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ADDENDA, ERRATA, AND TECHNICAL NOTES

APPLICATION FRAMEWORK™

VERSION 4.1

Addenda, Errata, and Technical Notes

Zinc® Application Framework™
Version 4.1
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Pleasant Grove, Utah

Table of Contents

UIW_IMAGE

UIW_IMAGE allows you to load a bitmapped image in native format from an image file, such as .tif or .pcx, or a resource file into your Zinc application. You can display these images in a window normally, tiled, or stretched—either in their own region of the window, or as nonfield regions occupying all available space within a window.

In environments that use resource files, such as DOS, Windows, OS/2, and Macintosh, load the image from the application's resource file, a native image file, or from the application's .DAT file. In environments that do not use resource files, such as OSF/Motif and NEXTSTEP, load an image from a native image file. Currently, UIW_IMAGE only loads native images; you cannot use a UIW_IMAGE object to load an image other than the image types specified in Table 1, "Supported bitmap image formats of UIW_IMAGE," on page 26, for specific operating environments. (In other words, don't ask an image object running under Windows to load an OSF/Motif bitmap.)

A UIW_IMAGE object cannot store its image data; it can only store its own data, such as flags, dimension, and other attributes. To store images, use another method, such as a native image manipulation program.

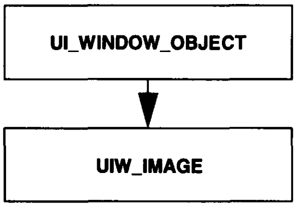
Because UIW_IMAGE derives from UI_WINDOW_OBJECT, an image object inherits the window object class's persistence mechanisms. This means that you can use the normal mechanisms for loading and storing image object descriptions in .DAT files.

NOTE:

The 4.1 release of Zinc Application Framework contains a new reference format. If you have any comments, please send email to documentation@zinc.com, or contact Zinc Software by phone, fax, or ground mail.

Class overview

Inheritance



Located in	UI_WIN.HPP
Implemented in	Z_IMAGE.CPP
Portability	All except Curses, DOS text

Public

Types and constants

```
const IMF_FLAGS IMF_NO_FLAGS          = 0x0000;
const IMF_FLAGS IMF_TILED             = 0x0001;
const IMF_FLAGS IMF_SCALED            = 0x0002;
const IMF_FLAGS IMF_BACKGROUND        = 0x0004;
const IMF_FLAGS IMF_STATIC_HANDLE     = 0x0008;
const IMF_FLAGS IMF_AUTO_SIZE         = 0x0010;
```

Member functions

```
UIW_IMAGE(int left, int top, int width, int height,
    ZIL_ICHAR *pathName,
    IMF_FLAGS imFlags = IMF_NO_FLAGS,
    WOF_FLAGS woFlags = WOF_NO_FLAGS);

virtual ~UIW_IMAGE(void);

virtual EVENT_TYPE DrawItem(const UI_EVENT &event,
    EVENT_TYPE ccode);

virtual EVENT_TYPE Event(const UI_EVENT &event);

int IsBackground(void) { return ((imFlags & IMF_BACKGROUND)
    ? TRUE : FALSE); }

int IsScaled(void) { return ((imFlags & IMF_SCALED)
    ? TRUE : FALSE); }

int IsTiled(void) { return ((imFlags & IMF_TILED) ? TRUE : FALSE); }

int HasStaticHandle(void) { return ((imFlags & IMF_STATIC_HANDLE)
    ? TRUE : FALSE); }

int IsAutoSize( void) { return ((imFlags & IMF_AUTO_SIZE)
    ? TRUE : FALSE);)

#if defined(ZIL_LOAD)

virtual ZIL_NEW_FUNCTION NewFunction(void) { return
    (UIW_IMAGE::New); }


static UI_WINDOW_OBJECT *New(const ZIL_ICHAR *name,
        ZIL_STORAGE_READ_ONLY *file =
            ZIL_NULLP(ZIL_STORAGE_READ_ONLY),
        ZIL_STORAGE_OBJECT_READ_ONLY *object =
            ZIL_NULLP(ZIL_STORAGE_OBJECT_READ_ONLY),
        UI_ITEM *_objectTable = ZIL_NULLP(UI_ITEM),
        UI_ITEM *_userTable = ZIL_NULLP(UI_ITEM))
        {
            return (new UIW_BUTTON(name, file, object,
            _objectTable, _userTable));
        }

UIW_IMAGE(const ZIL_ICHAR *name,
    ZIL_STORAGE_READ_ONLY *file,
    ZIL_STORAGE_OBJECT_READ_ONLY *object,
    UI_ITEM *objectTable = ZIL_NULLP(UI_ITEM),
    UI_ITEM *userTable = ZIL_NULLP(UI_ITEM));

virtual void Load(const ZIL_ICHAR *name,
    ZIL_STORAGE_READ_ONLY *file,
    ZIL_STORAGE_OBJECT_READ_ONLY *object,
    UI_ITEM *objectTable, UI_ITEM *userTable);

#endif
```

#if defined(ZIL_STORE)

virtual void Store(const ZIL_ICHAR *name, ZIL_STORAGE *file,
ZIL_STORAGE_OBJECT *object,
UI_ITEM *objectTable, UI_ITEM *userTable);

#endif

Member variables

static ZIL_ICHAR _className[];
IMF_FLAGS imFlags;

Protected

Member functions

int LoadImageFromApplication(void);

int LoadImageFromFile(void);

Member variables

ZIL_ICHAR *pathName;

ZIL_IMAGE_HANDLE image;

int imageWidth, imageHeight;

Class description

Public

Types and constants

IMF_NO_FLAGS

Causes a new or existing UIW_IMAGE object to exhibit default behavior, which is neither tiled nor scaled.

IMF_TILED

Instantiates a UIW_IMAGE object that, starting from the upper left-hand corner of the region, displays copies of itself to cover all of the region's available space. If the width and height of the object are such that multiple copies of the images cannot fit perfectly in the region, the tiled images will appear to display themselves beyond the right and bottom edges of the region area, leaving only portions of the image visible at the region's boundary.

IMF_SCALED

Instantiates a UIW_IMAGE object that occupies all available space in its region, whether or not the width and height of the region are bigger or smaller than the width and height of the image.

If the region width is smaller than the image width, the image will appear condensed horizontally; and if the region width is larger than the image width, the image will appear stretched out of proportion horizontally.

If the region height is smaller than the image height, the image will appear condensed vertically; and if the region height is larger than the image height, the image will appear stretched out of proportion vertically.

IMF_BACKGROUND

The UIW_IMAGE equivalent of a nonfield region. Instantiates a UIW_IMAGE object that occupies the size of its parent window as either tiled or scaled, depending on the flags passed in at construction time. Additionally, you can combine the IMF_ BACKGROUND flag with the IMF_TILED or IMF_SCALED flags for a tiled or scaled background image. Cannot be used with IMF_AUTO_SIZE.

IMF_STATIC_HANDLE

Maintains the file handle to a UIW_IMAGE object, even if the object is destroyed. Useful for sharing a single image between multiple programs. If you construct an image object and load in an image file that already exists in memory and is used by one or more other applications, the UIW_IMAGE object will set this file automatically.

IMF_AUTO_SIZE

Causes the parent window of a UIW_IMAGE object to size itself automatically to the size of the image object's region. Cannot be used with IMF_BACKGROUND.

Member functions

UIW_IMAGE(int left, int top, int width, int height,
ZIL_ICHAR *pathName,
IMF_FLAGS imFlags = IMF_NO_FLAGS,
WOF_FLAGS woFlags = WOF_NO_FLAGS);

Constructs a UIW_IMAGE object. Finds image data in the file called pathName. Default construction is to construct it in a window with the same proportions as the image. Pass in

- **IMF_TILED**
- **IMF_SCALED**,
- **IMF_BACKGROUND,** in conjunction with **IMF_TILED** or **IMF_ SCALED,** to create a tiled or scaled image in a window, or
- **IMF_AUTO_SIZE**.

To use the member functions LoadImageFromApplication( ) and LoadImage-FromFile( ), specify a pathname for the image on disk. Use this constructor except when creating your own persistent UIW_IMAGE object.

virtual ~UIW_IMAGE(void);

Destroys a UIW_IMAGE object and frees any memory used.

virtual EVENT_TYPE DrawItem(const UI_EVENT &event,
EVENT_TYPE ccode);

When this function is called, the UIW_IMAGE object virtualizes its screen region, displays itself, then devirtualizes its region. If the image has a border, it will draw itself with a border one pixel wide. Default construction is no border.

virtual EVENT_TYPE Event(const UI_EVENT &event);

Event( ) function of the UIW_IMAGE object. By default, the UIW_IMAGE object does not respond to any events.

```
int IsBackground(void) { return ((imFlags & IMF_BACKGROUND)
    ? TRUE : FALSE); }
```

Returns TRUE if the UIW_IMAGE was constructed as a background image. Returns FALSE otherwise.

```
int IsScaled(void) { return ((imFlags & IMF_SCALED)
    ? TRUE : FALSE); }
```

Returns TRUE if the UIW_IMAGE was constructed as a scaled image. Returns FALSE otherwise.

```
int IsTiled(void) { return ((imFlags & IMF_TILED) ? TRUE : FALSE); }
```

Returns TRUE if the UIW_IMAGE was constructed as a tiled image. Returns FALSE otherwise.

```
int HasStaticHandle(void) { return ((imFlags & IMF_STATIC_HANDLE)
    ? TRUE : FALSE); }
```

Returns TRUE if the UIW_IMAGE object was constructed with a static handle. Returns FALSE otherwise.

```
int AutoSizes( ) { return ((imFlags & IMF_AUTO_SIZE) ? TRUE : FALSE);)
```

Returns TRUE if the UIW_IMAGE was constructed to autosize. Returns FALSE otherwise.

```
#if defined(ZIL_LOAD)
    virtual ZIL_NEW_FUNCTION NewFunction(void)
    {
        return (UIW_IMAGE::New); }
```

Returns a new UIW_IMAGE object (ZIL_LOAD only).

```
static UI_WINDOW_OBJECT *New(const ZIL_ICHAR *name,
    ZIL_STORAGE_READ_ONLY *file =
        ZIL_NULLP(ZIL_STORAGE_READ_ONLY),
    ZIL_STORAGE_OBJECT_READ_ONLY *object =
        ZIL_NULLP(ZIL_STORAGE_OBJECT_READ_ONLY),
    UI_ITEM *_objectTable = ZIL_NULLP(UI_ITEM),
    UI_ITEM *_userTable = ZIL_NULLP(UI_ITEM))
    {
        return (new UIW_BUTTON(name, file, object,
        _objectTable, _userTable));
    }
```

Returns a new read-only, persistent UIW_IMAGE object using the following parameters (ZIL_LOAD only).

name	name of the window object stored in the .DAT file
file	pointer to ZIL_STORAGE_READ_ONLY
object	pointer to ZIL_STORAGE_OBJECT_READ_ONLY
objectTable	table of pointers to New( ) functions of persistent objects
userTable	table of pointers to user functions of persistent objects

UIW_IMAGE(const ZIL_ICHAR *name,
ZIL_STORAGE_READ_ONLY *file,
ZIL_STORAGE_OBJECT_READ_ONLY *object,
UI_ITEM *objectTable = ZIL_NULLP(UI_ITEM),
UI_ITEM *userTable = ZIL_NULLP(UI_ITEM));

Returns a new read-only, persistent UIW_IMAGE object using the following parameters (ZIL_LOAD only).

name	name of the window object stored in the .DAT file
file	pointer to ZIL_STORAGE_READ_ONLY
object	pointer to ZIL_STORAGE_OBJECT_READ_ONLY
objectTable	table of pointers to New( ) functions of persistent objects
userTable	table of pointers to user functions of persistent objects

virtual void Load(const ZIL_ICHAR *name,
ZIL_STORAGE_READ_ONLY *file,
ZIL_STORAGE_OBJECT_READ_ONLY *object,
UI_ITEM *objectTable, UI_ITEM *userTable);

Loads a read-only UIW_IMAGE from storage using the following parameters (ZIL_LOAD only).

name	name of the window object stored in the .DAT file
file	pointer to ZIL_STORAGE_READ_ONLY
object	pointer to ZIL_STORAGE_OBJECT_READ_ONLY
objectTable	table of pointers to New( ) functions of persistent objects
userTable	table of pointers to user functions of persistent objects

virtual void Store(const ZIL_ICHAR *name, ZIL_STORAGE *file,
ZIL_STORAGE_OBJECT *object, UI_ITEM *objectTable,
UI_ITEM *userTable);

Stores a UIW_IMAGE using the following parameters (ZIL_STORE only).

name	name of the window object stored in the .DAT file
file	pointer to ZIL_STORAGE_READ_ONLY
object	pointer to ZIL_STORAGE_OBJECT_READ_ONLY
objectTable	table of pointers to New( ) functions of persistent objects
userTable	table of pointers to user functions of persistent objects

Member variables

static ZIL_ICHAR _className[];

The class name of the current object.

IMF_FLAGS imFlags;

The attributes of the current object.

Protected

Member functions

int DestroyImageHandle(void);

Destroys an image and deallocates any memory it may have used.

int LoadImageFromApplication(void);

Loads the image in native format from a resource file in an application.

int LoadImageFromFile(void);

Loads the image in native format from a file stored on disk.

Member variables

ZIL_ICHAR *pathName;

Path name of the read-only image on disk.

ZIL_BITMAP_HANDLE image;

A handle to the image. Set by the operating environment.

int imageWidth, imageHeight;

Width and height of the current image in pixels.

Supported image formats

Using UIW_IMAGE, you can display the following bitmap formats under these operating environments:

TABLE 1. Supported bitmap image formats of UIW_IMAGE

Platform	*Image format*
DOS graphics	.PCX, .DCX
Windows	.BMP or resource file
OS/2	.BMP or resource file
Macintosh	PICT
Motif	XBM or .XPM
NEXTSTEP	.TIFF

ZIL_FILE

In release 4.1, Zinc moved the functionality of the Designer class IO_FILE to the new library class ZIL_FILE, a general-purpose class for reading and writing files, including but not limited to .DAT files. ZIL_FILE writes and reads files to and from disk under all operating environments and locales that Zinc supports.

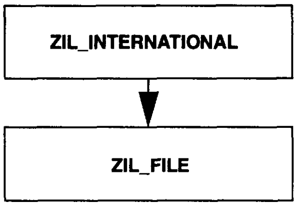
A ZIL_FILE object can write data in either text or binary format. Further, a ZIL_FILE object supports read-only or read-write attributes. It also reports any errors that occur when it saves or reads a file.

NOTE:

The 4.1 release of Zinc Application Framework contains a new reference format. If you have any comments, please send email to documentation@zinc.com, or contact Zinc Software by phone, fax, or ground mail.

Class overview

Inheritance



Located in	UI_GEN.HPP
Implemented in	Z_FILE.CPP
Portability	All

Public members

Types, constants, and enums

```
typedef UIF_FLAGS UIS_FLAGS;
const UIS_FLAGS UIS_READ                    = 0x0001;
const UIS_FLAGS UIS_READWRITE               = 0x0002;
const UIS_FLAGS UIS_CREATE                  = 0x0004;
const UIS_FLAGS UIS_OPENCREATE              = 0x0008;
const UIS_FLAGS UIS_TEMPORARY               = 0x0010;
const UIS_FLAGS UIS_COPY                    = 0x0020;
const UIS_FLAGS UIS_BINARY                  = 0x0100;
const UIS_FLAGS UIS_TEXT                    = 0x0200;
```

```
enum Z_ERROR
{
    ERROR_NONE    = 0,
    ERROR_NAME    = 1,
    ERROR_NULL_STRING= 2,
    ERROR_ACCESS = 3
};
```

```
enum SEEK
{
    SEEK_FROM_START= 0,
    SEEK_FROM_CURRENT= 1,
    SEEK_FROM_END = 2
};
```

Member functions

```
ZIL_FILE(const ZIL_ICHAR *pathName,
    UIS_FLAGS access = UIS_READ | UIS_BINARY);

virtual ~ZIL_FILE(void);

long Length(void) const;

long Tell(void) const;

ZIL_FILE::Z_ERROR GetError(void);
```

```
ZIL_FILE::Z_ERROR SetError(ZIL_FILE::Z_ERROR error);

virtual ZIL_FILE::Z_ERROR Open(void);

virtual ZIL_FILE::Z_ERROR Close(void);

Z_ERROR Unlink(void);

Z_ERROR Rename(const ZIL_ICHAR *pathName);

Z_ERROR Seek(long offset, SEEK location) const;

virtual int Read(ZIL_INT8 *value) const;

virtual int Read(ZIL_UINT8 *value) const;

virtual int Read(ZIL_INT16 *value) const;

virtual int Read(ZIL_UINT16 *value) const;

virtual int Read(ZIL_INT32 *value) const;

virtual int Read(ZIL_UINT32 *value) const;

virtual int Read(ZIL_ICHAR *text, int length) const;

virtual int Read(ZIL_ICHAR **text) const;

virtual int Read(void *buffer, int size, int length) const;

#if defined(ZIL_UNICODE)

virtual int Read(char *text, int length) const;

virtual int Read(char **text) const;

#endif


virtual int Write(ZIL_INT8 value) const;

virtual int Write(ZIL_UINT8 value) const;
```

virtual int Write(ZIL_INT16 value) const;

virtual int Write(ZIL_UINT16 value) const;

virtual int Write(ZIL_INT32 value) const;

virtual int Write(ZIL_UINT32 value) const;

virtual int Write(ZIL_ICHAR *text) const;

virtual int Write(void *buffer, int size, int length) const;

#if defined(ZIL_UNICODE)

virtual int Write(char *text) const;

#endif

Protected

Member variables

ZIL_FILE::Z_ERROR error;
ZIL_ICHAR *pathName;
int access;
int handle;
unsigned mode;

Class description

Public members

Types, constants, and enums

UIS_READ

Sets file access read-only.

UIS_READWRITE

Sets file access read-write.

UIS_CREATE

When passed into the ZIL_FILE constructor, allocates a new file object.

If you use this flag to create a file object with a path name that doesn't already exist on disk, ZIL_FILE creates the file you specified. If you create a file object with a path name already on disk, ZIL_FILE overwrites the file.

If it could not open or create the file you specified, ZIL_FILE sets its handle to -1 and returns ERROR_ACCESS as the error message.

UIS_OPENCREATE

When passed into the ZIL_FILE constructor, allocates a new file object and opens the file.

If you create a file object with a path name that doesn't already exist on disk, and if you pass in the UIS_CREATE flags, ZIL_FILE creates the file object you specified.

If ZIL_FILE could not open or create the file object you specified, it sets its handle to -1 and returns ERROR_ACCESS as the error message.

UIS_TEMPORARY

Allocates a temporary file that is deleted when the file object is destroyed.

UIS_COPY

Copies a file to another file.

UIS_BINARY

Sets read/write mode to binary.

UIS_TEXT

Sets read/write mode to binary.

ERROR_NONE

Indicates no error has occurred.

ERROR_NAME

Indicates you tried to read a file whose name wasn't found.

ERROR_NULL_STRING

Indicates you tried to open a file with a null filename.

ERROR_ACCESS

Indicates you tried to write to or read a file without proper permission.

SEEK_FROM_START

Seeks from the beginning of the file.

SEEK_FROM_CURRENT

Seeks from current location of the file pointer.

SEEK_FROM_END

Seeks from the end of the file.

Member functions

ZIL_FILE(const ZIL_ICHAR *pathName,
UIS_FLAGS access = UIS_READ | UIS_BINARY);

Creates a new file object specified by pathName with read and write attributes specified by access. By default, attempts to open a read-only binary file.

virtual ~ZIL_FILE(void);

Destroys the file object and deallocates any memory it used. Does not, however, delete the file object unless you created the object as temporary.

long Length(void) const;

Returns the length of a file.

long Tell(void) const;

Returns the current position of the file pointer in a file object.

virtual ZIL_FILE::Z_ERROR Open(void);

Opens the file associated with the ZIL_FILE object.

```
ZIL_FILE *myFile;
...
myFile->Open( );
```

virtual ZIL_FILE::Z_ERROR Close(void);

Closes the file associated with the ZIL_FILE object..

```
ZIL_FILE *myFile;
...
myFile->Close( );
```

Z_ERROR Unlink(void);

Deletes the file associated with the ZIL_FILE object..

```
ZIL_FILE *myFile;
...
myFile->Unlink( );
```

Z_ERROR Rename(const ZIL_ICHAR *pathName);

Renames a file to a new file specified by pathName.

```
ZIL_FILE *myFile;
...
myFile->Rename(ZIL_ICHAR newPathname="newfile");
```

Z_ERROR Seek(long offset, SEEK location) const;

Sets the position of the file pointer in a file object to a location that is offset bytes from a starting location in the file. Location can be either

—SEEK_FROM_CURRENT (the current location)

—SEEK_FROM_START (the beginning of the file)

—SEEK_FROM_END (the end of the file)

```
ZIL_FILE *myFile;
...
myFile->Seek(128232, SEEK_FROM_CURRENT);
```

virtual int Read(ZIL_INT8 *value) const;

Reads the data at the current file pointer into a ZIL_INT8 variable.

```
ZIL_FILE *myFile;
int position;
...
position = myFile->Seek(128232, SEEK_FROM_CURRENT);
```

virtual int Read(ZIL_UINT8 *value) const;

Reads the data at the current file pointer into a ZIL_UINT8 variable.

virtual int Read(ZIL_INT16 *value) const;

Reads the data at the current file pointer into a ZIL_INT16 variable.

virtual int Read(ZIL_UINT16 *value) const;

Reads the data at the current file pointer into a ZIL_UINT16 variable.

virtual int Read(ZIL_INT32 *value) const;

Reads the data at the current file pointer into a ZIL_INT32 variable.

virtual int Read(ZIL_UINT32 *value) const;

Reads the data at the current file pointer into a ZIL_UINT32 variable.

virtual int Read(ZIL_ICHAR *text, int length) const;

Reads the data at the current file pointer into a string of a maximum length.

virtual int Read(ZIL_ICHAR **text) const;

Reads the data at the current file pointer into a n array of strings.

virtual int Read(void *buffer, int size, int length) const;

Reads the data at the current file pointer into a buffer of any type, up to a maximum length. Size is the size in bytes of the type specifier of the buffer. Default Read( ) function.

virtual int Read(char *text, int length) const;

Reads the data at the current file pointer into a string of a specific length (Unicode only).

virtual int Read(char **text) const;

Reads all strings in the file inside a file (Unicode only).

virtual int Write(ZIL_INT8 value) const;

Writes a ZIL_INT8 value in a file.

```
ZIL_FILE *myFile;

ZIL_INT8 number=127;
...
myFile->Write(number);
```

virtual int Write(ZIL_UINT8 value) const;

Writes a ZIL_UINT8 value into a file.

virtual int Write(ZIL_INT16 value) const;

Writes a ZIL_INT16 value into a file.

virtual int Write(ZIL_UINT16 value) const;

Writes a ZIL_UINT16 value into a file.

virtual int Write(ZIL_INT32 value) const;

Writes a ZIL_INT32 value into a file.

virtual int Write(ZIL_UINT32 value) const;

Writes a ZIL_UINT32 value into a file.

virtual int Write(ZIL_ICHAR *text) const;

Writes a single- or double-byte string into a file.

virtual int Write(void *buffer, int size, int length) const;

Default Write( ) function. Writes the contents of an untyped buffer of a specific word size, up to a maximum length, into a ZIL_FILE object.

virtual int Write(char *text) const;

Writes a string of single-bytes into a file (Unicode only).

Protected

Member variables

ZIL_FILE::Z_ERROR error;

Error condition reported when reading or storing a file.

ZIL_ICHAR *pathName;

Pathname of the file.

int access;

The access attributes of the file—whether it is read-only or read-write.

int handle;

Handle to the file in a ZIL_FILE object. Assigned by the operating environment.

unsigned mode;

In operating environments with the POSIX API, mode represents the mode of the file. Default POSIX mode is 0664 (-rw-rw-r--). Non-POSIX operating environments set the mode to the access attributes of the file when it was created.

Addenda

This document contains additions and changes to the documentation shipped with Zinc 4.0 and 4.1.

Changes to General notebook page of Combo box

Since the documentation was printed, Zinc added some new features to the General page of the combo box notebook.

Zinc added a new field called List ID. This field provides access, not just to the presentation space of the list object, but to the pop-up list as well. List ID provides the ID number of the list. You can specify a new value, or you can view it to determine what list ID the Designer assigned to the list.

Changes to General notebook page of Pop-up item

Since the documentation was printed, Zinc added two new fields to the General page of the pop-up menu notebook.

- Menu name

  Contains the name of the list of pop-up menu items associated with a parent items. Assigned automatically by Zinc Designer when a pop-up menu item has a list of child items attached. You can specify a new name for the menu list, or use the one assigned by Zinc Designer. (You will probably be able to identify it easier in the object directory or in the .HPP file if you specify a new name for it.)

- Menu ID

  Represents the numberID of the pop-up item. Assigned automatically by Zinc Designer. You can specify a new value, or you can view it to determine what menu ID the Designer assigned to the menu.

Changes to the Geometry page of Zinc Designer

In release 4.1, Zinc updated the Geometry page of the information notebook. The new page style provides new ways to work with geometry management for all objects in the Designer.

In Zinc, an object can have three types of constraints:

- none
- absolute, and
- relative.

Further, the constraints work for the following sides:

- top
- bottom
- left, and
- right

In release 4.0, Zinc Designer visually represented constraints for each side of an object using four combo boxes connected to the top, bottom, left, and right of the object. In turn, each combo box contained a type of constraint, which was either no constraint or a relative or absolute constraint. To specify an object's constraint, you selected a constraint type from each combo box connected to the object's bitmap.

In release 4.1, Zinc simplified choosing constraints for each side of an object by replacing the visual representation of an object's constraints. To specify an object's constraint,

- select the side of the object from the list of sides in the combo box.
- Then select a type of constraint for that side by clicking the appropriate button.

Zinc replaced the visual representation of an object's constraints with a group called CONSTRAINT, which contains a combo box with the sides of an object, the three constraint types, and another combo box that lists potential anchors for sides of your object.

Combo box

The topmost combo box contains the four sides of the object in its list:

- LEFT
- TOP
- BOTTOM
- RIGHT

Each one of these sides can have its own type of constraint, and, depending on the constraint, its own anchor.

Constraints

In addition to a combo box, the CONSTRAINT group also has three buttons that represent the type of constraints you can assign to a particular side of the object. These constraints are:

- no constraint
- absolute

  When using an absolute constraint, you can anchor the object to its parent or to one of its siblings with no restrictions.

  When specifying an offset for an object that uses an absolute constraint, specify the offset in units of the current measurement system. You can determine the measurement system by turning to the Position page.
- relative

  When using a relative constraint, you cannot specify an anchor for that side. When Zinc Designer detects a relative constraint, Zinc Designer automatically anchors it to the object's parent.

  When determining an offset for an object that uses a relative constraint, specify the offset as proportion or percentage of distance from its parent.

Anchor

In addition to a combo box with the object's sides, and as well as three constraint buttons, the CONSTRAINT group also contains a combo box with a list of sibling and parent objects to which you can anchor the object. As mentioned above, when using a relative constraint, you cannot specify an anchor for that side. When Zinc Designer detects a relative constraint, Zinc Designer automatically anchors it to the object's parent.

New ability to access lists associated with objects

Zinc objects with attached lists, such as combo boxes or pop-up menu item options, have two components:

- the presentation space

  The visual representation of the object. Contains all object components, including the list

- the list.

  Contains the items or options of the object. Contained in the presentation space, but can be accessed separately from the presentation space using the list or menu ID or name specified in the General page.

New help system

In addition to improved help screens, Zinc 4.1's new help display system enables access to all help contents. To use it, press the Index button on a help context screen. It will bring up a new window that contains a vertical list with all help screens available in the application.

Zinc provides this new feature automatically. You don't have to do anything special to your Zinc 4.1 applications to enable this feature.

New inline functions for checking flags

Release 4.1 includes some new inline functions that will improve your ability to check the state or attributes of an object. These functions are written in plain English style to improve readability of your code.

With 4.0 and earlier releases, to check if an object's flag member was set with a certain flag, you used the FlagSet( ) or FlagsSet( ) macro. With release 4.1, you can use the same methods—or you can use the new inline functions instead. However, using the new functions will help improve code readability.

Using a new function to check the state or attributes of an object returns TRUE if the object has that state or attribute, and returns FALSE otherwise. Here are some examples of how you can use the new functions instead of the older FlagSet( ) and FlagsSet( ) macros.

Using new functions instead of FlagSet( )

Using FlagSet( ), you might have written code that looked like this:

```
UIW_TIME *myTime;
...
if (FlagSet(myTime->tmFlag, TMF_SYSTEM))
  // do something
```

In release 4.1, you can use the new functions to carry out the same check.

```
UIW_TIME *myTime;
...
if (myTime->DefaultsToSystem( ))
  // do something
```

Using multiple functions instead of FlagsSet( )

Using FlagsSet( ), you might have written code that looked like this:

```
UIW_TIME *myTime;
...
if (FlagsSet(myTime->tmFlag, TMF_SYSTEM | TMF_ZERO_FILL))
  // do something
```

In release 4.1, you can use multiple functions to carry out the same check.

```
UIW_TIME *myTime;
...
if (myTime->DefaultsToSystem( ) && myTime->HasZeroFill( ))
  // do something
```

Notice in the examples that

- the code that uses the new flag-checking functions is more readable; and
- it's easier to remember how to accomplish a check.

The following is a list of new functions and the flags they're designed to affect.

TABLE 2. **Flag-checking functions**

Function name	Affected flag
Attachments	ATCF_FLAGS
IsLeftAttachment( )	ATCF_LEFT
IsTopAttachment( )	ATCF_TOP
IsRightAttachment( )	ATCF_RIGHT
IsBottomAttachment( )	ATCF_BOTTOM
AppliesToOppositeSide( )	ATCF_OPPOSITE
StretchesObject( )	ATCF_STRETCH
Buttons	BTF_FLAGS
AllowsToggling( )	BTF_NO_TOGGLE
SelectsOnDownClick( )	BTF_DOWN_CLICK
SelectsOnDoubleClick( )	BTF_DOUBLE_CLICK
AutoRepeatsSelection( )	BTF_REPEAT
AutoSizes( )	BTF_AUTO_SIZE
Is3D( )	BTF_NO_3D
IsCheckBox( )	BTF_CHECK_BOX
IsRadioButton( )	BTF_RADIO_BUTTON
SendsMessageWhenSelected( )	BTF_SEND_MESSAGE
HasStaticArray( )	BTF_STATIC_BITMAPARRAY
IsDefaultButton( )	BTF_DEFAULT_BUTTON
Button status	BTS_FLAGS
IsDepressed( )	BTS_DEPRESSED
IsCurrentDefault( )	BTS_DEFAULT
Dimension constraints	DNCF_FLAGS
IsHeightConstraint( )	DNCF_HEIGHT
IsWidthConstraint( )	DNCF_WIDTH

TABLE 2. Flag-checking functions

Function name	Affected flag
Dates	DTF_FLAGS
IsUS( )	DTF_US_FORMAT
IsEuropean( )	DTF_EUROPEAN_FORMAT
IsAsian( )	DTF_ASIAN_FORMAT
IsMilitary( )	DTF_MILITARY_FORMAT
HasDashSeparator( )	DTF_DASH
HasSlashSeparator( )	DTF_SLASH
HasAlphaMonth( )	DTF_ALPHA_MONTH
UsesDayOfWeekFormat( )	DTF_DAY_OF_WEEK
IsUpperCase( )	DTF_UPPER_CASE
UsesShortYear( )	DTF_SHORT_YEAR
UsesShortMonth( )	DTF_SHORT_MONTH
UsesShortDay( )	DTF_SHORT_DAY
HasZeroFill( )	DTF_ZERO_FILL
DefaultsToSystem( )	DTF_SYSTEM
Icons	ICF_FLAGS
SelectsOnDoubleClick( )	ICF_DOUBLE_CLICK
IsMinimizeIcon( )	ICF_MINIMIZE_OBJECT
HasStaticArray( )	ICF_STATIC_ICONARRAY
Images	IMF_FLAGS
HasStaticHandle( )	IMF_STATIC_HANDLE
IsAutoSize( )	IMF_AUTOSIZE
IsScaled( )	IMF_SCALED
IsTiled( )	IMF_TILED
IsBackground( )	IMF_BACKGROUND

TABLE 2. Flag-checking functions

Function name	Affected flag
Menu items	MNIF_FLAGS
IsSeparator( )	MNIF_SEPARATOR
IsMaximizeOption( )	MNIF_MAXIMIZE
IsMinimizeOption( )	MNIF_MINIMIZE
IsMoveOption( )	MNIF_MOVE
IsSizeOption( )	MNIF_SIZE
IsSwitchOption( )	MNIF_SWITCH
IsRestoreOption( )	MNIF_RESTORE
IsCloseOption( )	MNIF_CLOSE
AllowsCheckMark( )	MNIF_CHECK_MARK
SendsMessageWhenSelected( )	MNIF_SEND_MESSAGE
IsSelectable( )	MNIF_NON_SELECTABLE
IsAboutOption( )	MNIF_ABOUT
Numbers	NMF_FLAGS
HasCurrencySymbol( )	NMF_CURRENCY
HasCreditSymbol( )	NMF_CREDIT
IsCommaDelimited( )	NMF_COMMAS
HasPercentageSymbol( )	NMF_PERCENT
UsesScientificFormat ( )	NMF_SCIENTIFIC
HasDecimalPoint( )	NMF_DECIMAL
Relative constraints	RLCF_FLAGS
IsLeftConstraint( )	RLCF_LEFT
IsTopConstraint( )	RLCF_TOP
IsRightConstraint( )	RLCF_RIGHT
IsBottomConstraint( )	RLCF_BOTTOM
AppliesToOppositeSide( )	RLCF_OPPOSITE
StretchesObject( )	RLCF_STRETCH
CentersObjectHorizontally( )	RLCF_HORIZONTAL_CENTER
CentersObjectVertically( )	RLCF_VERTICAL_CENTER

TABLE 2. Flag-checking functions

Function name	Affected flag
Strings	STF_FLAGS
HasVariableName( )	STF_VARIABLE_NAME
IsLowerCase( )	STF_LOWER_CASE
IsUpperCase( )	STF_UPPER_CASE
IsPasswordStyle( )	STF_PASSWORD
IsSubstringOfText( )	STF_SUBSTRING
System buttons	SYF_FLAGS
IsGeneric( )	SYF_GENERIC
Time	TMF_FLAGS
HasSeconds( )	TMF_SECONDS
HasHundredths( )	TMF_HUNDREDTHS
HasHours( )	TMF_NO_HOURS
HasMinutes( )	TMF_NO_MINUTES
Is12Hour( )	TMF_TWELVE_HOUR
Is24Hour( )	TMF_TWENTY_FOUR_HOUR
HasZeroFill( )	TMF_ZERO_FILL
HasColonSeparator( )	TMF_COLON_SEPARATOR
HasNullSeparator( )	TMF_NO_SEPARATOR
IsUpperCase( )	TMF_UPPER_CASE
IsLowerCase( )	TMF_LOWER_CASE
DefaultsToSystem( )	TMF_SYSTEM
Storage	UIS_FLAGS
IsReadOnly( )	UIS_READ
IsCreateMode( )	UIS_CREATE
IsReadWrite( )	UIS_READWRITE
IsCopyMode( )	UIS_COPY
IsOpenCreateMode( )	UIS_OPENCREATE
IsTemporary( )	UIS_TEMPORARY
IsText ( )	UIS_TEXT
IsBinary( )	UIS_BINARY

TABLE 2. Flag-checking functions

Function name	Affected flag
Lists	WNF_FLAGS
AllowsMultipleSelection( )	WNF_SELECT_MULTIPLE
AutoSortsData( )	WNF_AUTO_SORT
AllowsDragSelection( )	WNF_CONTINUE_SELECT
SelectsOnDownClick( )	WNF_AUTO_SELECT
HasWrappedData( )	WNF_NO_WRAP
HasOwnerDrawChildren( )	WNF_OWNERDRAW_CHILDREN
IsScrollable( )	WNF_NO_SCROLL
Window object actions	WOAF_FLAGS
UsesOutsideRegion( )	WOAF_OUTSIDE_REGION
IsNoncurrent( )	WOAF_NON_CURRENT
IsTemporary( )	WOAF_TEMPORARY
IsDestroyable( )	WOAF_NO_DESTROY
UsesNormalHotKeys( )	WOAF_NORMAL_HOT_KEYS
IsSizable( )	WOAF_NO_SIZE
IsMovable( )	WOAF_NO_MOVE
IsModal( )	WOAF_MODAL
IsLocked( )	WOAF_LOCKED
IsCopyDraggable( )	WOAF_COPY_DRAG_OBJECT
AcceptsDrop( )	WOAF_ACCEPTS_DROP
IsMoveDraggable( )	WOAF_MOVE_DRAG_OBJECT
IsMDI( )	WOAF_MDI_OBJECT
IsDialog( )	WOAF_DIALOG_OBJECT
Window objects	WOF_FLAGS
IsLeftJustified( )	WOF_JUSTIFY_CENTER | WOF_JUSTIFY_RIGHT
IsCenterJustified( )	WOF_JUSTIFY_CENTER
IsRightJustified( )	WOF_JUSTIFY_RIGHT
IsBordered( )	WOF_BORDER
UsesUserData( )	WOF_NO_ALLOCATE_DATA
IsViewOnly( )	WOF_VIEW_ONLY
IsSupport( )	WOF_SUPPORT_OBJECT
IsDefaultUnanswered( )	WOF_UNANSWERED
IsDefaultInvalid( )	WOF_INVALID

TABLE 2. Flag-checking functions

Function name	Affected flag
UsesAvailableRegion( )	WOF_NON_FIELD_REGION
IsSelectable( )	WOF_NON_SELECTABLE
IsAutoclear( )	WOF_AUTO_CLEAR
UsesDefaultCellCoordinate( )	WOF_MINICELL | WOF_PIXEL
UsesDefaultMinicellCoordinate( )	WOF_MINICELL
UsesDefaultPixelCoordinate( )	WOF_PIXEL
Window object status	WOS_FLAGS
HasConvertedCoordinates( )	WOS_GRAPHICS
IsCurrent( )	WOS_CURRENT
HasChanged( )	WOS_CHANGED
IsSelected( )	WOS_SELECTED
IsUnanswered( )	WOS_UNANSWERED
IsInvalid( )	WOS_INVALID
IsMaximized( )	WOS_MAXIMIZED
IsMinimized( )	WOS_MINIMIZED
IsUpToDate( )	WOS_REDISPLAY
HasReadError( )	WOS_READ_ERROR
IsOwnerDraw( )	WOS_OWNERDRAW

New mouse message

In 4.1, Zinc added a new mouse message entitled DM_DRAG, which has a value of -1214. This new message changes the mouse cursor to a drag image. Though your applications that use drag and drop already behave this way, you can now trap for this flag explicitly.

New open and print document events

Many graphical user interfaces enable the user to open and print documents by double-clicking and dragging their icons. To enable you to write Zinc applications that offer this ability, Zinc added two events:

• S_OPEN_DOCUMENT

Generated when the user double-clicks on one or multiple document icons, or when the user drags and drops a document onto an application icon. The system launches the application or makes it current if it's already running, then sends S_OPEN_DOCUMENT to the application. S_OPEN_DOCUMENT contains a pointer to a ZIL_ICHAR, which indicates the pathname of the document to be opened.

The system also generates S_OPEN_DOCUMENT when the user

—double-clicks the application icon

—launches the application without specifying a document name to open. For example, under Macintosh, the user may select the application icon from the Finder and chooses File | Open from the menu bar.

• S_PRINT_DOCUMENT

Generated when the user drags one or multiple document icons onto the printer icon. The system launches the application or makes it current, then sends S_PRINT_DOCUMENT to the application. S_-PRINT_DOCUMENT contains a pointer to a ZIL_ICHAR, which indicates the pathname of the document to be printed.

Implementing opening and printing functionality

Remember, Zinc provides the potential for your applications to open and print documents—it does not provide the implementation. In order to enable your applications to open and print files, you must implement those features yourself. However, by implementing these features, your Zinc application will act like any other native application.

Implementing these features will enable the user to open a document by double-clicking on a document icon, even if the Zinc application associated with the document is inactive or is not currently running. Further, it will enable the user to print a document associated with a Zinc application by dragging the document icon to a printer icon without first launching the application.

Since Zinc is a multiplatform-enabled development environment, implementing these features will allow opening and printing a document to work in any graphical user interface that Zinc supports.

Restrictions on drag-and-drop under Macintosh

Under the Macintosh operating system, you can open a document by dragging and dropping it on the application icon only if the document's type is in the application's database of valid documents.

If you drag and drop a document on an application icon and the application can open the document type, the application icon will become highlighted. But if you try this with a document type not supported by the application, the application icon will not change.

Environment-specific mapping

Zinc objects can map system events to Zinc events. However, at present, the only environment in which Zinc maps system events to Zinc events is Macintosh, where Zinc maps Apple events into the corresponding S_OPEN_DOCUMENT and S_PRINT_DOCUMENT events. Zinc will provide additional mappings for other environments in future releases.

Using these events programmatically

This code snippet demonstrates a control structure for using S_OPEN_DOCUMENT and S_PRINT_DOCUMENT in a derived Window Manager class.

Program 1. Using the open and print document flags

```
EVENT_TYPE DERIVED_WINDOW_MANAGER::Event(const &event)
{
 if (event.type == S_OPEN_DOCUMENT)
 {
   if (event.text)
   {
     // Open the document specified by event.text
     *this + UIW_WINDOW::Generic(0, 2, 20, 6, event.text);
     delete event.text;
   }
   else
   {
     // Open a new document
     *this + UIW_WINDOW::Generic(0, 2, 20, 6, "Untitled");
   }
   return (event.type);
 }
 else if (event.type == S_PRINT_DOCUMENT)
 {
   // Print the document specified by event.text
   // Printing code goes here
   delete event.text;
   return (event.type);
 }
 else
   return (UI_WINDOW_MANAGER::Event(event));
}
```

Using S_OPEN_DOCUMENT

To use S_OPEN_DOCUMENT, employ the following approach.

1. Derive a class from a button or menu item that posts S_OPEN_-DOCUMENT to the event queue.
2. Derive a class that contains a mechanism for opening a document from within your application when it receives S_OPEN_DOCU-MENT. Zinc recommends you derive this class from UI_-WINDOW_MANAGER; this will allow your application to run without modification under all platforms that Zinc supports.
3. Trap for S_OPEN_DOCUMENT in the derived object's Event( ) function. When Event( ) receives S_OPEN_DOCUMENT, it can use UI_PRINTER to print the document to the system printer.

4. After the event is processed, and if event.text has a value other than null, delete event.text to deallocate the memory the pathname used. (If it has a null value, the pathname took up no memory and need not be deleted.)

Using S_PRINT_DOCUMENT

To use S_PRINT_DOCUMENT, employ the following approach.

1. Derive a class from a button or menu item that posts S_PRINT_DOCUMENT to the event queue.
2. Derive a class that contains a mechanism for printing within your application. In this example, Zinc derives this class from UI_WINDOW_MANAGER to keep the opening and printing mechanism in the same class.
3. Trap for S_PRINT_DOCUMENT in the derived object's Event( ) function. When Event( ) receives S_PRINT_DOCUMENT, it can use UI_PRINTER to print the document to the system printer.

   Zinc recommends that your mechanism for printing within your application print the document without opening it. This way, you can generalize the printing behavior of your application for all circumstances. For example, if your application prints the document without opening it, you can use the same mechanism for both when the user has an active document and when he doesn't. If your mechanism opened the document to print it, the user could find herself in the unexpected position of having *two* open copies of her document for the duration of the print job.
4. As with S_OPEN_DOCUMENT, delete event.text to deallocate the memory the pathname used.

New support for 3D controls in Zinc 4.1

Starting with Zinc 4.1, control objects can use the popular 3D look and feel. This feature is available only with Zinc applications running under Windows.

To use 3D controls in Zinc 4.1, do the following:

1. In UI_ENV.HPP, uncomment

```
#define ZIL_WINDOW_CTL3D
```

2. Rebuild the library.
3. In your program's makefile, add CTL3DV2 to the WIN_LIBS variable.
4. Make sure the include and lib path includes a path to the CTL3D.H header file and the control library. Also make sure CTL3D.DLL is in your path.

Functions moved from Designer to the library

Zinc moved the following functions from the Designer to the library in order to enable all Zinc programs to use their functionality.

- NormalizePosition( )

```
static void NormalizePosition(
  UI_WINDOW_OBJECT *object,  // object with position to use
    const UI_EVENT &event,   // event.position to convert
    UI_POSITION &position    // converted position
```

Compares a coordinate's event.position to an object's true region. Does this by converting event.position to a normalized coordinate. This enables comparison with an object's true region (object->true).

- NormalizeString( )

```
static void NormalizeString(
  ZIL_ICHAR *destination,  // destination string
  const char *source       // source string
```

Converts an eight-bit string to a 16-bit string, even if the 8-bit string is in Unicode.

- TrueToRelative( )

```
static void TrueToRelative(
  UI_WINDOW_OBJECT *object,// Object with coord to compare
  const UI_POSITION &true, // Coord to position
  UI_POSITION &relative    // Converted position
```

Compares an object's relative coordinate with its relative region. Does this by converting event's true coordinate to a relative coordinate. Eliminates complications caused by nonfield-region objects and object contexts.

System events

All system events available to the user

The documentation does not clarify that all native system events are available to the Zinc programmer.

Some logical events generic to all platforms

The documentation does not clarify which logical events are generic to all platforms. The following is a list of logical events you can use on all platforms:

TABLE 3. Logical events generic to all platforms

Logical events	
L_MDICHILD_EVENT	(ADD 500)
L_LOGICAL_EVENT	100
L_EXIT	1000
L_SELECT	1002
L_BEGIN_SELECT	1003
L_CONTINUE_SELECT	1004
L_END_SELECT	1005
L_HELP	1009
L_CANCEL	1010
L_EXIT_FUNCTION	1011
L_DOUBLE_CLICK	1012
L_MOVE	1013
L_SIZE	1014
L_PREVIOUS	1054
L_NEXT	1055
L_BEGIN_MARK	1101
L_CONTINUE_MARK	1102
L_END_MARK	1103
L_BEGIN_MOVE_DRAG	1150
L_CONTINUE_MOVE_DRAG	1151
L_END_MOVE_DRAG	1152
L_BEGIN_COPY_DRAG	1153

TABLE 3. **Logical events generic to all platforms**

Logical events	
L_CONTINUE_COPY_DRAG	1154
L_END_COPY_DRAG	1155
L_LOGICAL_LAST	9999

PowerPak 32 and crashing applications

If you build applications with the Borland PowerPak 32 DOS extender and without UI_APPLICATION::Main( ), your applications could crash unexpectedly. When using PowerPak 32, your program can attempt to allocate memory for the stack while servicing a 16-bit real-mode interrupt, such as when the user moves the mouse. Due to a Borland bug, this will sometimes cause the application to crash.

To work around the problem, your program should allocate stack space while in 32-bit mode. For an example of how to do this, see the CommitStack( ) function in the Zinc source file Z_APP.CPP.

Zinc ships a patch for this problem on your distribution disks. You can find it in Zinc\Powerpak.

Errata

This document contains the errata to the documentation of Zinc Application Framework 4.1. Information in this document supersedes any information contained in manuals printed prior to release 4.1.

To use this document, scan the Table of Contents for the section in the documentation about which you have a question, then open the appropriate page. Or you can use the index to search for occurrences of a specific topic.

Programmer's Reference Volume One—Support Objects

Introduction

UIW_STRING inheritance

Although the class hierarchy indicates that UIW_STRING inherits from multiple parents, it is actually a normally derived object.

Chapter 1—UI_APPLICATION

argc and argv

Contrary to the documentation of the constructor, argc and argv are available in Windows. In all environments, argc is always >=1,and argv[0] contains the program name.

Chapter 7—UI_DISPLAY

UI_DISPLAY::Text( )

The description for left and top of UI_DISPLAY::Text( ) incorrectly states that they are relative to the region identified by the screenID passed in. Actually, left and top are relative to the coordinate system that is in turn relative to the true region passed into the function. (You can identify the true region by its screenID.)

Calling VirtualGet( ) and VirtualPut( )

You must call VirtualGet( ) and VirtualPut( ) before calling any of the display primitives.

Chapter 12—UI_EVENT_MANAGER

DeviceState( )

The manual erroneously stated in the description for DeviceState( ) that if the deviceType parameter is E_DEVICE, then each device's state will be set to deviceState. The manual should have stated that setting the parameter to E_DEVICE will affect only devices that exactly match the deviceType.

Chapter 14—UI_GEOMETRY_MANAGER

Pixel and minicell

You can specify the geometry-management constraints using minicell or pixel coordinates.

- WOF_MINICELL

  Sets minicell coordinates.
- WOS_GRAPHICS

  Sets pixel coordinates.

Chapter 17—UI_HELP_SYSTEM

Incorrect class name

The UI_HELP_SYSTEM::SetLanguage section is incorrectly entitled UIW_HELP_SYSTEM:: SetLanguage. (This error also occurs in the Table of Contents.)

Chapter 20—UI_LIST

Undocumented behavior of Add( )

The documentation didn't explain all the functionality of the UI_LIST:: Add( ) function.

Before adding an item to a list, UI_LIST::Add( ) and UI_LIST::operator + check to confirm that the element is not already in the list. If it is present, that item then becomes current.

When you add an element to a list, Add( ) makes that element current, whether or not it was previously a member of the list. In other words, if you have a list that contains the elements A, B, C, and you add element D to the list, element D will become current. And if you readd element A to the list, element A will become current.

Chapter 22—UI_MACINTOSH_DISPLAY

maxColors

The member maxColors is actually an unsigned long instead of an int.

MapRGBColor( )

The manual erroneously described the MapRGBColor( ) function as a static function. It should have described it as a virtual function.

patternTable and rgbColorMap

UI_MACINTOSH_DISPLAY no longer has the patternTable or rgbColor-Map member variables.

PTN_RGB_COLOR

UI_MACINTOSH_DISPLAY now uses the PTN_RGB_COLOR identi-fier.

FontRec **fRec

All references to FontRec **fRec should now read FontInfo fInfo. fInfo is a Macintosh Toolbox structure that contains information about the font.

PTN_INTERLEAVE_FILL

PTN_INTERLEAVE_FILL is now used on the Macintosh. Zinc uses the QuickDraw 50% gray pen-pattern for this entry.

Chapter 32—UI_PRINTER

Dot-matrix printer support

In 4.1, a Zinc application running under DOS graphics or text mode is now able to print to an Epson-compatible nine- and 24-pin dot-matrix printer. This functionality is not available under other environments.

UI_PRINTER contains one member function specific to printing using a dot-matrix printer. It is

```
UI_PRINTER::PrintDotMatrixString(char *string)
```

Using this function prints the string passed in as a parameter.

One limitation of the UI_PRINTER class is that you cannot print graphics to a dot-matrix printer. Zinc is considering implementing this feature in a future release.

Using UI_PRINTER

To print documents with UI_PRINTER, use the following UI_PRINTER member functions:

- Begin all print jobs with UI_PRINTER::BeginPrintJob( ).
- End all print jobs with UI_PRINTER::EndPrintJob( ).
- Begin printing a page with UI_PRINTER::BeginPage( ).
- End printing a page with UI_PRINTER::EndPage( ).
- Place your drawing routines after BeginPage( ) and before EndPage( ).
- Print all pages after BeginPrintJob( ) and before EndPrintJob( ).
- UI_PRINTER::ScreenDump( ) calls BeginPrintJob, EndPrintJob, BeginPage, and EndPage. ScreenDump( ) is the only exception to the above rules.
- In DOS, you must create an environment variable ZINC_PRINTER and set the lpt identifier to a string that identifies the type of default printing and the printer port. If an environment variable doesn't exist, the class will write printer output to a PostScript file.

Types of default printing:

- PS
- PCL
- DM9
- DM24

Types of lpt values:

- LPT1
- LPT2
- LPT3

Examples:

```
SET ZINC_PRINTER=PS,LPT1
```

Sets defaults to PostScript output, port 1.

```
SET ZINC_PRINTER=PCL,LPT2
```

Sets defaults to PCL output, port 2.

```
SET ZINC_PRINTER=DM9,LPT3
```

Sets defaults to nine-pin dot matrix, port 3.

```
SET ZINC_PRINTER=DM24,LPT1
```

Sets defaults to 24-pin dot matrix, port 1.

When printing output to a PostScript file, the ZINC_PRINTER environment variable is ignored.

New BeginPage( ) function

After the documentation was printed, Zinc added a BeginPage( ) function:

```
virtual void BeginPage(int left, int top, int right, int bot-
   tom, int orientation = 0, int resolution = 0);
```

Use BeginPage( ) to print within a certain region and to print a document in landscape mode. Use PRM_LANDSCAPE for the orientation parameter to print landscape.

New TextFormat( ) function

After the documentation was printed, Zinc added a new member function TextFormat( ). This member function formats text to fit on the page and inserts new lines and page breaks where necessary.

```
virtual void TextFormat(ZIL_SCREENID screenID, int x, int y,
   ZIL_ICHAR *text, const UI_PALETTE *palette, int width = -1,
   ZIL_LOGICAL_FONT font = FNT_DIALOG_FONT);
```

For an example of how to use this function, read the source code to the PRINTR example.

CHAPTER 38—UI_RELATIVE_CONSTRAINT

Centering flags

The documentation incorrectly described the RLCF_HORIZONTAL_ CENTER and RLCF_VERTICAL_CENTER flags, which center an object accurately in a window. It should have explained that flags cause the object's relative position to be calculated from the horizontal center and the vertical center of the object, instead of the left, right, top, or bottom of the object.

CHAPTER 42—UI_WINDOW_MANAGER

exitFunction

The documentation incorrectly defined the member variable exitfunction. The actual definition is:

```
EVENT_TYPE FunctionName(UI_DISPLAY *display, UI_EVENT_MANAGER
   *eventManager, UI_WINDOW_MANAGER *windowManager);
```

Chapter 43—UI_WINDOW_OBJECT

New member function and flag

After the documentation was printed, Zinc added the following member function and flag to UI_WINDOW_OBJECT.

• DrawFocus( )

```
EVENT_TYPE DrawFocus(ZIL_SCREENID screenID,
 UI_REGION &region, EVENT_TYPE ccode);
```

Draws a focus rectangle on the object.

• WOF_PIXEL

Causes the object's position and size parameters to be interpreted as pixel coordinates.

Chapter 53—ZIL_DECORATION_MANAGER

New defaultOSName

New member variable defaultOSName contains the ISO name of the current operating system.

Chapter 57—ZIL_I18N_MANAGER

New defaultOSName

New member variable defaultOSName contains the ISO name of the current operating system.

Chapter 61—ZIL_LANGUAGE_MANAGER

New defaultOSName

New member variable defaultOSName contains the ISO name of the current operating system.

Chapter 64—ZIL_LOCALE_MANAGER

New defaultOSName

New member variable defaultOSName contains the ISO name of the current operating system.

Programmer's Reference Volume Two—Window Objects

Introduction

Although the class hierarchy indicates that UIW_STRING inherits from multiple parents, it is actually a normally derived object.

Chapter 1—UIW_BIGNUM

Information requests

The documentation incorrectly describes the I_DECREMENT_VALUE and I_INCREMENT_VALUE requests for the Information( ) function. It states that the data parameter must be a pointer to an int. Instead, the parameter must be a pointer to ZIL_INT32.

NMF_SCIENTIFIC not supported

UIW_BIGNUM does not support the NMF_SCIENTIFIC flag.

Chapter 3—UIW_BUTTON

Toggling behavior

If a button is added to a vertical or horizontal list and if the BTF_NO_TOGGLE flag is on, it will have its BTF_NO_TOGGLE flag turned off.

Toggling appearance

The manual erroneously states that a toggle button usually appears flat if BTF_NO_TOGGLE is toggled to the selected state. Instead, the toggle button usually will appear depressed when toggled to the selected state.

TOP is bottom edge

Buttons are positioned with TOP as the bottom edge of the button.

Chapter 5—UIW_DATE

Information requests

The manual erroneously describes the I_DECREMENT_VALUE and I_INCREMENT_VALUE requests for the Information( ) function. It states that the data parameter must be a pointer to an int. Instead, the parameter must be a pointer to ZIL_INT32.

Chapter 14—UIW_POP_UP_ITEM

MNIF_ABOUT for Macintosh only

MNIF_ABOUT is currently ignored in all environments except Macintosh. On the Macintosh, a pop-up item created with this flag will be created as the About... option in the Apple menu. Please note that this is the preferred method for creating the Apple | About... option. The method documented in the Reference Manual will still work but might be removed in the future.

Chapter 19—UIW_REAL

NMF_DIGITS should be NMF_DECIMAL

The manual erroneously labeled a flag NMF_DIGITS. Its name is actually NMF_DECIMAL.

Chapter 20—UIW_SCROLL_BAR

Default width and height

A vertical scroll bar or slider created with a width of 0 will have a default width. A horizontal scroll bar or slider created with a height of 0 will have a default height.

Chapter 22—UIW_STATUS_BAR

Adding objects to status bar

The documentation should explain that objects are added to the status bar the same way objects are added to a window.

Chapter 24—UIW_SYSTEM_BUTTON

Using Apple menu "About" item

The section describing how to create the Apple menu's "About" item on the Macintosh is no longer valid. While this method may still work, the preferred method is to use the new MNF_ABOUT flag, described in this document in the UIW_POP_UP_ITEM chapter section.

Chapter 25—UIW_TABLE

Building library with persistence

Currently, the library must be built with persistent load and store capability in order for the table object to function properly.

Chapter 29—UIW_TIME

Information requests

The documentation omitted a description of the I_DECREMENT_VALUE and I_INCREMENT_VALUE requests for the Information( ) function. See the description of these requests in the UIW_REAL chapter.

Chapter 33—UIW_WINDOW

New constructor

The UIW_WINDOW class has a new constructor and two new functions that allow it to use delta storage. The new constructor has the following signature:

```
UIW_WINDOW(const ZIL_ICHAR *name,
 const ZIL_ICHAR *deltaName,
 const ZIL_ICHAR *deltaPathName = ZIL_NULLP(ZIL_ICHAR),
 ZIL_STORAGE_READ_ONLY *file = ZIL_NULLP(ZIL_STORAGE_READ_ONLY),
 ZIL_STORAGE_READ_ONLY *deltaFile
   =ZIL_NULLP(ZIL_STORAGE_READ_ONLY),
 UI_ITEM *objectTable = ZIL_NULLP(UI_ITEM),
 UI_ITEM *userTable = ZIL_NULLP(UI_ITEM));
```

The first new function has the following signature:

```
void DeltaLoad(const ZIL_ICHAR *name,
 const ZIL_ICHAR *deltaName,
 const ZIL_ICHAR *deltaPathName,
 ZIL_STORAGE_READ_ONLY *file,
 ZIL_STORAGE_READ_ONLY *deltaFile,
 UI_ITEM *objectTable, UI_ITEM *userTable);
```

The second new function has the following signature:

```
void DeltaStore(const ZIL_ICHAR *name,
 const ZIL_ICHAR *deltaName,
 const ZIL_ICHAR *deltaPathName = ZIL_NULLP(ZIL_ICHAR),
 ZIL_STORAGE_READ_ONLY *file = ZIL_NULLP(ZIL_STORAGE_READ_ONLY),
 ZIL_STORAGE *deltaFile = ZIL_NULLP(ZIL_STORAGE),
 UI_ITEM *objectTable = ZIL_NULLP(UI_ITEM),
 UI_ITEM *userTable = ZIL_NULLP(UI_ITEM),
 int appendNames = FALSE);
```

Setting WOAF_MDI_OBJECT

Setting WOAF_MDI_OBJECT clears the WOF_NON_FIELD_REGION flag during construction.

Using default storage with the storage constructor

The documentation omitted an explanation of how to use the default storage when calling the storage constructor of UIW_WINDOW. Here's how to use default storage with UIW_WINDOW's storage constructor:

```
UIW_WINDOW *window =
  new UIW_WINDOW("HELLO_UNIVERSE",
  UI_WINDOW_OBJECT::defaultStorage);
```

This will load the window HELLO_UNIVERSE from the application's DAT file.

Chapter 35—ZAF_MESSAGE_WINDOW

New member variables

The ZAF_MESSAGE_WINDOW class now has three more member variables:

• static ZIL_ICHAR _className[ ];

• static int defaultInitialized;

• const ZIL_LANGUAGE *myLanguage;

These members serve the same purpose as the members in UIW_ SYSTEM_BUTTON. See their description in that chapter.

Getting Started

Chapter 4—Writing Multiplatform Programs

Different contents than listed

The contents of some of the Macintosh libraries is different from what is listed. The following descriptions are accurate:

- Mac_ZIL2 Device and display classes
- Mac_ZIL3 Window Manager, window object, error classes
- Mac_ZIL8 Number classes
- Mac_ZIL9 Button and geometry management classes
- Mac_ZIL10 Controls classes

New libraries

There are also two new libraries:

- Mac_ZIL11—Window-derived classes
- Mac_ZIL12—Notebook and table classes

Also, the chapter erroneously calls the Macintosh application file an .EXE file.

Chapter 7—Zinc and C++

Misspelling

In both the Object creation section and the Object deletion section (pages 90, 95) UI_WINDOW_MANAGER is misspelled as UI_WINDOW_-MANGER.

Chapter 18—Using Languages

Code to switch windows wrong

The code shown to switch windows when the user selects a new language is incorrect. The new code subtracts the original window in the Event( ) function rather than placing an S_SUBTRACT_OBJECT event on the queue. The new code adds the new window, then places the DELETE_OBJECT event on the queue.

CreateWin( ) function

The CreateWindow( ) function referred to in the Changing languages section is actually called CreateWin().

Chapter 19—Program Design

Accelerator keys work differently

The accelerator keys work differently than described in the manual. Previously, the accelerator keys worked only in DOS. They now work in all environments. The accelerator keys are now implemented as a custom event map table, mapped when looking for an accelerator key.

Appendix A—Compiler Considerations

New Mac_ZIL11

In addition to the Macintosh libraries listed, Zinc added a Mac_ZIL11 library.

Appendix B—Example Programs

Description of VALIDT program

The description of the VALIDT example program is inaccurate. Only one window appears.

The description of the ANALOG example program is inaccurate. It no longer has a status bar or a UIW_DATE object.

The PHONBK example refers to a UI_STORAGE_OBJECT_READ_-ONLY member function. It is now called ZIL_STORAGE_OBJECT_-READ_ONLY.

Appendix D—Keyboard and Mouse Mappings

Keyboard mappings for gray keys

All keyboard mappings for gray keys should be listed without '+.'

Backspace and Delete

The section for the Macintosh states that the <Backspace> key deletes the character to the left of the current cursor location. The <Delete> key is used for this purpose. The <Delete Right> key will delete the character to the right of the current cursor location.

<Opt+Tab>

On the Macintosh, <Opt+Tab> will move to the next window.

Zinc Designer

Chapter 1—Introducing Zinc Designer

Reactivating object on Mac

Because the Macintosh mouse only has one button, use <Option-click> to reactivate the last object added.

Pull-down menu on Mac

On the Macintosh the pull-down menu will not appear on the screen while editing a window. You can edit it through its parent window's Subobjects page.

Chapter 11—Edit Options

Grouping objects on Mac

To group objects using the Macintosh Designer, press <Option> and click somewhere in the window. Then you can draw a marquee around the objects.

Relative constraints in Zinc Designer

The documentation was unclear about how to set a relative constraint using Zinc Designer. The following is a step-by-step explanation of how to set a relative constraint in a new user interface using Zinc Designer.

1. Launch Zinc Designer.
2. Create a new window by selecting Window | Create.
3. Select the button object from the tool bar. Or, select Button from the Object | Control pull-down menu. When you have selected a button, the place object text field on the main window of Zinc Designer will display "Button."
4. Place the button on the window by clicking on the window.
5. Once you have placed the button, double-click it to open its information notebook.
6. Once you have opened the information notebook, select the Geometry notebook page.
7. Inside the Geometry notebook page, select Relative constraint.

8. Inside the Geometry notebook page and inside the CONSTRAINT group, click in the text field labeled Offset. Type in the amount of offset you wish.

   When using relative constraints in Zinc Designer, offset is a percentage of distance from one border to its opposite border.

   For example, if the button's parent window is 50 minicells wide, and if you type 40 in the Offset text field, Zinc Designer will place the button 20 minicells (40%) from the left border. If you enlarge the window to 100 minicells, Zinc Designer will place the button 40 minicells from the left border.

Chapter 15—Control Objects

Can't set Send flag for pull-down item

You can't set the Send user message flag for a pull-down item.

Chapter 17—Other Objects

There are several new features of UIW_TABLE.

Columns and RecordSize

The General Page of the table's Information notebook has two new fields.

- Columns

  Specifies the number of columns that appear in the table. A table record will appear in each column.

- Record Size

  The Record Size field specifies the size of the programmer's data structure used to store data for a single record. This value is used by the table, in conjunction with the number of records in the table, to determine how much memory to allocate for the table's data space.

Initializing table with DataSet( )

After loading a window with a table on it in your application, call the table's DataSet( ) function to initialize the fields in the table.

Manipulating table visually

- You can size the table headers and table records visually by grabbing their border with the mouse and dragging it, just like with any other object. If a header or record is sized, the corresponding record or header should be sized appropriately so that the table headers and table records will scroll synchronously.
- You can add objects to the table records visually by dropping them on the record with the mouse, just like adding fields to a window.
- Double-clicking on a table header opens the table header's editor.
- Double-clicking on a table record opens the table record's editor.
- Double-clicking on an object in a table record opens the object's editor.

Window Object option in Zinc Designer

The documentation omitted an explanation of how to use Zinc Designer's Window Object option, which enables you to work visually with derived window objects. The Window Object option is located in the tool bar, as well as under Object |Other.

The following is a step-by-step explanation of how to use Window Object in a new application interface.

1. Launch Zinc Designer.
2. Create a new window by selecting Window | Create.
3. Select Window Object from the tool bar. (It's the last object in the tool bar.) Or, select Window Object from the Object | Other pull-down menu. When you have selected Window Object, the place object text field on the main window of Zinc Designer will display "Window Object."
4. Place the derived window object on the window by clicking on the window.
5. Once you have placed the derived object, double-click it to open its information notebook.
6. Once you have opened its information notebook, select the Advanced notebook page.
7. Inside the Advanced notebook page, click in the text field labeled DerivedName. Type in the name of your derived class.

8. Using the same derived class name you typed in the text field, derive a class within your source code the way you do normally. However, since your derived class will be loaded from a .DAT file, you must define a Load( ) function. Further, you must provide your class with a static New( ) function.

Chapter 19—Image Editor

Grouping objects

To group objects on the Macintosh, press <Option> and drag the mouse.

Appendix A—Compiling the Designer

Libraries

The manual mentions a Macintosh SCCPP700 Libraries folder. The folder is actually called SCCPP700 Library.

In addition to the Macintosh libraries listed in step 2, there is also a Window 4 library.

Defaults Editor

The manual refers improperly to the Defaults Editor as the I18N Defaults Editor in the Macintosh section.

Integrated Zinc Designer modules

At the time the documentation was printed, Zinc Designer running under the Macintosh was composed of different applications that you compiled separately. Currently, however, Zinc Designer under the Macintosh is an integrated application; that is, all of the editors have been placed into the same application. Access to any Zinc Designer editor on the Macintosh is accomplished through the Tools menu.

Drag and drop

Zinc Application Framework now supports drag and drop. Several new flags, events, and mouse states are required to use this capability. In addition to these values, described below, you must compile the library with ZIL_STORE and ZIL_LOAD defined in UI_ENV.HPP in order for drag and drop to work.

The *Reference* manual lists the WOAF_DRAG_OBJECT in several places; WOAF_MOVE_DRAG_OBJECT and WOAF_COPY_DRAG_OBJECT replaced it after the manual went to press.

Here is a list of the flags you can use with drag-and-drop:

- WOAF_ACCEPTS_DROP

  Indicates that the object can accept a drop operation.

- WOAF_MOVE_DRAG_OBJECT

  Indicates that the object can be moved in a drag and drop operation.

- WOAF_COPY_DRAG_OBJECT

  Indicates that the object can be copied in a drag and drop operation.

- DM_CANCEL

  Indicates that a drop may not be performed at the present mouse location.

- DM_DRAG_MOVE

  Indicates that a drop at the present mouse location would result in a move operation.

- DM_DRAG_COPY

  Indicates that a drop at the present mouse location would result in a copy operation.

- DM_DRAG_MOVE_MULTIPLE

  Indicates that a drop at the present mouse location would result in a move operation.

- DM_DRAG_COPY_MULTIPLE

  Indicates that a drop at the present mouse location would result in a copy operation.

- S_DRAG_MOVE_OBJECT

  Sent to an object when a move operation is performed over the object. The object sets the mouse cursor to an appropriate state.

- S_DRAG_COPY_OBJECT

  Sent to an object when a copy operation is performed over the object. The object sets the mouse cursor to an appropriate state.

- S_DRAG_DEFAULT

  Sent to an object when a drag operation is in effect but neither a copy or move has been specified. The object receiving this event determines the type of drag and sets the mouse cursor appropriately.

- S_DROP_MOVE_OBJECT

  Sent to an object to indicate that a move drop was just performed on the object.

- S_DROP_COPY_OBJECT

  Sent to an object to indicate that a copy drop was just performed on the object.

- S_DROP_DEFAULT

  Sent to an object when a drop operation is in effect but neither a copy or move has been specified. The object which is receiving this event then determines the type of drag and sets the mouse cursor appropriately.

- L_BEGIN_MOVE_DRAG

  Indicates that a move-drag operation was just started with a mouse down-click.

- L_CONTINUE_MOVE_DRAG

  Indicates that a move-drag operation is continuing with the mouse being dragged while the mouse button is depressed.

- L_END_MOVE_DRAG

  Indicates that a move-drag operation was just completed with a mouse up-click.

- L_BEGIN_COPY_DRAG

  Indicates that a copy-drag operation was just started with a mouse down-click.

- L_CONTINUE_COPY_DRAG

  Indicates that a copy-drag operation is continuing with the mouse being dragged while the mouse button is depressed.

- L_END_COPY_DRAG

  Indicates that a copy-drag operation was just completed with a mouse up-click. If an object with the WOAF_ACCEPTS_DROP flag set receives an S_DRAG_* or an S_DROP_* message, it will call the receiving object's user function, passing it the S_* message it received. The user function can process the message, if desired. The user function must return one of the following values when it receives a drag or drop message:

- S_ERROR

  Indicates that the dragged object cannot be dropped here.

  0 indicates that the user function processed the message.

- S_UNKNOWN

  Indicates that the user function did not process the message and that the receiving object should handle the message.

Mac and NEXTSTEP File and Edit menus

To allow maximum flexibility in your Zinc applications running under Macintosh and NEXTSTEP, Zinc recommends that you use the following menus and items and implement the following functionality:

- File

  —New

  Create a new document.

  —Open

  Open an existing document.

  —Close

  Close the current document.

  —Print

  Print the current document.

  —Quit

  Quit the application.

- Edit

  —Cut

  Cut the selected text or object from the document and place in the paste buffer (Clipboard in Mac, Pasteboard in NEXTSTEP).

  —Copy

  Copy the selected text or object to the paste buffer.

—Paste

Paste text or an object from the paste buffer to the current cursor location in the document.

Microsoft and Watcom graphics

In DOS, if you are using the UI_MSC_DISPLAY with the Microsoft compiler, or the UI_WCC_DISPLAY with the Watcom compiler, put HELVB.-FON somewhere in the path so that the fonts can be loaded.

New virtualized Add( ) and Subtract( ) functions

For 4.1, Zinc has modified the Add( ) and Subtract( ) member functions of some classes derived from UIW_WINDOW. Before Zinc 4.1, Add( ) and Subtract( ) were defined in the UI_LIST class; adding and subtracting elements to and from a list was accomplished by an instance of UI_LIST. In Zinc 4.1, Add( ) and Subtract( ) are virtual functions, so that objects derived from UI_LIST can implement new adding and subtracting functionality specific to those objects.

These newly virtualized functions will have no effect on classes derived from UI_LIST when upgrading existing Zinc applications to 4.1.

The classes with overloaded Add( ) and Subtract( ) functions are:

- UIW_VT_LIST
- UIW_HZ_LIST
- UIW_COMBO_BOX
- UIW_STATUS_BAR
- UIW_PULL_DOWN_MENU
- UIW_POP_UP_MENU

Recommended stack size

The following are recommended stack sizes for use with Zinc for applicable environments and compilers.

TABLE 4. Recommended stack size by environment and compiler

Environment	Compiler	Size
DOS	Watcom	48K
	Symantec (except 32-bit)	20K
	Symantec (32-bit)	16K
	Borland (real, PharLap 16-bit)	20K
	Borland (PowerPack 16, Rational DOS 16M 16-bit)	18.75K
	Borland (PowerPack 32) default	1024K
	Microsoft 1.0 (PharLap TNT 6.1 32-bit) default	32K
	Microsoft 1.5 (real)	5K
	Microsoft 1.5 (PharLap 16-bit, DOS 16M 16-bit)	12K
Windows	All compilers	18.75K
OS/2	All compilers	94K
Motif (DESQview/X)	Watcom	48K
Motif (QNX)	Watcom	48K
Power Macintosh	All compilers	64K

Macintosh heap size

A minimum heap size of 1024K is recommended for any Macintosh application.

Zinc Technical Notes

This section contains the Technical Notes for Zinc Application Framework 4.1. The Technical Notes are brief technical explanations of how to accomplish various programming tasks with Zinc. If you are having problems using Zinc, scan the Technical Notes for a topic concerning your problem. You can often find a note describing how to solve the problem, thereby helping you avoid placing a call to Zinc Technical Support.

Section 1

IDEs

1.1 Working with the Borland IDE ZD-TN1000

Keywords: Borland IDE
Version: 3.6 R1 and later
Component: Borland IDE
Platforms: DOS, Windows
Issued: August 1, 1994

Question

What do I need to do in Borland's 4.0 IDE to make it work properly with Zinc?

Answer

Set up your project files first. Make sure you include **.CPP** files first, then Zinc **.LIB** files as required for the particular environment, then **.DEF** and **.RC** for Windows programs.

Be careful that the project hierarchy is correct. Borland has changed the way that projects are set up in the IDE of Borland 4.0. The library and code files should come directly under the target executable unless one of the **.CPP** files is dependent upon another.

For example:

Correct	Incorrect
-prog.exe [target]	-prog.exe [target]
|- prog.cpp	|- prog.cpp
|- sub.cpp	|- sub.cpp
|- \zinc\lib\btcpp400\dos_zil.lib	|- \zinc\lib\btcpp400\dos_zil.lib
|- \zinc\lib\btcpp400\dos_gfx.lib	|- \zinc\lib\btcpp400\dos_gfx.lib
|- \zinc\lib\btcpp400\bc_lgfx.lib	|- \zinc\lib\btcpp400\bc_lgfx.lib

Make sure you have set the proper target. This is usually an **.EXE** file.

The only libraries that should be used in the IDE are the **RUNTIME** libraries. Don't use the **GRAPHICS** (unless you are using the **BGI** graphics instead of the **GFX**), or the **OWL**, or **CLASS** libraries.

Make sure you turn off all exception handling and RTTI options. The reason for this is that Zinc libraries are not compiled with exception handling or RTTI information. If you want this information you can recompile the libraries with exception handling and RTTI information. This will, however, dramatically increase the size of your executable.

Make sure the directories are correct for the include and library files. These should include Borland's **include** and **lib** as well as Zinc's **include** and **lib** directories.

Select the large memory model.

1.2 Setting up the Microsoft IDE to work with Zinc ZD-TN1006

Keywords:	IDE, Microsoft, Visual C++
Versions:	All
Components:	Microsoft IDE
Platforms:	DOS, Windows
Issued:	August 1, 1994

Question

How do I set up the Microsoft IDE so that it works properly with Zinc?

Answer

The Microsoft IDE requires that scanning dependencies in the Workbench be resolved. Two methods can be used to accomplish this. (The first method is recommended since it will eliminate the need for changes as Zinc is updated.)

Either add the following filenames to the end of your **MSVC\BIN\SYSINCL.DAT** file:

- **KEYSYM.H, XM.H, TIMER.H, INTRINSI.H, DPSNEXT.H, EVENT.H**, and possibly other **.H** references that Microsoft Workbench doesn't recognize.

Or comment out the following lines in the Zinc header files:

- Zinc 4.0: lines 652, 667 in **UI_ENV.HPP** and 641 in **UI_MAP.HPP**.
- Zinc 3.6: lines 641, 642 in **UI_ENV.HPP** and 630 in **UI_MAP.HPP**.
- Zinc 3.5: lines 477, 478 in **UI_ENV.HPP** and 598 in **UI_EVT.HPP**.

Change the settings inside Microsoft Workbench as follows:

- **Project** | **New** and set your **Project** type to **MS-DOS** or **Windows Application** (.EXE)
- Add your **.CPP** files.
- For DOS only:
  —Add the **DOS_ZIL.LIB**.
  —Add **DOS_GFX.LIB** or **DOS_MSC.LIB**.
  —Add **MS_LGFX.LIB** if you use **DOS_GFX.LIB**.
- For Windows only:
  —Add the **WIN_ZIL.LIB**
- Under **Options** | **Project**...
  —Choose the **Compiler... Button**

—Under **Code Generation** set **CPU** to **8086/8088**

—Under **Memory Model** set **Model** to **Large**

—Choose the **Linker... Button**

—Under **Input**, turn on **Prevent Use of Extended Dictionary**

—Under **Memory Image**, set **Max Number of Segments** to **256** (Zinc 4.0 only)

- For DOS only:

  —Under **Input**, add "**,graphics**" to **Libraries**

  —For Windows only:

- Under **Memory Image**, remove entry in **Stack Size** if using *STACK* in your **.DEF** file.

1.3 Watcom 10.0 IDE for Windows ZD-TN5006

Keywords:	Watcom IDE, Windows
Versions:	4.0
Components:	
Platforms:	Windows
Issued:	October 13, 1994

Question

How do you build a Zinc application for Windows using the Watcom 10.0 IDE?

Answer

To build a Zinc application for Windows using the Watcom 10.0 IDE, do the following:

Create a new project by selecting **File | New project** (e.g., **whello1.prj**).

Enter the desired target name (e.g., **whello1.exe**).

Name the source files needed to build the target by selecting **Source | New source**

(e.g., **hello1.cpp c:\zinc\lib\wccpp\win_zil.lib whello.def whello.rc**).

Choose **Options | C++ Compiler** switches... and make the following modifications:

File Option Switches

- Include directories—should be amended to also include c:\zinc\include

Diagnostic Switches

- Warning level—should be set to Warning level 4[-w4]

Optimization Switches

- Style of optimization—should be set to Space optimizations [-os]
- Relax alias checking[-oa]—should be turned on

CodeGen Option Switches

- Constants in code segment[-zc] -- should be turned on

Memory Model and Processor Switches

- Memory Model—should be set to Large model[-ml]

Choose **Options | Windows Linking Switches...** and make the following modifications:

Basic Switches

- Other options[,]—should be set to op heapsize=28k
- Stack:[op st]—should be set to 16k

Resource Switches

- Requires Windows 3.0 or later[-30]—should be turned on

Make the target by selecting **Targets | Make.**

Run the target by selecting **Targets | Run**.

Section 2

Fonts

2.1 Changing object fonts ZD-TN1001

Abstract:	Changing object fonts
Keywords:	font, *fontTable*
Version:	3.0 and later
Component:	Library
Platforms:	All
Issued:	August 1, 1994

Question

How do I change a font for an object?

Answer

Each object derived from **UI_WINDOW_OBJECT** has a member variable called font. This member is an index into the font table. The font table is an array of fonts. The size of the array is 10. The *fontTable* variable is a member of the display class that you have chosen to use such as **UI_GRAPHICS_DISPLAY**. It is a protected member of the class and is not directly accessible. There are two ways to modify this variable.

You can derive your own object and change the font value in the constructor of your object such as:

```
MY_OBJECT::MY_OBJECT(...) : UI_WINDOW_OBJECT(...)
{
  font = 3;
}
```

This will cause the object to use entry 3 in the font table.

Version 3.6 introduced a new public member function of the **UI_WINDOW_OBJECT** class. This function is called **Font(LOGICAL_FONT _font)**, and takes an integer value as a parameter. The same thing is accomplished as in the previous example by making the following call.

```
object->Font(3);
```

This function can be used by any valid object pointer. Typically the use of this function would be for objects that have viewable text associated with them, such as strings, prompts, buttons, etc.

Notes:

For additional information on changing/adding fonts, see the technote on creating and adding a new font. There are also system specific technotes available.

2.2 Adding a new font to the *fontTable* under OS/2 ZD-TN1002

Keywords:	OS/2, font, *fontTable*
Version:	3.5 and later
Component:	Library
Platforms:	OS/2
Issued:	July18, 1994

Question

How do I add a new font to the *fontTable* under OS/2?

Answer

To load a font, use specific OS/2 system commands found in the OS/2 code file **O_DSP.CPP**. The following is an extract from this file.

Get a pointer to the desktop.

```
HPS desktopPS = WinGetPS(HWND_DESKTOP);
```

Get the number of available fonts from the system.

```
LONG maxFonts = 0;
maxFonts = GpiQueryFonts(desktopPS, QF_PUBLIC, (PSZ)"Courier", &maxFonts,
   sizeof(FONTMETRICS), NULLP(FONTMETRICS));
```

Create the space for the new font.

```
FONTMETRICS *font = new FONTMETRICS[maxFonts];
```

Load the available fonts into the newly created font.

```
GpiQueryFonts(desktopPS, QF_PUBLIC, (PSZ)"Courier", &maxFonts, sizeof(FONTMETRICS),
  font);
```

Add the font, based on 100 point, into the *fontTable* so it is available for use.

```
for (int i = 0; i < maxFonts; i++)
{
  if (font[i].sNominalPointSize <= 100 &&
     !UI_OS2_DISPLAY::fontTable[MY_FONT_ENTRY].lMatch)
  {
    UI_OS2_DISPLAY::fontTable[MY_FONT_ENTRY] = font[i];
    break;
  }
}
```

Free the space.

```
delete font;
WinReleasePS(desktopPS);
```

2.3 Adding a new font to the *fontTable* in GFX graphics ZD-TN1003

Keywords: font, GFX, *fontTable*
Versions: All
Components: GFX Graphics, **UI_GRAPHICS_DISPLAY**
Platforms: DOS
Issued: July 29, 1994

Question

How do I create and add a new font to the *fontTable* using GFX graphics?

Answer

Create the font using one of two methods.

The first method is to use Borland's font editor to create the font. When you save it, the font editor will produce a .CHR file. Then use the **BGI2GFX** program to convert the **.CHR** file to a **.CPP** file. This file can then be linked into your code. If the utility is not compiled, the code for **BGI2GFX** is located in **\ZINC\SOURCE\CONVERT** subdirectory and can be readily compiled with the existing makefile.

The second method is to get the GFX font editor from C-Source, the developer of GFX, or get their fonts. These can be readily linked into your source. C-Source may be contacted at 616-725-4882.

Make sure that the following declarations have been added to the bottom of your newly created **.CPP** font file. There should be a structure definition as well as a function that returns a pointer to the newly created font. The following is an extract from the **ISO_DIAL.CPP** file located in your **\ZINC\SOURCE\GFX** subdirectory.

- Structure definition of the new font:

```
static FONT iso_dial
{
  iso_dial_offset_table, iso_dial_data_table, 176, 13, 0, 255, 12, 0, 11, 0
};
```

- Function that returns the pointer to the new font:

```
FONT *GFX_iso_dial_font (void)
{
  return (&iso_dial);
}
```

Next, declare in your main **.CPP** file or header file some external reference to the same functions that are located in the bottom of your font's **.CPP** file. The following is an example of the type of declaration that should be used to return a pointer to your new font. The code sample is taken from **D_GFXDSP.CPP**.

```
#define GFX_DIALOG_FONT GFX_iso_dial_font
```

```
    extern FONT *GFX_DIALOG_FONT(void);
```

Finally, load the font into the font table for use. The member, *fontTable*, is a public member of the display class that you are using, such as **UI_GRAPHICS_DISPLAY**, and can contain up to ten fonts. Loading the font must done after your display has been constructed and before you create your objects. If you are using **UI_APPLICATION** then we suggest doing it at the top of your code since it constructs your display. That way the font will be loaded into the fontTable where you can use it as you load your various resources. The following is an extract from **D_GFXDSP.CPP**.

- Initialize a new font variable for use.

```
    GRAPHICSFONT font = { 0, 0, 0 };
    FONT *tmp;
```

- Load and insert the new font into the fontTable.

```
    font.font = OpenMemFont(tmp = GFX_DIALOG_FONT());
    if (font.font >= 0 && _loadFont)
    {
      font.maxWidth = tmp->widest_cell - 1;
      font.maxHeight = tmp->height - 1;
      // Locations 0..9 are possible.
      UI_GRAPHICS_DISPLAY::fontTable[FNT_DIALOG_FONT] = font;
    }
```

Notes:

- The sample code shown here is used to load the dialog font into the *fontTable*. This is to give you something tangible to look at when you are trying to load your own. The files that are referred to in this technote are ISO_DIAL.CPP and D_GFXDSP.CPP and should be consulted.

2.4 Adding a new font to the *fontTable* in Motif ZD-TN2001

Keywords:	font, Motif
Versions:	3.5, 3.6, 4.0
Components:	Library
Platforms:	Motif
Issued:	July 14, 1994
File:	M_FONTS.TAR

Question

How do I change or add a font in Motif?

Answer

The first three entries of the font table are initialized by Zinc in **M_DSP.CPP**. Fonts are loaded from default strings in the Zinc App.**Xdefaults** file. If the .**Xdefaults** file is not found, or the font strings are not found in the .**Xdefaults** file, there are default strings in **M_DSP.CPP** that are used as the default. The first three fonts can be changed at run time by modifying the ZincApp .**Xdefaults** file. For example, to change the small font used by Zinc the small font entry could be changed from:

```
*zincSmallFont:-*-helvetica-medium-r-*--12-*-iso8859-1
```

to the following for a italic small font.

```
*zincSmallFont:-*-helvetica-medium-o-*--14-*-iso8859-1
```

Fonts can also be added in code. If a new font is added to the font table there should also be added an entry in the .**Xdefaults** file for that font. The following code is necessary for adding an italic small font to the font table.

```
const int FNT_ITALIC_SMALL= 3;
// Create pointer for string in XResource data base.
typedef struct {
  char *italicSmallFont;
} AppData;
#define XmNitalicSmallFont"italicSmallFont"
#define XmCItalicSmallFont"ItalicSmallFont"
// Create XResource sturcture
static XtResource resources[] =
{
  {
    XmNitalicSmallFont,
    XmCItalicSmallFont,
    XmRString,
    sizeof(char *),
    XtOffsetOf(AppData, italicSmallFont),
    XmRString,
// If the .Xdefaults file or the font string is not found this font will be used.
    (XtPointer)"-*-helvetica-medium-o-*--12-*-iso8859-1"
  },
};
// Get the font name from X and load it.
  AppData appData;
  XtGetApplicationResources(display->topShell, (XtPointer)&appData,resources,
    XtNumber(resources), NULLP(Arg), 0);
  display->fontTable[FNT_ITALIC_SMALL].fontStruct =
    XLoadQueryFont(display->xDisplay, appData.italicSmallFont);
// If using Zinc's Unicode Key
#if defined(ZIL_UNICODE)
// Create font set and load font for Unicode
  XmFontListEntry entry;
  XmFontType type;
  entry = XmFontListEntryLoad(display->xDisplay, appData.italicSmallFont,
    XmFONT_IS_FONTSET,XmFONTLIST_DEFAULT_TAG);
  display->fontTable[FNT_ITALIC_SMALL].fontList = XmFontListAppendEntry(NULL,
    entry);
  display->fontTable[FNT_ITALIC_SMALL].fontSet =
    (XFontSet)XmFontListEntryGetFont(entry, &type);
  XmFontListEntryFree(&entry);
#else
  display->fontTable[FNT_ITALIC_SMALL].fontList =
    XmFontListCreate(display->fontTable[FNT_ITALIC_SMALL].fontStruct,
    XmSTRING_DEFAULT_CHARSET);
#endif
}
```

The following line should be added to the .Xdefaults file:

```
*italicSmallFont:-*-helvetica-medium-o-*--14-*-iso8859-1
```

Note:

- Other platforms use different methods to load new fonts into the font table. See technotes for those platforms for specific information.
- There is a program on our BBS and ftp server that uses the above code to add more fonts to the font table. On the BBS the file is in the 3.6 Conference under User Contributions and is called M_ FONTS.TAR. On the Internet the file is in PUB/CONTRIB/36 and is called M_FONTS.TAR.Z. This example also contains an example of the .Xdefaults file.

2.5 Adding a fixed-width font to the *fontTable* under Windows ZD-TN5002

Keywords:	fixed-width font, fontTable, Windows
Versions:	3.0 and later
Components:	Library
Platforms:	MS Windows
Issued:	August 1, 1994

Question

How do you add a fixed-width font to the *fontTable* under MS Windows?

Answer

Adding a fixed-width font to the *fontTable* under MS Windows is straightforward. The following code shows how this is done.

```
// Initialize the display.
UI_DISPLAY *display = new UI_MSWINDOWS_DISPLAY(hInstance, hPrevInstance, nCmdShow);

// Get a handle to a fixed width font.
HFONT fixedFont = GetStockObject(ANSI_FIXED_FONT);

// Assign the fixed-width font to the 4th entry (index 3) of the fontTable.
UI_MSWINDOWS_DISPLAY::fontTable[3] = fixedFont;
...
// Assign the appropriate index to a window object.
object->Font(3);
```

The font ID passed to **GetStockObject( )** could also be *OEM_FIXED_FONT* or *SYSTEM_FIXED_FONT*. See your MS Windows reference guide for additional information concerning stock fonts.

Section 3

Event flow, messaging, and flags

3.1 Event flow ZD-TN1005

Keywords:	event, message passing
Version:	All
Component:	Library
Platforms:	DOS, OS/2, Windows, Macintosh
Issued:	August 22, 1994

Question

How do events flow through the system?

Answer

Zinc uses three different methods for event flow in order to maintain full compatibility with operating systems. The three methods are top-down, bottom-up, and NEXTSTEP. This technote explains the first two.

Top-Down (DOS, Macintosh, Curses):

After the event is placed in the event queue, the Event Manager pulls the event from the queue and dispatches it to the window manager. At that point the Window Manager has three options:

- Act on the event—as in the case of *S_CLOSE*;
- Dispatch the message to the current window; or
- Make an object (a window) current, then dispatch the message.

If a window receives the event, it then has the same three options:

- Act on the event—as in the case of *L_NEXT* (the <tab> key);
- Dispatch the message to the current object; or
- Make an object current, then dispatch the message (mouse click on a button).

If an object receives the event it has two options:

- Act on the event; or
- Pass the message to its base class (usually **UI_WINDOW_OBJECT**) and let it handle the event.

If the object still doesn't know what to do with the message then *S_UNKNOWN* is returned. At this point the parent object may pass the message to its base class. The message is propagated back to the window manager in this manner, and if nothing is done with the message, it is then discarded.

Bottom-Up (Windows, OS/2, Motif):

In the case of bottom-up event flow, the event manager gets the event and gives the event to the window manager. At that point the window manager has two options:

- Pass the event to the operating system if the events are native system messages (most); or
- Pass the message as described in top-down (Zinc-specific messages).

The operating system event handler—Zinc calls it the "black box"—then passes the event to the current object where it has the same two choices described for top-down:

- Act on the event; or
- Pass the message to its base class (usually **UIW_WINDOW_OBJECT**) and let it handle the event.

If the message is not used by the object then the message is given back to the operating system where its default callback function is called.

Notes:

- Top-down event flow may seem like a long route for a message to follow, but very few messages ever get this far, so overhead incurred by this flexible architecture is minimal.
- All Zinc-specific messages are passed as described in the top-down section. Mouse and keyboard messages are all system specific.
- NEXTSTEP event flow resembles bottom-up, except that the event is not handled first by the Zinc Event Manager. Zinc 'sees' the event for the first time at the object level and handles or passes the event from there.

3.2 Local control loops ZD-TN1008

Keywords:	control, main loop, local, modal
Versions:	All
Components:	Library
Platforms:	All
Issued:	November 17, 1994
File:	ctloop.zip

Question

How do I determine when to write a local control loop?

Answer

Local control loops can cause of difficult problems and are not recommended unless absolutely necessary. If not implemented properly, the system may become confused because it doesn't know the origin or destination of events.

There are few instances require a local control loop. The only reason to have a local control loop is if the user's input is necessary for the completion of a currently running task. The error system falls in this category. Another use could possibly be for to allow the user to break out of a running process. Regardless, you must design tasks to work in "pieces," thereby preserving the event-driven characteristics of graphical user interfaces.

A local control loop is used to take complete control over the trapping and dispatching of events. This means that all normal event flow is halted. If the programmed loop doesn't responsibly take control then other events could slip through, thereby causing confusion in the system.

For a good example of a local control loop you should examine the DOS error system. On DOS it was necessary for Zinc to create its own error system since DOS does not provide one. On other operating systems Zinc is able to call native controls to handle the task (e.g. Windows calls **MessageBox( )**, OS/2 calls **WinMessageBox( )**, etc.) These environment-specific objects wait for the user to select one of the buttons on the window, then allows Zinc to test the return value and respond accordingly.

The control code in this technote was taken from the DOS **ErrorMessage( )** function in **D_ERROR1.CPP** and modified for the purpose of this example. The following snippet shows one case statement from a derived window's **Event( )** function.

Note that the *LOOP_WINDOW* must be modal or it will not work properly. The do/while loop is waiting for either *LOOP_OK* or *LOOP_CANCEL* which are user-defined *EVENT_TYPE* values sent by **OK** and **Cancel** buttons. Because all other events are being sent to the *windowManager* this window must be modal, or other windows or objects could receive messages.

```
case CONTROL_LOOP:
```

```
{
  LOOP_WINDOW *window = new LOOP_WINDOW("test.dat~LOOP_WINDOW");
  *windowManager + window;

  // Make sure the window is modal.
  UI_EVENT event;
  EVENT_TYPE ccode = 0;
  do
  {
    eventManager->Get(event, Q_NORMAL);
    ccode = event.type;

    // LOOP_OK and LOOP_CANCEL are user defined values (>=10000)
    // and programmed into the buttons that are on the LOOP_WINDOW.
    if (ccode == LOOP_OK || ccode == LOOP_CANCEL)
      *windowManager - window;
    else
      ccode = windowManager->Event(event);
  } while (windowManager->Index(window) != -1);
  *windowManager - window;
  delete window;
}
break;
```

The control loop will break when one of two conditions occurs.

- Either *LOOP_OK* came through, or
- *LOOP_CANCEL.* If *LOOP_CANCEL* was seen the window is subtracted from the *windowManager* and the second part of the **while** loop test will fail and end the loop.

3.3 Interpretation of events in Zinc ZD-TN4572

Keywords:	event interpretation
Versions:	3.0 and later
Components:	Library
Platforms:	All
Issued:	July 7, 1994

Question

How do events get interpreted in Zinc?

Answer

All raw events—for example, those coming from a keyboard or mouse—are passed to the receiving object. The receiving object's **Event( )** function interprets and processes the event if it pertains to that object.

The following concepts are important:

One system-wide event map table contains entries for each object, and all logical events that correspond to a given raw event for that object. The event map table is a member variable of **UI_WINDOW_OBJECT**. The default event map table is located in g_event.cpp. The definition is:

```
UI_EVENT_MAP *eventMapTable;
```

The programmer may modify this table, or reassign the event map-table to a programmer defined table.

All objects contain an *eventMapTable* pointer since they all inherit from **UI_WINDOW_OBJECT**. When instantiated, each object points to the default (system-wide) *eventMapTable*.

All objects contain a virtual **Event( )** member function. While most changes to event handling can be handled with changes to the default *eventMapTables*, the **Event( )** function can be easily overloaded to handle programmer defined events, etc.

Example

For our example, a text field is the current object. Its **Event( )** function demonstrates how Zinc processes and translates a raw event.

```
EVENT_TYPE UIW_TEXT::Event(const UI_EVENT &event)
{
  ...
  // get logical event from event map table
  EVENT_TYPE ccode = LogicalEvent(event, ID_TEXT);

  // process event
  switch (ccode)
  {
    case S_CREATE:
    case S_SIZE:
          ...
    case OTHER_EVENTS:
          ...
    // any unprocessed events are passed to base class for processing
    default:
      ccode = UIW_WINDOW::Event(event);
      break;
}
```

Internal Details

LogicalEvent( ) searches the event map table, finds an exact match for the event, event raw code and object (e.g. window, button etc), or finds a match to the closest object from which the object is inherited and returns the logical event associated with this match, or if no match is found, no mapping occurs.

LogicalEvent( ) lives in **z_win2.cpp**, **MapEvent( )** in **z_map.cpp**. To fully understand the algorithm, you must first understand *windowID*, which shows inheritance—the entries for *windowID[ ]*. For example, a **UIW_GROUP** would have:

```
windowID[0] =  ID_GROUP;
  windowID[1] =  ID_WINDOW;
  windowID[2] =  ID_WINDOW_OBJECT;
  windowID[3] =  ID_WINDOW_OBJECT;
  windowID[4] =  ID_WINDOW_OBJECT;
```

To modify the *eventMapTable* and reassign it to an object, refer to the following example:

```
#define MY_EVENT   10001
static UI_EVENT_MAP _eventMapTable[] = {
  { ID_TEXT, S_CLOSE,   WM_KEYUP,     F8 },
  { ID_TEXT, L_TOP,   WM_KEYDOWN,     F7 },
  // Define my new event in the event table
  { ID_TEXT, MY_EVENT,   WM_CHAR,     F6 },
  // End of array.
  { ID_END, 0, 0, 0 } };

// then in code, assign the new table to a text object ...
UIW_TEXT *text = new UIW_TEXT(2,2,20,20,"",50);
text->eventMapTable = _eventMapTable;
```

If this is done, when the text object is current, only the above logical events will be mapped by the text's **Event( )** function. For more complete examples see the Zinc BBS.

Notes:

- When a user clicks with the mouse on a text field, the raw mouse event code is placed in the event queue and the event is passed to the text object.
- The text object's Event( ) function calls LogicalEvent( ), which in turn calls MapEvent( ).
- The raw event is mapped to a logical event (by looking it up in an *eventMapTable*) and which is then returned by LogicalEvent( ). In this case, the logical event will be *L_BEGIN_MARK*, and the x/y information in the event will indicate where in the text field to begin marking. (Alternatively, if a button were the current object, this same mouse click would generate an *L_SELECT* for the ccode, and the Event( ) function for the button would process it accordingly.)
- The Event( ) function acts on the logical event. (You might have the Event( ) function pass control to your callback function here, or send another event to a programmer-defined object.)

3.4 Trapping the S_CLOSE event ZD-TN1010

Keywords:	S_CLOSE
Versions:	3.0+
Components:	UI_WINDOW_MANAGER.
Platforms:	All
Issued:	January 20, 1995

Question

Where can I trap *S_CLOSE*?

Answer

Here are two ways of trapping *S_CLOSE.*

The first way is to trap for *S_DEINITIALIZE* in the Event( ) function of your derived window. Once the Event function receives the event, you know that the window is about to be closed by the Window Manager. When this happens you can do any special cleanup or handling before passing the event to the base class. The drawback to this method is that the window is already in the process of being closed and shouldn't be blocked. The following snippet of code illustrates.

```
EVENT_TYPE DERIVED_WINDOW::Event(const UI_EVENT &event)
{
  ...

  case S_DEINITIALIZE: // Done in the Event() function of my derived window.
    {
    // Do any data handling or cleanup, then pass it to the base class.
    ccode = UIW_WINDOW::Event(event);
    }
    break;
  ...
```

The second way is deriving your own Window Manager. When S_CLOSE is put on the queue, the Window Manager will see it first, since it handles this type of message. Once it sees the event, you can continue to delete the window, or block the event upon conditions you define. The following snippet illustrates.

```
EVENT_TYPE NEW_WINDOW_MANAGER::Event(const UI_EVENT &event)
{
  ...

  case S_CLOSE: // Trap the S_CLOSE to swap the windows.
    {
    // Get a pointer to the old window.
    UI_WINDOW_OBJECT *currentWindow = First(); // current == first.
    // Make sure it is OK to delete the window.
```

```
        if (deleteWin == OK)
          ccode = UI_WINDOW_MANAGER::Event(event);

        // Else whatever condition is met to keep the window.
        }
        break;

      ...
```

3.5 Working with Flags ZD-TN7000

Keywords:	Flags
Versions:	3.0+
Platforms:	All
Issued:	January 20, 1995

Question

What are flags, and what do they do?

Answer

Flags are what you use to set and check information contained in objects; they provide more functionality to objects than just their class. For example, a UIW_BUTTON object uses flags to determine whether it is a radio button, a check box, or a button that appears three-dimensional.

Defined more technically, flags are const declarations, located in class definitions, with bits set to ones in binary places (2^0, 2^1, 2^2, etc.). For readability by humans, the names of flags reflect what types of classes the flag affects. For example, the window object flag WOF_JUSTIFY_CENTER is

```
const WOF_JUSTIFY_CENTER = 00000001
```

the flag WOF_BORDER is

```
const WOF_BORDER = 00000100
```

and the flag WOF_MINICELL is

```
const WOF_MINICELL = 01000000
```

This way, a window object can be center justified and bordered, and use minicell coordinates, at the same time.

The following is a table of flag types, their naming conventions, and an example of how they affect the status or attributes of objects.

Flag naming convention

Flag type	Class	Example
Attachments	ATCF_FLAGS	ATCF_STRETCH
Buttons	BTF_FLAGS	BTF_RADIO_BUTTON
Button status	BTS_FLAGS	BTS_DEPRESSED
Dimension constraints	DNCF_FLAGS	DNCF_WIDTH
Dates	DTF_FLAGS	DTF_ASIAN_FORMAT
Icons	ICF_FLAGS	ICF_DOUBLE_CLICK
Images	IMF_FLAGS	IMF_TILED
Menu items	MNIF_FLAGS	MNIF_MINIMIZE
Numbers	NMF_FLAGS	NMF_SCIENTIFIC
Relative constraints	RLCF_FLAGS	RLCF_VERTICAL_CENTER
Strings	STF_FLAGS	STF_UPPER_CASE
System buttons	SYF_FLAGS	SYF_GENERIC
Storage	UIS_FLAGS	UIS_BINARY
Lists	WNF_FLAGS	WNF_AUTO_SORT
Window object actions	WOAF_FLAGS	WOAF_MDI_OBJECT
Window objects	WOF_FLAGS	WOF_NON_FIELD_REGION
Window object status	WOS_FLAGS	WOS_SELECTED

Flag functionality

Although there are flag types for nearly every window object in Zinc, flags do only one of two things: check status or set status. There are only a few status flags, and quite a few other flags. Use the status flags to determine if the user has changed your object in some way. Use the status flags to set or change the attributes of your objects.

- status flags

  —Flag prefixes that end in "S," as in WOS_. These reflect the status of an object, such as whether the user minimized or maximized it, or whether the user clicked in it.

- other flags

  —Flag prefixes that end in "F," as in WOAF_. These set the attributes of an object, such as whether the object takes up the entire window region, is lowercase, or is a vertical or horizontal scroll bar.

Where to find a complete list of flags

As we mentioned earlier, flags are really declarations of constants. To learn about the different flags that Zinc objects can use, you have several resources:

- The Quick Reference Guide

  —Lists the flags that each class uses, as well as the hexadecimal values of the flags.
- *Programmer's Reference* Vols. 1 and 2

  —Lists an class's different members, including the flag-setting member variables.
- The source code

  —You can always read the source code to find out the flags a class uses, and find out what happens to an object when it receives a specific flag after it's constructed.

How do I use flags?

You use flags to set or check the state of an object. You can use them three ways.

1. You can use an object's flag-checking functions.
2. You can set the flags in the object's constructor when you use the new operator.
3. After the object's construction, you can

   —set a flag into an object's flag member with a bitwise OR

   —unset a flag into an object's flag member with a bitwise AND

   —toggle a flag into an object's flag member with a bitwise XOR.

Using an object's flag-checking functions

Each object class definition contains some flag-checking functions that you can use with an object flag member. The functions return TRUE if the condition is met, or FALSE if it is not.

An example of a flag-checking function is UI_WINDOW_OBJECT's IsLeftJustified( ). Here's an example of how you can use it:

UIW_STRING *myString;

```
if (myString->IsLeftJustified( ))
  \\ do something
```

There are quite a few flag-checking functions you can use. For an exhaustive list of them, consult Table 2, "Flag-checking functions," on page 42.

Setting flags in the object's constructor with a new operator

To set a flag in the object's constructor with the new operator, do the following:

```
UIW_TEXT *myTextObject = new UIW_TEXT(0, 0, 60, 20, "", 256, WNF_NO_FLAGS, WOF_NON_
  SELECTABLE);
```

Setting flags with the flag members

To set a flag with an object's woFlags member, use a bitwise OR. If the object is attached to the Window Manager, call the object's Information( ) function to cause it to redisplay itself.

```
object->woFlags |=WOF_NON_SELECTABLE; \\ set the object as nonselectable
object->Information(I_CHANGED_FLAGS, ZIL_NULLP(void); \\ tell the object its flag changed
only if attached to Window Manager
```

To unset a flag with an object's woFlags member, use a bitwise AND. If the object is attached to the Window Manager, call the object's Information( ) function to cause the object to redisplay itself.

```
object->woFlags &= WOF_NON_SELECTABLE; \\ set the object as nonselectable
object->Information(I_CHANGED_FLAGS, ZIL_NULLP(void); \\ tell the object its flag changed
only if attached to Window Manager
```

To toggle a flag with an object's woFlags member, use a bitwise XOR. If the object is attached to the Window Manager, call the object's Information( ) function to cause the object to redisplay itself.

```
object->woFlags ^=WOF_NON_SELECTABLE; \\ set the object as nonselectable
object->Information(I_CHANGED_FLAGS, ZIL_NULLP(void); \\ tell the object its flag changed
only if attached to Window Manager
```

Section 4

Drawing, video, and graphics

4.1 The DrawItem( ) function ZD-TN1007

Keywords:	**DrawItem(**), drawing, **VirtualGet(**), **VirtualPut(**)
Versions:	All
Components:	**DrawItem( )**
Platforms:	All
Issued:	November 11, 1994

Question

How do I use the **DrawItem(**) function?

Answer

Use the **DrawItem(**) function when you want an object to appear differently than its default appearance, or when you want additional graphics drawn on a generic object. The generic format follows.

```
EVENT_TYPE CLASS_NAME::DrawItem(const UI_EVENT &event, EVENT_TYPE ccode)
{
  UI_REGION region = true;
  display->VirtualGet(screenID, region);
  // Possibly call the base class (if you'll draw on "top" of the standard object)
  BASE_CLASS::DrawItem(event, ccode);

  // Programmer defined drawing (use display class primitives)

  display->VirtualPut(screenID);

  return(TRUE);
}
```

If the object is derived from one of Zinc's class objects then the user may want to call the base class **DrawItem( )** function before he does his drawing (which might draw on top of the default object.) At the end of the **DrawItem(**) function we return *TRUE* to indicate that the drawing is complete and no more drawing should take place. If *FALSE* or 0 is returned then additional drawing may take place by the base class. **VirtualGet(**) and **VirtualPut(**) functions attempt to optimize the amount of drawing done to the screen.

Drawing should be based on the true coordinates and not relative; "true" is a *UI_REGION* structure and has the proper region assigned to it. If the programmer draws outside of this region then there may be unexpected results. If drawing could occur outside of this region, such as a long line, then an additional member, clip, also a *UI_REGION* structure, should be passed to the drawing primitives. This will ensure that any drawing outside of "true" will be properly clipped; "true" is a public member and "clip" a protected member of **UI_WINDOW_OBJECT**.

WOS_OWNERDRAW must be set in the object's *woStatus* member for this function to be called. For additional information consult the Getting Started manual under the **LSTITM** example.

4.2 Multithreaded applications on OS/2 ZD-TN1017

Keywords: Event manager.
Versions: 4.0+
Components: UI_EVENT_MANAGER
Platforms: OS/2

Question

How do I get Zinc to work with multiple threads?

Answer

There are several things that must be done to get Zinc to function with multiple threads. Zinc is a non-reentrant application. What this means is that a call to a function can't be interrupted by a subsequent call to the same function or the variables will become corrupted. Most C library functions are this way, and so is Zinc.

To get around this you must derive the Event Manager and override the Put( ) function. Since this is a virtual function it very simple to do. Here is a typical class declaration that you might use with the Event Manager.

```
class ZIL_EXPORT_CLASS EVENT_MANAGER : public UI_EVENT_MANAGER
{
public:
    EVENT_MANAGER(UI_DISPLAY *_display, int _noOfElements = 100);
    virtual ~EVENT_MANAGER();
    void Put(const UI_EVENT &event, Q_FLAGS flags);
};
```

Since the Put( ) function is non-reentrant it must be protected or the event queue will become corrupted. There are two ways to do this. You can either use the OS/2 functions, DosEnterCritSec( ) and DosExitCritSec( ) functions which is very simple or you can use the functions DosCreateMutexSem( ) and DosCloseMutexSem( ).

The Enter and Exit critical section functions take no arguments and are therefore simple to use. The example uses this method as illustrated by the following snippet of code.

```
void EVENT_MANAGER::Put(const UI_EVENT &event, Q_FLAGS flags)
{
    // Start the critical section.
    DosEnterCritSec();
    UI_EVENT_MANAGER::Put(event, flags);
    // Exit the critical section.
    DosExitCritSec();
}
```

True OS/2 gurus would probably argue that this should be done with semaphores, using the other mentioned functions. You should consult your OS/2 programming manual on the use of the other functions. They create and delete mutual exclusive semaphores.

Once you have protected the Put( ) function this allows your other threads to post messages on the event queue giving you the ability to communicate with Zinc. The only constraint on this is that Zinc must remain on a single thread. It can't at this time be split apart into multiple threads. Threading allows you to run other programs or processes next to your Zinc program.

4.3 Changing video modes at run time ZD-TN2005

Key words:	display mode, resolution, run time
Versions:	Zinc 3.5 and later
Components:	Library
Platforms:	DOS
Issued:	September 15, 1994

Question

How do you change graphics or text resolution at run time?

Answer

Changing the display mode requires:

- Notifying the Window Manager and Event Manager that the display is being changed;
- Deleting the current display;
- Creating the new display; and
- Notifying the Window Manager and Event Manager of the new display.

The following is an example program that can change between two possible text modes and two possible graphics modes. The graphics display used in this example is the **UI_GRAPHICS_DISPLAY**. The major portion of the **MY_WIN::Event( )** function came from the **ZINCAPP.CPP** module in the **ZINCAPP** tutorial.

Note: If using Zinc 3.6 or Zinc 3.5 you will need to replace **ZIL_NULLF(ZIL_USER_FUNCTION)** with **NULLF** and **ZIL_NULLP(void)** with **NULLP(void)**.

```
#include <ui_win.hpp>

const int TDM_25X40  = 10000;
const int TDM_43X80  = 10001;
const int GR_DEFAULT = 10002;
const int GR_102     = 10003;

class MY_WIN : public UIW_WINDOW
{
public:
  MY_WIN();
  virtual ~MY_WIN(){}
  virtual EVENT_TYPE Event(const UI_EVENT &event);
};

MY_WIN::MY_WIN() : UIW_WINDOW(0, 0, 50, 10)
```

```
{
  *this
    + new UIW_BORDER
    + new UIW_MAXIMIZE_BUTTON
    + new UIW_MINIMIZE_BUTTON
    + new UIW_SYSTEM_BUTTON(SYF_GENERIC)
    + new UIW_TITLE("TEST")
    + &(*new UIW_PULL_DOWN_MENU()
      + &(*new UIW_PULL_DOWN_ITEM("Text Mode")
        + new UIW_POP_UP_ITEM("TDM_25", MNIF_SEND_MESSAGE, BTF_NO_3D,
          WOF_NO_FLAGS, ZIL_NULLF(ZIL_USER_FUNCTION), TDM_25X40)
        + new UIW_POP_UP_ITEM("TDM_43", MNIF_SEND_MESSAGE, BTF_NO_3D,
          WOF_NO_FLAGS, ZIL_NULLF(ZIL_USER_FUNCTION), TDM_43X80))
      + &(*new UIW_PULL_DOWN_ITEM("Graphics Mode")
        + new UIW_POP_UP_ITEM("Default", MNIF_SEND_MESSAGE, BTF_NO_3D,
          WOF_NO_FLAGS, ZIL_NULLF(ZIL_USER_FUNCTION), GR_DEFAULT)
        + new UIW_POP_UP_ITEM("SuperVGA", MNIF_SEND_MESSAGE, BTF_NO_3D,
          WOF_NO_FLAGS, ZIL_NULLF(ZIL_USER_FUNCTION), GR_102)));
}

EVENT_TYPE MY_WIN::Event(const UI_EVENT &event)
{
  UI_EVENT tEvent;
  int isGraphics = FALSE;
  EVENT_TYPE ccode = LogicalEvent(event);

// Check if the event is a Zinc system event.
  if (ccode < TDM_25X40)
    return (UIW_WINDOW::Event(event));
  else
  {
    switch(ccode)
    {
    case TDM_25X40:
      tEvent.rawCode = TDM_25x40;
      break;
    case TDM_43X80:
      tEvent.rawCode = TDM_43x80;
      break;
    case GR_DEFAULT:
      tEvent.rawCode = 4;
      isGraphics = TRUE;
      break;
    case GR_102:
      tEvent.rawCode = 0x102;
      isGraphics = TRUE;
      break;
    }
    tEvent.type = (S_RESET_DISPLAY);
    tEvent.data = ZIL_NULLP(void);

// Notify the event and window managers that we are changing the display.
    windowManager->Event(tEvent);
    eventManager->Event(tEvent);
    delete display;

// Check for text or graphics mode.
    if (isGraphics)
    {
      display = new UI_GRAPHICS_DISPLAY(tEvent.rawCode);
      if (!display->installed)
      {
        delete display;
        display = new UI_TEXT_DISPLAY();
      }
    }
    else
      display = new UI_TEXT_DISPLAY(tEvent.rawCode);

// Make sure the window doesn't have negative coordinates. If you have
// more than one window, this will need to be done for each window.
    if (relative.top < 0)
    {
      relative.bottom = relative.Height() - 1;
      relative.top = 0;
    }
    if (relative.left < 0)
    {
       relative.right = relative.Width() - 1;
       relative.left = 0;
    }

// Notify the event and window managers that we changed the display.
    tEvent.data = display;
    eventManager->Event(tEvent);
    ccode = windowManager->Event(tEvent);
  }
  return(ccode);
}

int UI_APPLICATION::Main (void)
{
  UIW_WINDOW *window = new MY_WIN();
  *windowManager
    + window;
  UI_APPLICATION::Control();
```

```
// Must re-initialize the UI_APPLICATION class' display member to exit gracefully.
  display = UI_WINDOW_OBJECT::display;
  return(0);
}
```

4.4 Palette mapping in Zinc ZD-TN4573

Keywords:	color, palette mapping
Versions:	3.0 and later
Components:	Library
Platforms:	All
Issued:	July 7, 1994
File:	**PALETTE.ZIP**

Question

How are object colors handled in Zinc?

Answer

Palette mapping (color control) under Zinc follows these rules:

- The native operating system will draw objects in the native OS colors, unless the *WOS_OWNER-DRAW* flag is set for that object.
- In DOS and Curses Zinc's **DrawItem( )** function will be called to draw each object.
- If the *WOS_OWNERDRAW* flag is set, the following applies:
  — In DOS, Zinc will always call a programmer-defined **DrawItem( )** function for the drawing of the object.
  —In other operating systems, the OS will defer the drawing of that object to Zinc's **DrawItem( )** function for the object or to a programmer defined **DrawItem( )** function, if defined.
- Each object has a pointer to a palette map table which contains entries for each object, possible states for that object (e.g. selected, current, noncurrent etc.,) and a corresponding set of colors for that object's state.
- This table can be directly modified by the programmer or the programmer can reassign an object's palette map table to a programmer defined table.
- Objects are drawn (or redrawn) whenever the object or its parent receives a message to draw. For example, objects are redrawn when they receive *S_REDISPLAY* or *S_SIZE* messages, etc.
- The palette map table is a member of **UI_WINDOW_OBJECT** and is defined as:

```
UI_PALETTE_MAP *paletteMapTable;
```

- All objects contain a *paletteMapTable* pointer since they all inherit from **UI_WINDOW_OBJECT**. Upon instantiation, each object's *paletteMapTable* pointer will point to the default palette map table found in **g_pnorm.cpp**.

Example

```
EVENT_TYPE UIW_STRING::DrawItem(const UI_EVENT &, EVENT_TYPE ccode)
// The DrawItem() function is defined virtual so the base class's DrawItem() function //
can be overridden by a programmer defined DrawItem() function.
{
  UI_REGION region = true;

  // lastPalette is set under the S_DISPLAY_ACTIVE / S_DISPLAY_INACTIVE
  // event in the string's Event() function by a call to the LogicalPalette()
  // function in z_map1.cpp.  It calls MapPallette() in z_win2.cpp.
  display->Rectangle(screenID, region, lastPalette, 0, TRUE, FALSE, &clip);
  ...
  DrawText(screenID, region, text, lastPalette, FALSE, ccode);
  ...
  return (ccode);
}
```

To fully understand this algorithm, the following concepts are important:

windowID[ ] shows inheritance. The entries for *windowID[ ]* for a **UIW_GROUP** object would be

```
windowID[0] =  ID_GROUP;
windowID[1] =  ID_WINDOW;
windowID[2] =  ID_WINDOW_OBJECT;
windowID[3] =  ID_WINDOW_OBJECT;
windowID[4] =  ID_WINDOW_OBJECT;
```

FlagSet( ) and **FlagsSet( )** are defined as follows:

```
#define FlagSet(flag1, flag2) ((flag1) & (flag2))
#define FlagsSet(flag1, flag2) (((flag1) & (flag2)) == (flag2))
```

LOGICAL_PALETTE values:

```
const LOGICAL_PALETTE PM_ANY= 0x0000;
const LOGICAL_PALETTE PM_ACTIVE= 0x0001;
const LOGICAL_PALETTE PM_INACTIVE= 0x0002;
const LOGICAL_PALETTE PM_CURRENT= 0x0004;
const LOGICAL_PALETTE PM_SELECTED= 0x0008;
const LOGICAL_PALETTE PM_NON_SELECTABLE= 0x0010;
const LOGICAL_PALETTE PM_HOT_KEY= 0x0020;
// Special mode palettes (WOAF_DIALOG_OBJECT border)
const LOGICAL_PALETTE PM_SPECIAL= 0x0040;
```

- An analysis of the **LogicalPalette( )** and **MapPalette( )** algorithms shows an important concept for palette map table entries: *PM_ANY* must be at the end of an object's grouping of *UI_PALETTE_MAP* states.
- To create a programmer-defined palette mapping for an object create a *UI_PALETTE_MAP* for the object, add the specific entries, then assign *object->paletteMapTable* this new *paletteMap*.

```
static UI_PALETTE_MAP newPaletteMap[] =
{
   { ID_WINDOW_OBJECT, PM_CURRENT,
  { ' ', attrib(YELLOW, BLACK), attrib(MONO_HIGH, MONO_BLACK), PTN_SOLID_FILL,
    BLUE, WHITE, BW_BLACK, BW_WHITE, GS_BLACK, GS_WHITE } },
   { ID_WINDOW_OBJECT, PM_ANY,
  { ' ', attrib(YELLOW, LIGHTGRAY), attrib(MONO_HIGH, MONO_BLACK),
    PTN_SOLID_FILL, WHITE, BLUE, BW_BLACK, BW_WHITE, GS_BLACK, GS_WHITE } },
   // End of array.
   { ID_END, 0, { 0, 0, 0, 0, 0, 0 } }
};
object->paletteMapTable = newPaletteMap;
```

For more information see **palette.zip** on the Zinc BBS (3.6 conference, user contributions).

4.5 Loading large bitmaps with OS/2-specific functions ZD-TN1011

Keywords:	bitmaps, OS/2
Versions:	4.0+
Components:	UI_WINDOW_OBJECT
Platforms:	OS/2

Question

How do I display bitmaps larger than 128x128 under OS/2?

Answer

A bitmap ID is assigned in a resource (.RC) file that corresponds to an OS/2 .BMP file. With that ID, a bitmap can be loaded using OS/2 calls. Once the bitmap is loaded it can be easily displayed using Zinc's UI_WINDOW_OBJECT class. The OS/2 function GpiLoadBitmap takes the bitmapID, loads the bitmap and returns a handle to the bitmap. It is also necessary to get a handle to the presentation space with WinGetPS( ). Once that is done then the call to WinDrawBitmap( ) can be used to display the bitmap as the following code shows.

```
BITMAP_OBJECT::BITMAP_OBJECT(int _bitmapID) :
  UI_WINDOW_OBJECT(0, 0, 0, 0, WOF_NON_FIELD_REGION, WOAF_NON_CURRENT),
  bitmapID(_bitmapID), hBitmap(0)
{
}

BITMAP_OBJECT::~BITMAP_OBJECT()
{
// We need to make sure that we delete the bitmap when we destroy the object.
  If (hBitmap)
    GpiDeleteBitmap(hBitmap);
}

// Displaying the bitmap is done here.
EVENT_TYPE BITMAP_OBJECT::DrawItem(const UI_EVENT &, EVENT_TYPE)
{
  UI_REGION region = true;
  display->VirtualGet(screenID, region);

// We create an RECTL structure and fill it with our objects region to prepare for the
drawing of the bitmap.
  RECTL rect;
  rect.xLeft = 0;
  rect.yBottom = 0;
  rect.xRight = true.Width() - 1;
  rect.yTop = true.Height() - 1;
// The bitmap is drawn with WinDrawBitmap.
  WinDrawBitmap(hps, hBitmap, NULL, (POINTL *)&rect, 0, 0,
    DBM_IMAGEATTRS |
    (FlagSet(woFlags, WOF_NON_FIELD_REGION) ? DBM_STRETCH : 0));
  display->VirtualPut(screenID);
  return(TRUE);
}
EVENT_TYPE BITMAP_OBJECT::Event(const UI_EVENT &event)
{
  EVENT_TYPE ccode = event.type;
  switch (ccode)
  {
  case S_CREATE:
// Since we are doing the loading and displaying of the bitmap the object must be marked
with
// WOS_OWNERDRAW flag.
    woStatus |= WOS_OWNERDRAW;
// In the event function under S_CREATE we first get a handle to the presentation space //
by calling WinGetPS then make the call to GpiLoadBitmap with the returned
// presentation space handle.
    ccode = UI_WINDOW_OBJECT::Event(event);
    hps = WinGetPS(screenID);
    hBitmap = GpiLoadBitmap(hps, NULLHANDLE, bitmapID, 0, 0);
    break;
  default:
    ccode = UI_WINDOW_OBJECT::Event(event);
  }
  return ccode;
}
```

A complete set of code is available on our BBS for downloading upon request.

4.6 Setting the mouse cursor to a wait state ZD-TN4020

Keywords: mouse, changing to an hourglass.
Version: 3.6, 4.0
Component: Mouse; eventManager
Platforms: Windows
Issued: January 31, 1995

Question

How can the I change the mouse cursor image an hourglass so that when the user moves the mouse, it doesn't change back to a normal view cursor mouse image?

Answer

In Windows, each object determines how the mouse cursor image is to be displayed when the mouse is moved over that object. This means that when the mouse gets changed to an hourglass image (*DM_WAIT*), as soon as the user moves the mouse, the object that the mouse is over gets a mouse move event, and changes the mouse cursor image back to the image that object wants.

One simple way to force the mouse to remain as an hourglass, even when the user moves the mouse, is to trap all mouse events before they get passed to the *windowManager*, and not pass any mouse events to the *windowManager* that would change the mouse image (such as *WM_MOUSEMOVE*). This can be done writing your own **Control**( ) loop as follows:

```
// Use the following code in place of UI_APPLICATION::Control();
  UI_EVENT event;
  EVENT_TYPE ccode;
  do
  {
    // get an event from the queue
    eventManager->Get(event, Q_NORMAL);

    // pass mouse event to windowManager only when not in hourglass state.
    // When in hourglass state, windowManger->userFlags gets set by programmer
    // to 1.
    if (!((windowManager->userFlags)
             && event.message.message ==WM_MOUSEMOVE))
      ccode = windowManager->Event(event);
    else
      eventManager->DeviceImage(E_MOUSE,DM_WAIT);

  } while (ccode != L_EXIT && ccode != S_NO_OBJECT);
```

In order for this to work, the mouse would have to be changed to an hourglass with the following line of code:

```
  eventManager->DeviceImage(E_MOUSE, DM_WAIT);
```

Then windowManager->userFlags could be set to a pointer to some object of window. This would cause the if( ) statement to fail and no mouse move events would get processed which would force the mouse to remain as an hourglass image.

When you want the hourglass image to be changed back, use the following:

```
eventManager->DeviceImage(E_MOUSE, DM_VIEW);
windowManager->userFlags =0;
```

For an example on doing this, see **mwait.zip** on the user contributions conference, Zinc 4.0 listing of the bulletin board.

Section 5

Zinc Designer

5.1 Integrating Directory Services from Zinc Designer ZD-TN1009

Keywords: Services, Zinc Designer
Versions: 4.0+
Components: Directory services from Zinc Designer.
Platforms: All
Issued: November 21, 1994

Question

How do I use the directory services incorporated in Zinc Designer?

Answer

In versions of Zinc previous to version 4.0, directory services have existed only as an example program called **FILEEDIT**. With version 4.0 this example has been eliminated, and the directory services directly supported as a component of Zinc Designer. This means that directory services has been added to the Designer libraries, and, even better, has been implemented as a separate module so the user can integrate this into his own code.

To make directory services available to your code:

In your code file you need to include **DIRECT.HPP** and in your makefile or project you need to include **SERVICE.LIB** and **DIRECT.LIB**.

The header should be in your **\ZINC\INCLUDE** directory and the **.LIB** files should be in the proper library directory. If these files are not present, you can remake the Designer or just compile the libraries in **\ZINC\DESIGN\SERVICE** and **\ZINC\DESIGN\DIRECT**.

To access directory services in your application you must create a new service manager and a new directory services:

```
// Create service manager to handle storage for various services
_serviceManager = new ZAF_SERVICE_MANAGER;
// Create directory service
*_serviceManager + new ZAF_DIRECTORY_SERVICE;
```

Various services take requests and return answers to those requests. You first need to set up the requestor, the request, then you activate the service as follows:

```
int myRequest = OPT_FILE_OPEN;
// Set up the requestor
directoryService->Information(I_SET_REQUESTOR, this);
// Make a request to the directory service.
directoryService->Information(I_SET_REQUEST, &myRequest);
// Activate the service.
directoryService->Information(I_ACTIVATE_SERVICE, ZIL_NULLP(void));
```

The requestor is the object which will receive the return event. The request is what you want the service to do. In this case the requestor is set as the derived window and the request to open a file. When terminated, the service will return the negative value of the original request (when you choose OK on the service window.) The returned request is put into the data portion of the event that is passed back to the window.

The following is a simple program that shows how to implement the directory service. You should look closely at the **Event( )** function of the derived window. This program assumes that there is a resource with a menu or button with the value 10000 assigned to it, and that there is a **UIW_STRING** field with the *stringID* of *STRING_FIELD*. The program takes the return value and copies the data into the string field.

```
#include <ui_win.hpp>
#include <direct.hpp>

const EVENT_TYPE OPEN_FILE = 10000;

class WINDOW : public UIW_WINDOW
{
public:
  WINDOW();
  virtual ~WINDOW() {}
  virtual EVENT_TYPE Event(const UI_EVENT &event);
  ZAF_DIRECTORY_SERVICE *directoryService;

protected:
  UI_WINDOW_OBJECT *field;
};

WINDOW::WINDOW() : UIW_WINDOW("p_main.dat~MAIN_WINDOW")
{
  directoryService = new ZAF_DIRECTORY_SERVICE;
  field = Get("STRING_FIELD");
  windowManager->Center(this);
}

EVENT_TYPE WINDOW::Event(const UI_EVENT &event)
{
  EVENT_TYPE ccode = LogicalEvent(event);
  switch(ccode)
  {
    case OPEN_FILE:
    {
      EVENT_TYPE myRequest = OPT_FILE_OPEN;
      // Set the requestor to be this window.
      directoryService->Information(I_SET_REQUESTOR, this);
      // Make a request to the directory service.
      directoryService->Information(I_SET_REQUEST, &myRequest);
      // Activate the service.
      directoryService->Information(I_ACTIVATE_SERVICE,ZIL_NULLP(void));
      }
    break;

    case -OPT_FILE_OPEN:  // The return request is the opposite of the initial request.
      field->Information(I_SET_TEXT, event.data);
    break;

    default:
      ccode = UIW_WINDOW::Event(event);
  }
  return(ccode);
}

UI_APPLICATION::Main()
{
   WINDOW *win = new WINDOW;

  _serviceManager = new ZAF_SERVICE_MANAGER;
  *_serviceManager + win->directoryService;

  *windowManager + win;

  Control();

  delete _serviceManager;
  return(0);
}
```

5.2 The Service Manager ZD-TN1015

Keywords: Service Manager
Versions: 4.0
Components: ZAF_SERVICE_MANAGER
Platforms: All

Question

Why do I need the Service Manager to use the directory service?

Answer

By default the Service Manager overrides the error system, help system, and the exit function. Because of this, you should override the Service Manager's allocation of these systems when using your own.

Service Manager manages the storage files for the services. The services request files from the Service Manager, then the Service Manager opens the file. After opening the file, the Service Manager returns the storage file pointer to the requesting service.

The Service Manager works similarly to the Window Manager. While the Window Manager manages the message passing to attached windows, the Service Manager handles attached services. This makes services reusable through the life of the program without instantiating the services over and over.

To override the Service Manager's errorSystem, helpSystem, and ExitFunction, assign them after allocating the Service Manager itself. Make sure that the memory to errorSystem and helpSystem is deleted before you reassign them, because the Service Manager has already allocated them. If you reallocate them without deleting them first, your program will have a memory leak.

```
  // The Service Manager allocates the helpSystem and errorSystem.
_serviceManager = new ZAF_SERVICE_MANAGER;
  // If you want your copy of these they must be set after allocating the Service Manager.
// Delete the previous copy or you will have a leak.
delete UI_WINDOW_OBJECT::errorSystem;
UI_WINDOW_OBJECT::errorSystem = new UI_ERROR_SYSTEM;
...
// Reassign the exitFunction if needed. No Deletion is necessary for this.
  windowManager->exitFunction = MyExitFunction;
  ...
  // Process user responses.
Control();
  // Clean up.
delete _serviceManager;
  // Don't delete errorSystem or helpSystem, Service Manager is already removing them!
  return (0);
```

5.3 Exporting a window to text ZD-TN1016

Keywords:	Export, .DAT, .TXT
Versions:	4.0+
Components:	UIW_WINDOW
Platforms:	All

Question

What does exporting a .DAT file to a .TXT file give me?

Answer

Exporting a .DAT file to a .TXT file outlines the relationships and contents of the objects in the .DAT file in a text file. The contents of the text file are the object's stringID and text.

Exporting a .DAT file to a .TXT file outputs the stringID and the text but does not output the type of object. This means that exporting a .DAT file to text is a one way operation; you can't import a .TXT file back into the Designer. You could, however, enter the text into the Designer through delta storage, if your application must support multiple languages. You could also create separate .DAT files for each language. Exporting a . DAT file to a text is useful in translating. You can send this file to your translators who can then return you a translation of the text in your main application's GUI. You can then enter the translation into your .DAT file.

Here is an output of a simple window. This window has a menu with several popup items, a status bar, and a notebook with three pages and a few objects on each page.

```
WINDOW = "Window"
{
   FIELD_1
    {
        FIELD_2 = "item"
        {
            FIELD_44 = "item"
            FIELD_45 = "item"
            FIELD_46 = "item"
        }
    }
    FIELD_3
    {
        STATUS_STRING = "empty string"
        STATUS_PROMPT = "Status:"
    }
    NOTEBOOK
    {
        PAGE_1 = "Page 1"
        {
            FIELD_9 = "string"
            FIELD_10 = "string"
            FIELD_11 = "string"
            FIELD_12 = "button"
            FIELD_13 = "button"
            VERTICAL_LIST
            {
                FIELD_15 = "Check-box"
                FIELD_16 = "Check-box"
                FIELD_17 = "Check-box"
                FIELD_18 = "Check-box"
                FIELD_19 = "Check-box"
            }
        }
        PAGE_2 = "Page 2"
        {
            HORIZONTAL_LIST
            {
                FIELD_21 = "Radio-button"
                FIELD_22 = "Radio-button"
                FIELD_23 = "Radio-button"
                FIELD_24 = "Radio-button"
                FIELD_25 = "Radio-button"
                FIELD_26 = "Radio-button"
                FIELD_27 = "Radio-button"
                FIELD_28 = "Radio-button"
                FIELD_29 = "Radio-button"
            }
            PHONE_FIELD = "(___) ___-____"
            DATE_FIELD = "5-2-1995"
            TIME_FIELD = "8:21 a.m."
        }
        PAGE_3 = "Page 3"
        {
            MAIN_GROUP = "Main Group"
            {
                FIELD_34 = "Radio-button"
                FIELD_35 = "Radio-button"
                FIELD_36 = "Radio-button"
                FIELD_37 = "Radio-button"
            }
            HUE
            SATURATION
            VALUE
            FIELD_41 = "Hue:"
            FIELD_42 = "Sat:"
            FIELD_43 = "Val:"
        }
    }
}
```

5.4 Using multiple .DAT files in one application ZD-TN2003

Keywords:	.DAT
Versions:	3.5, 3.6, 4.0
Components:	.DAT files
Platforms:	All
Issued:	September 8, 1994

Question

Can I have more than one **.DAT** file in an application?

Answer

Yes, you can have more than one **.DAT** file in an application. However, there are some things that must be done to do this. The designer generates three files when saving a resource file: the **.DAT** file itself, a **.CPP** and an **.HPP**. The **.CPP** contains a user table and an object table. The **.HPP** file contains the help context and the *numberIDs* for the objects.

To use multiple **.DAT** files, the user tables and object tables from all of the **.CPP** files must be combined into one user table and one object table. When combining the object tables, there must only be one entry for each type of object. When combining the user tables, there must only be one entry for each user function or compare function. The **.HPP** files must also be included in the one **.CPP** file.

Following is a simple example of combining two **.CPP** files created by Zinc Designer 4.0. Both original . **CPP** files are listed first, followed by a step-by-step merge of the two files:

TEST1.CPP

```
#include <ui_win.hpp>
#define USE_DERIVED_OBJECTS
#include "test1.hpp"
void z_jump_dummy(void) { }   // Bug fix for broken linkers.
extern EVENT_TYPE Function1(UI_WINDOW_OBJECT *, UI_EVENT &, EVENT_TYPE);
static ZIL_ICHAR _Function1[] = { 'F','u','n','c','t','i','o','n','1',0 };

static UI_ITEM _userTable[] =
{
  { 0, ZIL_VOIDF(Function1), _Function1, 0 },
  { ID_END, ZIL_NULLP(void), ZIL_NULLP(ZIL_ICHAR), 0 }
};
UI_ITEM *UI_WINDOW_OBJECT::userTable = _userTable;

static UI_ITEM _objectTable[] =
{
  { ID_BORDER, ZIL_VOIDF(UIW_BORDER::New), UIW_BORDER::_className, 0 },
  { ID_BUTTON, ZIL_VOIDF(UIW_BUTTON::New), UIW_BUTTON::_className, 0 },
  { ID_MAXIMIZE_BUTTON, ZIL_VOIDF(UIW_MAXIMIZE_BUTTON::New),
    UIW_MAXIMIZE_BUTTON::_className, 0 },
  { ID_MINIMIZE_BUTTON, ZIL_VOIDF(UIW_MINIMIZE_BUTTON::New),
    UIW_MINIMIZE_BUTTON::_className, 0 },
  { ID_STRING, ZIL_VOIDF(UIW_STRING::New), UIW_STRING::_className, 0 },
  { ID_SYSTEM_BUTTON, ZIL_VOIDF(UIW_SYSTEM_BUTTON::New),
     UIW_SYSTEM_BUTTON::_className, 0 },
  { ID_TITLE, ZIL_VOIDF(UIW_TITLE::New), UIW_TITLE::_className, 0 },
  { ID_WINDOW, ZIL_VOIDF(UIW_WINDOW::New), UIW_WINDOW::_className, 0 },
  { ID_END, ZIL_NULLP(void), ZIL_NULLP(ZIL_ICHAR), 0 }
};
UI_ITEM *UI_WINDOW_OBJECT::objectTable = _objectTable;
```

TEST2.CPP

```
#include <ui_win.hpp>
#define USE_DERIVED_OBJECTS
#include "test2.hpp"
void z_jump_dummy(void) { }   // Bug fix for broken linkers.
extern EVENT_TYPE Func2(UI_WINDOW_OBJECT *, UI_EVENT &, EVENT_TYPE);
static ZIL_ICHAR _Func2[] = { 'F','u','n','c','2',0 };

static UI_ITEM _userTable[] =
{
  { 0, ZIL_VOIDF(Func2), _Func2, 0 },
  { ID_END, ZIL_NULLP(void), ZIL_NULLP(ZIL_ICHAR), 0 }
};
UI_ITEM *UI_WINDOW_OBJECT::userTable = _userTable;

static UI_ITEM _objectTable[] =
{
  { ID_BORDER, ZIL_VOIDF(UIW_BORDER::New), UIW_BORDER::_className, 0 },
  { ID_BUTTON, ZIL_VOIDF(UIW_BUTTON::New), UIW_BUTTON::_className, 0 },
  { ID_ICON, ZIL_VOIDF(UIW_ICON::New), UIW_ICON::_className, 0 },
  { ID_MAXIMIZE_BUTTON, ZIL_VOIDF(UIW_MAXIMIZE_BUTTON::New),
    UIW_MAXIMIZE_BUTTON::_className, 0 },
  { ID_MINIMIZE_BUTTON, ZIL_VOIDF(UIW_MINIMIZE_BUTTON::New),
    UIW_MINIMIZE_BUTTON::_className, 0 },
  { ID_SYSTEM_BUTTON, ZIL_VOIDF(UIW_SYSTEM_BUTTON::New),
    UIW_SYSTEM_BUTTON::_className, 0 },
  { ID_TITLE, ZIL_VOIDF(UIW_TITLE::New), UIW_TITLE::_className, 0 },
  { ID_WINDOW, ZIL_VOIDF(UIW_WINDOW::New), UIW_WINDOW::_className, 0 },
  { ID_END, ZIL_NULLP(void), ZIL_NULLP(ZIL_ICHAR), 0 }
};
UI_ITEM *UI_WINDOW_OBJECT::objectTable = _objectTable;
```

TEST1.CPP and TEST2.CPP combined

```
#include <ui_win.hpp>
#define USE_DERIVED_OBJECTS
#include "test1.hpp"
```

```
Must add the include for test2.hpp.
#include "test2.hpp"
void z_jump_dummy(void) { }   // Bug fix for broken linkers.
extern EVENT_TYPE Function1(UI_WINDOW_OBJECT *, UI_EVENT &, EVENT_TYPE);
Must add the function prototype.
extern EVENT_TYPE Func2(UI_WINDOW_OBJECT *, UI_EVENT &, EVENT_TYPE);
static ZIL_ICHAR _Function1[] = { 'F','u','n','c','t','i','o','n','1',0 };
Must add the international string for the function name.
static ZIL_ICHAR _Func2[] = { 'F','u','n','c','2',0 };

static UI_ITEM _userTable[] =
{
  { 0, ZIL_VOIDF(Function1), _Function1, 0 },
Must add the function to the user table.
  { 0, ZIL_VOIDF(Func2), _Func2, 0 },
  { ID_END, ZIL_NULLP(void), ZIL_NULLP(ZIL_ICHAR), 0 }
};
UI_ITEM *UI_WINDOW_OBJECT::userTable = _userTable;

static UI_ITEM _objectTable[] =
{
  { ID_BORDER, ZIL_VOIDF(UIW_BORDER::New), UIW_BORDER::_className, 0 },
  { ID_BUTTON, ZIL_VOIDF(UIW_BUTTON::New), UIW_BUTTON::_className, 0 },
The UIW_ICON is the only object not already in the object table so it is the only object
that needs to be added.
  { ID_ICON, ZIL_VOIDF(UIW_ICON::New), UIW_ICON::_className, 0 },
  { ID_MAXIMIZE_BUTTON, ZIL_VOIDF(UIW_MAXIMIZE_BUTTON::New),
    UIW_MAXIMIZE_BUTTON::_className, 0 },
  { ID_MINIMIZE_BUTTON, ZIL_VOIDF(UIW_MINIMIZE_BUTTON::New),
    UIW_MINIMIZE_BUTTON::_className, 0 },
  { ID_STRING, ZIL_VOIDF(UIW_STRING::New), UIW_STRING::_className, 0 },
  { ID_SYSTEM_BUTTON, ZIL_VOIDF(UIW_SYSTEM_BUTTON::New),
    UIW_SYSTEM_BUTTON::_className, 0 },
  { ID_TITLE, ZIL_VOIDF(UIW_TITLE::New), UIW_TITLE::_className, 0 },
  { ID_WINDOW, ZIL_VOIDF(UIW_WINDOW::New), UIW_WINDOW::_className, 0 },
  { ID_END, ZIL_NULLP(void), ZIL_NULLP(ZIL_ICHAR), 0 }
};
UI_ITEM *UI_WINDOW_OBJECT::objectTable = _objectTable;
```

Notes:

- After combining all .CPP files you will only need to reference the proper .DAT file in your application.
- If you are referencing resources out of default storage you will need to delete the default storage and create a new default storage with the correct .DAT file so that the default storage does not reference the incorrect .DAT file.
- It may also necessary to combine both of the .HPP files similar to what is being done with the .CPP files.

5.5 Security on a .DAT file ZD-TN2014

Keywords: Security, .DAT file, Designer, MAGIC_NUMBER
Versions: 3.5+
Components: Library
Platforms: All
Issued: April 17, 1995

Question

How can I secure my .DAT file to prevent anybody with a Designer from opening the file?

Answer

To place security on a .DAT file, change MAGIC_NUMBER, located near the top of Z_STORE.HPP. If the MAGIC_NUMBER in the .DAT file does not match the MAGIC_NUMBER in the library, the .DAT file will not be opened.

When a .DAT file is opened, the library checks MAGIC_NUMBER. If you change MAGIC_NUMBER in your library, you will need to change the magic number in your .DAT files to open them. The following is a program that will change the magic number in your .DAT files by patching them.

```
#include <stdio.h>

#include <fcntl.h>

#include <io.h>

#include <ui_gen.hpp>

#include <z_store.hpp>
// This number must match exactly the number in Z_STORE.HPP.

#define NEW_MAGIC 0x47


int main(int argc, char **argv)

{

  argc--; argv++;

  while (argc)

  {

    int fd = open(*argv, O_RDWR);

    ZINC_SIGNATURE tmp;

    read(fd, &tmp, sizeof(tmp));

    tmp.magicNumber = NEW_MAGIC;
```

```
        lseek(fd, 0, 0);
        write(fd, &tmp, sizeof(tmp));
        close(fd);
        argc--; argv++;
    }
    return 0;
}
```

To edit an existing .DAT file in the Designer or create a new .DAT file, compile the Designer with the newly compiled library and patch the MAGIC_NUMBER of the Designer .DAT files. You can patch the Designer . DAT files in each individual subdirectory under the Designer directory, or patch these in the ZINC\BIN directory after you have built the Designer. The Designer .DAT files are all copied into the BIN directory as .ZNC files for graphics mode or .Z_T for DOS text mode.

After changing the MAGIC_NUMBER, if an application fails to come up on start-up, or all you hear is a beep, the magic number in the .DAT file probably does not match that of the library. Check the MAGIC_ NUMBER in Z_STORE.HPP and the program used to change the MAGIC_NUMBER and make sure that the numbers exactly match. If one defined as a HEX value you must also define the other as a HEX value.

5.6 Loading a derived object from a .DAT file ZD-TN3010

Keywords:	.DAT, derived object, load
Versions:	3.5 and later
Components:	Library
Platforms:	All
Issued:	October 31, 1994
File:	**MY_BTN.ZIP**

Question

How do I load a derived button from a **.DAT** file?

Answer

To load a derived object from a **.DAT** file you will need to create a static **New( )** function for that class that will call the persistent constructor for that class, which also must be provided.

Example

```
class MY_BUTTON:public UIW_BUTTON
{
public:
  MY_BUTTON(const char *name, UI_STORAGE *directory, UI_STORAGE_OBJECT *file) :
    UIW_BUTTON(name, directory, file) {};

  static UI_WINDOW_OBJECT *New(const char *name,
    UI_STORAGE *directory = NULL, UI_STORAGE_OBJECT *file = NULL)
    { return(new MY_BUTTON(name, directory, file));}
  ...
};
```

The above code will load a derived button that has been stored in a **.DAT** file using Zinc Designer. It will work for loading objects derived from any Zinc class. An example of this concept can be found on the Zinc BBS (**MY_BTN.ZIP** in the Zinc 3.5 conference).

5.7 Using a table created in Zinc Designer ZD-TN3011

Keywords: table
Versions: 4.0
Components: Library, **.DAT** file
Platforms: All
Issued: November 8, 1994

Question

How do I put information into a table that was created in the Zinc Designer?

Answer

There are two different approaches to using a table object designed in the Zinc Designer.

Set the record size in Zinc Designer and use **DataSet( )** to set the data, number of records, and maximum number of records. You will also need to set the user function for the table record, because the field to set it is not currently available in the designer.

```
UIW_TABLE *table = (UIW_TABLE *) win->Get("TABLE");
table->DataSet(data, numberOfRecords);
UI_WINDOW_OBJECT *tableRecord = table->First();
tableRecord->userFunction = TableRecordCallBack;
```

In **TableRecordCallBack( )**, *event.data* is a pointer to the data associated with that table record. The **UIW_ TABLE** maintains an internal array of data. Typecast the pointer into a pointer of the structure type that you are using. The *event.rawCode* will contain the number of the table record that is calling the callback function.

```
EVENT_TYPE TableRecordCallBack(UI_WINDOW_OBJECT *object, UI_EVENT &event, EVENT_TYPE
  ccode)
{
    switch (ccode)
    {
    case S_SET_DATA:
      {
        MY_DATA *myData = (MY_DATA *)event.data;
        object->Get("NAME")->Information(I_SET_TEXT, myData->name);
        ...
      }
    case S_NON_CURRENT:
    case L_SELECT:
      {
        MY_DATA *myData = (MY_DATA *)event.data;
        object->Get("NAME")->Information(I_COPY_TEXT, myData->name);
        ...
      }
```

```
        }
    }
```

Set the *WOF_NO_ALLOCATE_DATA* flag and maintain the data yourself.

```
    UIW_TABLE *table = (UIW_TABLE *) win->Get("TABLE");
    table->woFlags |= WOF_NO_ALLOCATE_DATA;
    table->DataSet(0, numberOfRecords);
```

In **TableRecordCallBack( )** *event.data* is a pointer to the data associated with that table record. The **UIW_TABLE** maintains an internal array of data. Since the *WOF_NO_ALLOCATE_DATA* flag was set *event.data* will be 0. You will need to cast the pointer into the structure type that you are using. The *event.rawCode* will contain the number of the table record that is calling the callback function. In the following example *_myData* is a global array that has been allocated.

```
    EVENT_TYPE TableRecordCallBack(UI_WINDOW_OBJECT *object, UI_EVENT &event, EVENT_TYPE
      ccode)
        {
        switch (ccode)
        {
        case S_SET_DATA:
          {
            object->Get("NAME")->Information(I_SET_TEXT,
              _myData[event.rawCode].name);
            ...
          }
        case S_NON_CURRENT:
        case L_SELECT:
          {
            object->Get("NAME")->Information(I_SET_TEXT,
              _myData[event.rawCode].name);
            ...
          }
        }
    }
```

Note:

- If the record size is set incorrectly in the .DAT file and you use DataSet( ) to initialize the table, then you could get unexpected results. For this reason Zinc recommends using method 2. To determine the size of your data structure, you could use a simple program that prints out the size of the structure. If you are doing this on multiple platforms and the size of the structure is different on each platform you could use #ifdefs to make the structures the same across platforms. This is only important if you are setting the data's size and aren't using the "don't allocate data" flag. *Zinc is currently improving the ability to set the record size, and it will probably not be read in from the .DAT file.*

- Access to the *WOF_NO_ALLOCATE_DATA* flag will probably be added in a future revision.
- The data array is to be maintained by the programmer, and the programmer is responsible for freeing any memory that they have allocated. The programmer does have the opportunity to use a file of records to provide virtual memory, in which case the above code for *S_SET_DATA* would contain a read from the data file and the *S_NON_CURRENT* would store the changes back out to the file.

5.8 Checking for errors when reading .DAT files ZD-TN2007

Keywords:	WOS_READ_ERROR, DAT file
Versions:	3.5 or later
Components:	Library
Platforms:	All
Issued:	February 1, 1995

Question

How do I check for an error in reading an object from a .**DAT** file and exit gracefully if there is an error?

Answer

To check for an error when reading an object from a .**DAT** file, check the *WOS_READ_ERROR* status. If this status is set, then the application can clean up and exit normally. This status is set if the .**DAT** file could not be found, if the resource could not be found in the .**DAT** file, or if any object in the resource had a problem being read in. If the *WOS_READ_ERROR* status is set, you could call error system to display a message, explaining that there was an error reading the resource from the .**DAT** file. Then the program can exit. The following is an example:

```
UI_WINDOW_OBJECT::errorSystem = new UI_ERROR_SYSTEM;
UIW_WINDOW *window = new UIW_WINDOW("test.dat~WINDOW_1");
if (FlagSet(window->woStatus, WOS_READ_ERROR)
{
  window->errorSystem->ErrorMessage(windowManager, WOS_NO_STATUS, "There was a
    problem loading the window from the .DAT file", ".DAT FILE ERROR");
  delete window;
  delete UI_WINDOW_OBJECT::errorSystem;
  return(0);
}
```

If the window is read in, but a *WOS_READ_ERROR* is generated, you can traverse the list of the window and check each object's *WOS_READ_ERROR* status to determine which object caused the problem.

5.9 Deriving an object in Zinc Designer ZD-TN2009

Keywords: Designer, deriving object
Versions: 4.0
Components: Designer
Platforms: All
Issued: February 3, 1995

Question

How do I derive an object in Zinc Designer?

Answer

To derive an object in Zinc Designer, first place an object on the window. Open the edit window for that object and select the advanced page. In the field for Derived Name, replace <none> with the name of the derived class. For example, if a class called MY_BUTTON was derived from UIW_BUTTON, replace <none> with MY_BUTTON.

When saving a file, the Designer generates a .CPP and a .HPP file, and you must include the header file with the derived class declaration in the generated .CPP file. For example:

```
#include <ui_win.hpp>
#define USE_DERIVED_OBJECTS
#include "test.hpp"
void z_jump_dummy(void) { } // Bug fix for broken linkers.
//Line added to include header file which contains the derived class declaration.
#include "my_btn.hpp"

static UI_ITEM _userTable[] =
```

Remember that because the Designer generates a new .CPP file each time a .DAT file is saved, you must edit the .CPP file. You can prevent this by selecting Preferences under File on the Designer's main window and deselecting Write CPP.

Next, type in the class declaration, which must contain entries for the required persistent functions. These functions are a persistence constructor and a static New( ) function. The following is an example of a class declaration:

```
class MY_BUTTON:public UIW_BUTTON
{
public:
  MY_BUTTON(const ZIL_ICHAR *name, ZIL_STORAGE_READ_ONLY *directory, ZIL_STORAGE_OBJECT_
READ_ONLY *file) :
    UIW_BUTTON(name, directory, file) {};
  static UI_WINDOW_OBJECT *New(const ZIL_ICHAR *name,
    ZIL_STORAGE_READ_ONLY *directory = ZIL_NULLP(ZIL_STORAGE_READ_ONLY), ZIL_STORAGE_
OBJECT_READ_ONLY *file = ZIL_NULLP(ZIL_STORAGE_OBJECT_READ_ONLY))
    { return(new MY_BUTTON(name, directory, file));}
  EVENT_TYPE Event(const UI_EVENT &);
};
```

5.10 Designer fails to launch ZD-TN2011

Keywords:	Designer, .ZNC, .Z_T
Versions:	4.0
Components:	Designer
Platforms:	All
Issued:	February 8, 1995

Question

Why does the Designer fail to launch, and why does it only beep?

Answer

The Designer will not come up if it can not find its .ZNC or .Z_T files. In some environments it will bring up an error message saying that it could not find a .ZNC or .Z_T file, however in other environments it will only beep and close the Designer down. After the Designer has been built, these files will be found in the ZINC/BIN directory. If these files are in the same directory as the Designer executable it should have no problems finding them. If they are in different directories you can create an environment variable, ZINC_PATH, which contains the path to the .ZNC or .Z_T files.

The .ZNC files contain the resources used by the Designer when run in graphics mode. The .Z_T files contain the resources used when running the Designer in text mode. It is not necessary to have separate .DAT files for text and graphics mode. The Designer has separate .DAT files so that when running in text mode the resources are positioned proportionally correct.

5.11 Designer import and export file types ZD-TN2012

Keywords: Designer, import, export, .DAT, .TXT, .BMP, .ICO, .XPM
Versions: Zinc 4.0
Components: Designer
Platforms: All
Issued: February 14, 1995

Question

What types of files can I import into and export out of each service in the Designer?

Answer

You can import and export the following file types:

Window Editor

- .DAT
- .TXT

Image Editor

- .BMP
- .ICO
- .XPM
- .DAT

Note: You can only import and export the file type for the specific platform you are running the Designer in. For example you can not import a Windows .BMP into the Designer when running in OS/2. It would need to be a OS/2 .BMP file.

Help Editor

- .DAT
- .TXT

Message Editor

.DAT

5.12 Displaying information in a table created in the Designer ZD-TN3011

Keywords: table, Designer
Versions: 4.0 Release 1
Components: Library, .DAT file
Platforms: All
Issued: November 8, 1994

Question

How do I display information in a table that was created in the Zinc Designer?

Answer

There are two different approaches to displaying information in a table object designed in the Zinc Designer. The first method is to use the WOF_NO_ALLOCATE_DATA flag and the second method is to allow the table to allocate the associated data. The WOF_NO_ALLOCATE_DATA flag is used to tell the table object not to allocate internal memory to track the information presented in its records. For the callbacks of both methods event.data will be a void pointer to the memory allocated (if any was allocated) by the table for the information, and event.rawCode will be the index of the record being accessed. Access to the WOF_NO_ALLOCATE_DATA flag is accessible in Zinc Designer with revision 2.

Method 1: Using the WOF_NO_ALLOCATE_DATA flag:

The following code initializes the table to have a maximum of 15 records and to start with 15 records.

```
UIW_TABLE *table1 = (UIW_TABLE *)win->Get("NO_ALLOCATE_TABLE");
if (table1)
{
  table1->woFlags |= WOF_NO_ALLOCATE_DATA; //This should be set in the Designer
                // after revision 2.
  table1->DataSet(ZIL_NULLP(void), 15, 15);
  _tableData = new ZIL_ICHAR *[15];
  for (int i = 0; i<15; i++)
  {
    _tableData[i] = new ZIL_ICHAR[15];// _tableData is a global variable
    sprintf(_tableData[i], "String_%d", i);
  }
}
```

In the callback associated with this table, NoAllocateCallback, the WOF_NO_ALLOCATE_DATA flag is set so event.data will be NULL, and event.rawCode will contain the index of the record being handled by the callback function.

```
EVENT_TYPE NoAllocateCallback(UI_WINDOW_OBJECT *object, UI_EVENT &event, EVENT_TYPE
  ccode)
{
        switch (ccode)
        {
        case S_SET_DATA:
          {
            UI_WINDOW_OBJECT *winObject = object->Get("STRING");
            winObject->Information(I_SET_TEXT, tableData[event.rawCode]);
          }
          break;

        case L_SELECT:
        case S_NON_CURRENT:
          {
            UI_WINDOW_OBJECT *winObject = object->Get("STRING");
            winObject->Information(I_COPY_TEXT, _tableData[event.rawCode]);
          }
          break;
        }

        return 0;
      }
```

However, with the method of using the WOF_NO_ALLOCATE_DATA flag any memory allocated to keep track of information related to the table must be maintained by the programmer. In a database application, one method of handling data would be to use a file of records to provide virtual memory, in which case the above code for S_SET_DATA would contain a read from the data file and the S_NON_CURRENT would store the changes back out to the file.

Method 2: Letting the table allocate the data.

Set the record size in the Zinc Designer and use the DataSet function to set the data, number of records and maximum number of records. The following code initializes the table to have a maximum of 15 records and to start with 15 records. It also initializes the data associated with the table.

```
UIW_TABLE *table2 = (UIW_TABLE *)win->Get("ALLOCATE_TABLE");
if (table2)
{
 ZIL_ICHAR table2Data[15][15];
 for (int i = 0; i<15; i++)
 {
  sprintf(table2Data[i], "String_%d", i);
 }
 table2->DataSet(table2Data, 15, 15);
}
```

In **AllocateCallback( )** event.data will be a pointer to the data that is associated with that table record. The UIW_TABLE maintains an internal array of data. Typecast the pointer into a pointer of the structure type that you are using.

```
EVENT_TYPE AllocateCallback(UI_WINDOW_OBJECT *object, UI_EVENT &event, EVENT_TYPE
  ccode)
{

 ZIL_ICHAR *string = (ZIL_ICHAR *)event.data;

 switch (ccode)
 {
 case S_SET_DATA:
  {
   UI_WINDOW_OBJECT *winObject = object->Get("STRING");
   winObject->Information(I_SET_TEXT, string);
  }
  break;

 case L_SELECT:
 case S_NON_CURRENT:
  {
   UI_WINDOW_OBJECT *winObject = object->Get("STRING");
   winObject->Information(I_COPY_TEXT, string);
  }
  break;
 }

 return 0;
}
```

5.13 Using the ZAF_STRING_EDITOR class of the Designer ZD-TN4025

Keywords: String editor
Version: 4.0
Component: Designer; ZAF_STRING_EDITOR
Platforms: ALL
Issued: January 31, 1995

Question

How can I use the String Editor outside of the Designer?

Answer

The String Editor of the Designer is an instance of the **ZAF_STRING_EDITOR** class. The file that contains the source code for the **ZAF_STRING_EDITOR** is found in **zinc\design\stredit\stredit.cpp**. Also in this directory are the makefiles and a sample program module, main.cpp,to build an executable program that uses the String Editor. Since the String Editor depends on functions found in the **ZAF_SERVICE_MANAGER** class, build **service.lib** by running the appropriate makefile from **zinc\design**.

A look at **main.cpp** from **zinc\design\stredit** shows the following:

```
#include "stredit.hpp"
int UI_APPLICATION::Main(void)
{
   UI_APPLICATION::LinkMain();
   _serviceManager = new ZAF_SERVICE_MANAGER;

  // Create and add the support editors.
  ZAF_STRING_EDITOR *stringEditor = new ZAF_STRING_EDITOR;
  stringEditor->Information(I_ACTIVATE_SERVICE, ZIL_NULLP(void));

  // Process user responses.
  UI_APPLICATION::Control();

  // Clean up.
  return (0);
}
```

Familiarize yourself with these main components of the String Editor and their use:

ZAF_SERVICE_MANAGER

The *_serviceManager* is declared in **SERVICE.HPP** in **zinc\design\service**. **SERVICE.HPP** is included in **STREDIT.HPP**. Create *_serviceManager* first, the **ZAF_STRING_EDITOR** class references it. The _ *serviceManager* is responsible for managing the persistent object storage file for the String Editor, **p_stredit.znc**.

ZAF_STRING_EDITOR

The constructor of **ZAF_STRING_EDITOR** creates the String Editor window in memory. It also creates and adds a string driver device to the *eventManager*. The purpose of the string driver device is to monitor the event queue, and when an F12 key is pressed, the String Editor service is restored from its iconized state. This occurs with the following line of code found in the **Poll( )** function of the string driver device:

```
Information(I_ACTIVATE_SERVICE, ZIL_NULLP(void));
```

After the computer executes the above line of code, the current editable object on the screen, if any, is found. Then, with the following line of code found in the **Poll( )** function of the string driver device, the current editable object is set to the object that gets String Editor service:

```
Information(I_SET_REQUESTOR, requestor);
```

I_ACTIVATE_SERVICE—Information request

The purpose of the line

```
stringEditor->Information(I_ACTIVATE_SERVICE,ZIL_NULLP(void));
```

is to add the string edit window created in the **ZAF_STRING_EDITOR** constructor to the *windowManager*. If it already exists in the *windowManager*'s list, this will make the string edit window become the current window. Also, if it was previously minimized, it gets restored to its normal size.

I_SET_REQUESTOR—Information request

When the user presses the F12 key, the string driver detects this and gets a pointer to the current window if one exists. It then searches the current window for an editable object that is current. If it finds one, it assigns this pointer as the requestor of the string editor service with the following line of code:

```
stringEditor->Information(I_SET_REQUESTOR, requestor);
```

After this occurs, the user can then select the characters in the table that are to appear in the requestor's text field.

If the user then selects the OK button on the string edit window, the text that the user has entered in the "Current" field of the string editor gets set as the actual text for the requestor object. After the text for that object gets set, the string edit window gets minimized if its *WOAF_LOCKED* flag is set. If this flag is not set, the string edit window is closed.

The only minor modification you may want to make to **stredit.cpp** is to increase the max length of the **UIW_EDIT_STRING** class from 100 to 1024. This is helpful when editing large text fields. The string editor requires the **p_string.znc** persistent object file for retrieval of the string editor window.

In addition to your **.DAT** file, if any, **p_string.znc** must accompany your application. If you do not want two persistent object storage files with your application, you can take a copy of this file and use the **Window | Import** selection to add your resources to this file. When doing this you would need to link in **p_string.cpp** to your application.

The string edit window defaults to code page ISO 8859-1 in Unicode mode. The code page control is nonselectable unless you are using the Unicode Designer that comes with the Unicode key. With code page control enabled, you can access fonts from the Unicode character set, including Japanese, Chinese, and the Korean font set.

An example using the **ZAF_STRING_EDITOR** outside of the Designer can be found on the bulletin board, user main conference, Tech Support listing.

Section 6

UI objects and programming techniques

6.1 Removing geometry constraints ZD-TN1014

Keywords:	Geometry management, constraints
Versions:	4.0+
Components:	UI_GEOMETRY_MANAGER, UI_CONSTRAINT
Platforms:	All
Issued:	May 15, 1995

Question

If I delete an object that has geometry constraints, my program doesn't continue to function properly. What can I do to fix this?

Answer

In this technote we will discuss how to remove any geometry constraints associated with an object.

Because Zinc has defined geometry management so that there is no extra overhead in the UI_WINDOW_OBJECT class, you must delete any geometry constraints associated with the object.

First we must get a pointer to the geometry manager.

```
UI_GEOMETRY_MANAGER *geometryManager = (UI_GEOMETRY_MANAGER *)Get(NUMID_GEOMETRY);
```

This example maintains the pointer as a member of the controlling class. When you delete an object that is managed, search through all the constraints and compare the constraint's object with the object that you are deleting. If they are equal remove that particular constraint. You can have multiple geometry constraints for any given object. All of these constraints must be removed or your program will terminate abnormally.

Here is a code snippet that will search for and delete any geometry constraints associated with an object.

```
// Get a pointer to the object to be deleted.
  UI_WINDOW_OBJECT *button = Get("RIGHT_BOTTOM");

  // Maintain a separate pointer for comparison.
  UI_WINDOW_OBJECT *constObj;

  // Get the first constraint.
  UI_CONSTRAINT *geoConst =  geometryManager->First();

  // Continue while there are constraints.
  while (geoConst)
  {
    // Get the next constraint.
    UI_CONSTRAINT *nextConst = geoConst->Next();
    geoConst->Information(I_GET_OBJECT, &constObj);
  // Compare the objects.
  if (constObj == button)
  {
      // Delete this constraint.
      *geometryManager - geoConst;
      delete geoConst;
  }
  geoConst = nextConst;
}

// Now we can safely delete the object.
*this - button;
delete button;

// Redisplay the window to reflect the deletion of the object.
Event(S_REDISPLAY);
```

When you delete an object that has been managed, you must delete any constraints that are associated with that object.

6.2 Using a button to close a window ZD-TN2000

Keywords:	close window, button
Version:	3.5, 3.6, 4.0
Component:	Library
Platforms:	All
Issued:	July 14, 1994

Question

How do I close a window using a button attached to that window?

Answer

You may close a window using a button three different ways.

If the button is only used to close the window and performs no other action, you need only set the *BTF_SEND_MESSAGE* flag on the button and set the button's value equal to *S_CLOSE*, or in the designer set the value equal to -11.

If the button is to perform some other function besides closing the window, and the window is a derived window, it can still be a *BTF_SEND_MESSAGE* button. Just set the value of the button equal to a user-defined event. When pressed the button will place the user defined event on the queue and it will be passed down to the window. The window can then trap this event in its **Event( )** function, perform any necessary action and then place an *S_CLOSE* on the queue with the following code.

```
eventManager->Put(S_CLOSE);
```

If a user function has been attached to the button, before leaving the user function place an *S_CLOSE* on the queue with the following line of code:

```
object->eventManager->Put(S_CLOSE);
```

Do not subtract the window from the *windowManager* while in the user function. If you do, your application will crash. This is because you are removing the object that called the user function and you must be able to return to that object.

If the window is an MDI child you should use *S_MDICHILD_EVENT* + *S_CLOSE* (-511 in the Designer). The *S_MDICHILD_EVENT* message instructs the *windowManager* that this message needs to be handled by the MDI parent.

The first two methods are preferred when using a button to perform an action because they take advantage of Zinc's event driven architecture.

6.3 Changing object flag or status at run time ZD-TN2002

Keywords:	flag, status, run time
Version:	3.5, 3.6
Component:	Library
Platforms:	All
Issued:	July 7, 1994

Question

How do I change the flag or status of an object at run time?

Answer

There are two methods that can be used to change a status or a flag on an object. One is to use the **Information( )** function. The other is to mask the specific bit on or off. Following is an example of setting and unsetting the selected status of a button.

Method 1 (Information( ) function):

```
UIS_STATUS status = WOS_SELECTED;
button->Information(SET_STATUS, &status, ID_WINDOW_OBJECT);
button->Information(CHANGED_STATUS, NULL);
button->Information(CLEAR_STATUS, &status, ID_WINDOW_OBJECT);
button->Information(CHANGED_STATUS, NULL);
```

When using the **Information( )** function the proper *objectID* must be passed in or it will not work. Consult the *Programmer's Reference* for the object's **Information( )** function to determine the proper *objectID* to be used with the specific flag or status you wish to change. When changing the flag of an object *UIF_FLAGS* should be used in place of *UIF_STATUS.*

Method 2 (Bit masking):

Mask On

```
button->woStatus |= WOS_SELECTED;
button->Information(CHANGED_STATUS, NULL);
```

Mask Off

```
button->woStatus &=~WOS_SELECTED;
button->Information(CHANGED_STATUS, NULL);
```

Whenever a status or a flag of an object has been changed the object must be told that it has been changed. This is done with the **Information( )** function and passing in a *CHANGED_STATUS* if a status was changed or passing in a *CHANGED_FLAGS* if a flag was changed.

6.4 Check boxes or toggle buttons on a window ZD-TN2004

Keywords:	check box, toggle, button
Versions:	3.5 and later
Components:	Library
Platforms:	All
Issued:	September 13, 1994

Question

When I select a check box or toggle button on my window I cannot deselect it.

Answer

When using check boxes or toggle buttons the *WNF_SELECT_MULTIPLE* flag must be set on the parent. If this flag has not been set it will cause the check boxes or toggle buttons to behave as radio buttons.

This flag can be set on the following parent objects:

- UIW_WINDOW
- UIW_GROUP
- UIW_VT_LIST
- UIW_HZ_LIST
- UIW_POP_UP_MENU

6.5 Nonselectable gray and nonselectable black ZD-TN2013

Keywords:	nonselectable gray, nonselectable black
Versions:	3.5+
Components:	Library
Platforms:	All
Issued:	April 17, 1995

Question

How do I make an object nonselectable gray or nonselectable black programmatically?

Answer

To make an object nonselectable gray, set the WOF_NON_SELECTABLE flag on the object.

```
object->woFlags |= WOF_NON_SELECTABLE;
object->Information(I_CHANGED_FLAGS, NULL); //For versions earlier than 4.0 replace
    //I_CHANGED_FLAGS with CHANGED_FLAGS.
```

To make an object nonselectable black, set the WOAF_NON_CURRENT and WOF_VIEW_ONLY flags.

```
object->woFlags |= WOF_VIEW_ONLY;

object->woAdvancedFlags |= WOAF_NON_CURRENT;
object->Information(I_CHANGED_FLAGS, NULL); //For versions earlier than 4.0 replace
//I_CHANGED_FLAGS with CHANGED_FLAGS.
```

The aforementioned method only works on editable objects such as a UIW_STRING object. If you want to make a noneditable object, such as button, nonselectable black:

- Derive your own button object.
- Set the WOAF_NON_CURRENT flag on the object.
- In the derived Event( ) function trap for the L_SELECT and L_BEGIN_SELECT messages. This will prevent them from being passed to the base class.

6.6 Scrolling more than 32,767 records in a UIW_TABLE ZD-TN2016

Keywords: UIW_TABLE, scrolling
Versions: 4.0+
Components: Library
Platforms: All
Issued: May 10, 1995

Question

How can I scroll more than 32,767 records in a table?

Answer

You can scroll more than 32,767 records by controlling the scrolling of the table. To control the scrolling of the table, derive your own table class from UIW_TABLE. The class will require both an Event() function and a ScrollEvent() function.

The Event() function will need to process the S_VSCROLL event. The S_VSCROLL event is sent to the table when the scroll bars position is changed. It should be passed to the ScrollEvent() function. You may also want to process the L_UP, L_DOWN, L_PGUP, L_PGDN, L_TOP, and L_BOTTOM to handle scrolling from the keyboard. The L_ events are mapped from keyboard events, in the Event() function of an object. When the Event() receives them it should translate them to a S_VSCROLL with the scroll.delta set to the proper value. Then it should send them to the ScrollEvent( ) function.

The table should only contain the number of records that are visible. This makes it easier to control the scrolling of the table. If the table only contains the number of records that are visible, call DataSet() to change the data in the records. Otherwise you must worry about scrolling the records and updating the data.

The information that the scroll bar maintains for scrolling is a ZIL_INT16, a 16-bit int. Because of this, the scroll bar can only scroll through 32,767 positions. To overcome this, set up a ratio between the number of objects you want to scroll and the number that can actually be scrolled. For example if you wanted to scroll 320,000 records in your table you could set the scroll bar's maximum to be 32,000 and scroll 10 records with each position the scroll bar moves.

After the table's Event() function has received an S_CREATE, set the scroll information on the table's scroll bar. To do this create a UI_SCROLL_INFORMATION structure and send it to the scroll bar's Event() function. You may want to initialize the scroll information like this:

```
UI_SCROLL_INFORMATION scrollInfo;
scrollInfo.current = 0;
scrollInfo.minimum = 0;
scrollInfo.maximum = 32000; // 320000 divided by 10
scrollInfo.showing = 10;
scrollInfo.delta = 1;
```

When ScrollEvent( ) receives a S_VSCROLL, the scroll bar's current position and the data in the table must be updated. The scroll bars new position can be calculated by getting the scroll bars current position. Do this by calling the scroll bar's Information() function, with I_GET_VALUE. The event.scroll.delta, passed into the ScrollEvent() function, contains the distance the scroll bar's thumb button was moved. Adding this to the current value will give the scroll bar's new position, which will be used to calculate what data should be displayed in the table. Then set the table data with a DataSet() and set the scroll bar's scroll information by creating a new UI_SCROLL_INFORMATION structure that contains the scroll bar's new position as the current position. Then send it to the scroll bar's Event() function, along with S_REDISPLAY. Update the data in the table before the new scroll information is sent to the scroll bar, otherwise the DataSet() on the table will reset the scroll information on the scroll bar.

In TN2016.ZIP, you can find an example that shows how to do this.

6.7 Columns in lists ZD-TN3000

Keywords:	column, list
Versions:	3.5 and later
Components:	Library
Platforms:	All
Issued:	July 20, 1994
File:	**AGENCY.ZIP**

Question

How do I get columns in a vertical list?

Answer

Derive a new class from **UIW_BUTTON**, **UIW_STRING**, or **UI_WINDOW_OBJECT** and provide your own **DrawItem( )** function.

In the **DrawItem( )** function, use the appropriate display member functions to display the data relative to the true coordinates of the derived object. In this way you can ensure that your objects display in a fixed width that will allow columns.

On the Zinc BBS, in the 3.6 conference, download the file **AGENCY.ZIP**. The sample code in this file shows how to get tabular data in a vertical list. You can also look at **COLUMNS.ZIP**. You can reach the BBS by calling (801) 785-8997.

Note

Zinc Application Framework 4.0 supports a table object that aligns objects in columns automatically. This may be more appropriate for some applications.

6.8 Retrieving the n^{th} item from a list ZD-TN3001

Keywords: combo box, list, n^{th} item
Version: 3.0 and later
Component: Library
Platforms: All
Issued: July 8, 1994

Question

How do I get a pointer to the n^{th} element in my list—a window, vertical list, horizontal list—or in my combo box?

Answer

There are two different techniques for getting a certain element from a list depending on which type of list you are using.

To retrieve the third item from a **UIW_WINDOW**, **UIW_VT_LIST**, or **UIW_HZ_LIST**, execute the following code with a pointer called list:

```
UI_WINDOW_OBJECT *item;
item = list->UI_LIST::Get(2); // The lists are zero based.
```

This method will not work with a combo box. For a combo box you must use method 2.

To retrieve the third item from a **UIW_COMBO_BOX**, use the **Get( )** function. For example to get the third element in a combo box with a pointer called *comboBox* execute the following code:

```
UI_WINDOW_OBJECT *item;
item = comboBox->Get(2); // The lists are zero based
```

6.9 Adding an object at run time ZD-TN3002

Keywords:	list, object, adding, run time
Version:	3.0 and later
Component:	Library
Platforms:	All
Issued:	July 6, 1994

Question

How do I add an object to a list at run time? When I do, it doesn't show up on the screen.

Answer

To add an object to a list and have it show up, simply add the item(s) and call the list's **Event( )** function with an *S_REDISPLAY* message.

The object doesn't show up on the screen after you add it to a list because of a Zinc design principle. After adding an item to a list, the list will not redisplay itself until it receives an *S_REDISPLAY.* This provides for greater efficiency because it eliminates unnecessary (and slow) screen updates when adding several items to a list.

```
EVENT_TYPE AddToList(UI_WINDOW_OBJECT *object, UI_EVENT &, EVENT_TYPE ccode)
{
  if (ccode != L_SELECT)
    return ccode;
  UI_WINDOW_OBJECT *list = object->parent->Get("VLIST");

  if (list)
  {
    // Create the string to be added.
    UIW_STRING *string = new UIW_STRING(0,0,0,"TEST");
    // Create the event that will add the string to the vertical list.
    UI_EVENT tEvent(S_ADD_OBJECT);
    tEvent.data = string;
    list->Event(tEvent);

    // Redisplay the list
    tEvent.type = S_REDISPLAY;
    list->Event(tEvent);
  }
  return ccode;
}
```

This technique works equally well with other objects such as windows or combo boxes. The call to **Event( )** in each of these cases is exactly the same.

6.10 Moving an object at run time ZD-TN3003

Keywords:	object, run time
Version:	3.5 and later
Component:	Library
Platforms:	All
Issued:	July 12, 1994
File:	None

Question

How do I move an object on a window at run time?

Answer

Simply modify the relative coordinates of the object and then call the **Information**( ) function for that object with a message of *CHANGED_FLAGS*. This will cause the object to update its information.

Example

```
EVENT_TYPE MY_WINDOW::Event(const UI_EVENT &event)
{
  ...
  // Get a pointer to the button
  UI_WINDOW_OBJECT *button = Get("THIS_BUTTON");

  int new_height = button->true.bottom - button->true.top;
  int string_width = display->TextWidth("Longest Button Text") /
    display->cellWidth;

  // Calculate its new coordinates
  // 3/4 of the way across the screen
  button->relative.left = (true.right - true.left)* 3/4 *
    display->cellWidth;
  // 3 cells from the bottom
  button->relative.top = (true.top - true.bottom - 3) *
    display->cellHeight;
  button->relative.right = button->relative.left +
    ((string_width + 2) * display->cellWidth);
  button->relative.bottom = button->relative.top + new_height;

  // Cause the button to reposition and redisplay itself.
  button->Information(CHANGED_FLAGS, NULL);
...
  return (ccode)
}
```

6.11 Removing the title from a window with the Designer ZD-TN3004

Keywords:	window, title
Version:	3.0 and later
Component:	Library
Platforms:	DOS, Windows, OS/2, Motif
Issued:	July 15, 1994

Question

How do I remove the title from a window created in the Designer?

Answer

Using the pointer to the window, get a pointer to the title with the **Get( )** function. Then subtract the title from the window and delete it.

```
UI_WINDOW_OBJECT *title = window->Get(NUMID_TITLE);


*window
  - title;

delete title;
```

Note:

While this technique should compile in all environments, some environments, such as Macintosh, do not allow windows without titles. In these cases the code would have no effect. Since this is not supported in all environments you should avoid the practice in order to create applications that are feature-portable as well as code-portable.

6.12 Selecting a check box or radio button programmatically ZD-TN3005

Keywords: check box, radio button
Version: 3.0 and later
Component: Library
Platforms: All
Issued: July 13, 1994

Question

How do I cause a check box or radio button to be selected?

Answer

To cause the check box to be selected set the *WOS_SELECTED* flag in the *woStatus* member of the check box. Then call its information function with *CHANGED_STATUS*. This will cause it to redisplay itself with the new status.

```
checkBox->woStatus |= WOS_SELECTED;
checkBox->Information(CHANGED_STATUS, NULL);
```

To cause a radio button to be selected just read it to its group. You will need to have the *WNF_AUTO_SELECT* flag set on the group that contains the radio buttons.

```
*group
  + radioButton;
```

6.13 Lifetime of an object ZD-TN3006

Keywords:	messages, object
Versions:	All
Components:	Library
Platforms:	All
Issued:	August 4, 1994

Question

What messages does an object receive during its lifetime?

Answer

An object goes through the following steps during its lifetime:

When the object is first created, the object's constructor is called. Before it does anything it calls its base class constructor(s). If the constructor called is the persistent constructor, it performs the following steps:

- It calls its nonpersistent base class constructor(s).
- It loads in its information from the data file.
- It directly calls the **Information( )** function(s) of its base class(es) with an *INITIALIZE_CLASS* message. *Note:* In version 4.0 the *INITIALIZE_CLASS* message has been changed to *I_INITIALIZE_ CLASS.*

The constructor then calls its own class's **Information( )** function with an *INITIALIZE_CLASS* message. This initializes any information that is not dependent on the object having a *screenID* (its internal flags, its *numberID*, etc.) *Note:* In version 4.0 the *INITIALIZE_CLASS* message has been changed to *I_INITIALIZE_ CLASS.*

When the object is added to the Window Manager or a list that already has a *screenID*, such as a window, a vertical or horizontal list, or a group, the list sends two messages to the object:

- First, an *S_INITIALIZE* message is sent to the object. This causes the object to set up its position information. This is when the *relative* coordinates are converted (i.e. cell to graphics or vice versa). These coordinates are determined by the status of the *woStatus* flags. (If the *WOS_GRAPHICS* flag is set there is no conversion to graphics.)
- Second, the list sends the object an *S_CREATE*. This is when the screen position (i.e. *true* coordinates) is determined. This position is determined by the *relative* position of the field and the amount of available space within the list.

When the object is removed from a list (e.g., as a result of an *S_CLOSE* message in the case of a window attached to the Window Manager), we subtract the object from the list, and then send the object an *S_DEINITIALIZE* message. This informs the object that it has been removed from the screen, and it should save its data if necessary. The object then resets its *screenID* to 0. In the case of a list object, the object passes the *S_ DEINITIALIZE* event to each of its children. In the case of an *S_CLOSE* the window manager then calls the object's destructor (unless the *WOAF_NO_DESTROY* flag has been set on the window).

When the object is destroyed, the object's destructor is called; this in turn calls its base class destructor(s). At this point the destructor takes care of freeing up any memory that the object is responsible for. This includes calling the destructors for any child objects.

Note:

- An object is also sent *S_INITIALIZE* and *S_CREATE* messages if it is a child of a window that is added to the Window Manager.
- Objects may receive many other messages (or events) during their lifetimes, but these messages are common to all Zinc objects.

6.14 Forcing an invalid field to remain current ZD-TN3007

Keywords: current, invalid field, validation
Versions: 3.5, 3.6
Components: Library
Platforms: All
Issued: July 26, 1994
File: **CURVALID.ZIP**

Question

I want to keep an object current until it passes its validation. How do I keep a user from tabbing or mouse clicking out of it?

Answer

Zinc does not have this feature built in; however, you can simulate it by forcing the object to be current. To do this:

Send a user-defined event to the window to tell it to make the correct object current again. To do this create a new event that will tell the object's parent to add the object pointed to by *userObject* to itself.

```
const EVENT_TYPE READD_CHILD = 10001;
```

For the case of *S_NON_CURRENT*, in the user function for the object. set the parent's *userObject* pointer equal to the object. Put an event on the Event Manager's queue that will tell the window to re-add the object pointed to by the *userObject* pointer.

```
EVENT_TYPE myUserFunction(UI_WINDOW_OBJECT *object, UI_EVENT &, EVENT_TYPE ccode);
{
    . . .
  if(!object->parent->userObject)
    {
      object->parent->userObject = object;
    object->eventManager->Put(UI_EVENT(READD_CHILD));
    }
  . . .
}
```

In order to interpret the new event you must derive a new window from **UIW_WINDOW** like this:

```
class MY_WINDOW: public UIW_WINDOW
{
  ...
};
```

When the window receives the event, it must add to itself the object pointed to by *userObject*. Then the window should set the *userObject* pointer = 0.

```
MY_WINDOW::Event(const UI_EVENT &event)
{
  . . .
  case READD_CHILD:
    *this + (UI_WINDOW_OBJECT *)userObject;
    userObject = 0;
  . . .
}
```

This method works equally well for vertical and horizontal lists. The Zinc BBS has a user contribution that shows this method. It is in the 3.6 Conference in the User Contributions directory and is called **CURVALID. ZIP**.

6.15 Menus on the Macintosh ZD-TN3015

Keywords:	Menu, Macintosh
Versions:	4.0 and later
Components:	Library
Platforms:	Macintosh
Issued:	March 22, 1995

Question

How do I get the menus at the top of the screen to change when I change the current window?

Answer

To swap the menus when you change the current window do the following:

First, derive a class from UIW_WINDOW with an Event( ) function to handle the S_CURRENT and S_ NON_CURRENT messages.

When handling these messages in the Event( ) function subtract the menu for that window on an S_NON_ CURRENT and add it to the window on an S_CURRENT. When deriving this class, provide the class definition:

```
class MY_WINDOW: public UIW_WINDOW
{
public:
    MY_WINDOW(const char *name, ZIL_STORAGE_READ_ONLY *file = NULL,
      ZIL_STORAGE_OBJECT_READ_ONLY *object = NULL);
    ~MY_WINDOW();
    virtual EVENT_TYPE Event(const UI_EVENT &event);
protected:
    UI_WINDOW_OBJECT *menu;
};
```

Second, provide a constructor for your class.

In this example we load the window from the .DAT file and provide a persistent constructor. In the constructor get a pointer to the menu so that we can add and subtract the menu later.

```
MY_WINDOW::MY_WINDOW(const char *name, ZIL_STORAGE_READ_ONLY *file,
    ZIL_STORAGE_OBJECT_READ_ONLY *object): UIW_WINDOW(name, file, object)
{
    menu = Get("MENU");
}
```

Third, provide a destructor for the window.

Since we add and subtract the menu from the window, our destructor must free the memory used by the menu.

```
MY_WINDOW::~MY_WINDOW()
{
#if defined(ZIL_MACINTOSH)
    delete menu;
#endif
}
```

Fourth, the window's Event( ) function must handle the S_CURRENT and the S_NON_CURRENT events.

As we mentioned earlier, in Event( ) subtract the menu for S_NON_CURRENT and add it for S_CURRENT.

```
EVENT_TYPE MY_WINDOW::Event(const UI_EVENT &event)
{
    EVENT_TYPE ccode = event.type;

    switch (ccode)
    {
#if defined(ZIL_MACINTOSH)
    case S_CURRENT:
      *this
        + menu;
      ccode = UIW_WINDOW::Event(event);
      break;
    case S_NON_CURRENT:
      *this
        - menu;
      ccode = UIW_WINDOW::Event(event);
      break;
#endif
    default:
      ccode = UIW_WINDOW::Event(event);
    }
    return ccode;
}
```

Finally, call the constructor for your derived class instead of the UIW_WINDOW constructor.

```
UI_APPLICATION::Main()
{
    UIW_WINDOW *win1 = new MY_WINDOW("p_test.dat~RESOURCE_1");
    UIW_WINDOW *win2 = new MY_WINDOW("p_test.dat~RESOURCE_2");

    *windowManager
      + win1
      + win2;
```

```
        Control();

        return (0);
    }
```

For the sample code referred to in this technote refer to TN3015.HQX.

6.16 Adding pop-up menus to the screen ZD-TN3016

Keywords:	pop-up menus, Window Manager
Versions:	4.0 and later
Components:	Library
Platforms:	All
Issued:	April 16, 1995

Question

I want to use a pop-up menu without attaching it to a menu bar. How do I add a pop-up menu to the screen and have it display itself without a menu bar?

Answer

To use pop-up menu without attaching it to a menu bar, create a UIW_POP_UP_MENU object and add it directly to the Window Manager.

Creating and adding a UIW_POP_UP_MENU to the Window Manager causes the pop-up to display itself without a menu bar.

To create the menu, you can use two different constructors. The first constructor takes an array of UI_ ITEMS:

```
EVENT_TYPE AddPopUpMenu(UI_WINDOW_OBJECT *object, UI_EVENT &, EVENT_TYPE ccode)
{
  if (ccode != L_SELECT)
    return (0);
// Array of UI_ITEMS used to initialize the pop-up menu
  UI_ITEM menuItems[]=
    {
      {S_CLOSE_TEMPORARY, ZIL_NULLP(void), "Cancel",MNIF_SEND_MESSAGE},
      {0, ZIL_NULLP(void), "", MNIF_SEPARATOR},
      {L_EXIT_FUNCTION, ZIL_NULLP(void), "Exit",MNIF_SEND_MESSAGE},
      {0, CloseWindow, "Close", MNIF_SEND_MESSAGE},
      {0, ZIL_NULLP(void), 0, 0}
    };
  UIW_POP_UP_MENU *menu = new UIW_POP_UP_MENU(object->true.right, object-
>true.bottom, WNF_NO_FLAGS, menuItems);
  menu->woStatus |= WOS_GRAPHICS;
  menu->woAdvancedFlags |= WOAF_TEMPORARY;
  *object->windowManager
    + menu;
  return (0);
}
```

The second constructor takes an initial position:

```
EVENT_TYPE AddPopUpMenu2(UI_WINDOW_OBJECT *object, UI_EVENT &, EVENT_TYPE ccode)
{
  if (ccode != L_SELECT)
    return (0);
  UIW_POP_UP_MENU *menu = new UIW_POP_UP_MENU(object->true.left, object->true.top, WNF_NO_
FLAGS,
    WOAF_TEMPORARY);
  menu->woStatus |= WOS_GRAPHICS;
  *menu
    + new UIW_POP_UP_ITEM("Cancel 2", MNIF_SEND_MESSAGE,BTF_NO_3D, WOF_NO_FLAGS, 0,
      S_CLOSE_TEMPORARY)
    + new UIW_POP_UP_ITEM()
    + new UIW_POP_UP_ITEM("Exit 2", MNIF_SEND_MESSAGE, BTF_NO_3D, WOF_NO_FLAGS, 0,
      L_EXIT_FUNCTION)
    + new UIW_POP_UP_ITEM("Close 2", MNIF_NO_FLAGS, BTF_NO_3D,
WOF_NO_FLAGS, CloseWindow)
    ;
  menu->woAdvancedFlags |= WOAF_TEMPORARY;
  *object->windowManager
    + menu;
  return (0);
}
```

To summarize, to use a pop-up menu without attaching it to a menu bar, create a UIW_POP_UP_MENU object and add it directly to the Window Manager.

6.17 Upgrading applications to run on Zinc 4.1 ZD-TN3018

Keywords: Zinc 1.0, Zinc 2.0, Zinc 4.1, upgrade, modify
Versions: All
Components: Library, Designer
Platforms: All
Issued: 15 May 1995

Question

How do I upgrade my application from Zinc 1.0 or 2.0 to Zinc 4.1?

Answer

To upgrade to 4.1 from Zinc 1.0 or 2.0, change the following:

1. Generic( )

Search for UIW_WINDOW::GENERIC( ) and replace it with UIW_WINDOW::Generic( ) and modify the parameters to match the new form for the generic function. Replace all instances of UIW_SYSTEM_BUTTON::GENERIC( ) with UIW_SYSTEM_BUTTON::-Generic( ).

```
UIW_WINDOW::GENERIC(int left, int top, int width, int height, USHORT
woFlags, USHORT
    woAdvancedFlags, int helpContext, char *title);
```

has been changed to:

```
UIW_WINDOW::Generic(int left, int top, int width, int height, ZIL_ICHAR
*title, UI_WINDOW_OBJECT
    *minObject = ZIL_NULLP(UI_WINDOW_OBJECT), WOF_FLAGS woFlags = WOF_NO_
FLAGS, WOAF_FLAGS
    woAdvancedFlags = WOAF_NO_FLAGS, UI_HELP_CONTEXT helpContext = NO_
HELP_CONTEXT);
```

```
UIW_SYSTEM_BUTTON::GENERIC()
```

has also changed to:

```
UIW_SYSTEM_BUTTON::Generic().
```

Note the change in case in the spelling of Generic, the change in the order of the parameters, the new icon parameter, and the default arguments.

2. windowList

Change all references of "windowList" to "UI_LIST::". UI_EVENT_MANAGER, UI_WINDOW_MANAGER, UIW_WINDOW, and all objects derived from window no longer contain the variable "windowList" because of the multiple inheritance from UI_LIST.

3. .first, .last, .current, .previous, and .next

Use First( ), Last( ), Current( ), Previous( ), and Next( ) respectively instead of the member variables *first, *last, *current, *previous, and *next. Those member variables are now protected members of UI_LIST and UI_ELEMENT.

4. Keyboard rawCodes

When using any of the constants for keyboard rawCodes (e.g., ALT_A, F3) place "#define USE_RAW_KEYS" before the "#include <ui_win.hpp>".

5. Palette map structure

Modify any references to the UI_PALETTE_MAP structure to conform to the new structure.

The structure for palette maps has changed slightly. The attrib macro should no longer be called for the graphics mappings. For example:

```
{ ID_WINDOW_OBJECT, PM_ANY, { ' ', attrib(BLACK, LIGHTGRAY), attrib(MONO_
NORMAL, MONO_BLACK), SOLID_FILL, attrib(BLACK, WHITE), attrib(BW_BLACK,
BW_WHITE), attrib(GS_BLACK, GS_WHITE)} }
```

would become:

```
{ ID_WINDOW_OBJECT, PM_ANY, { ' ', attrib(BLACK, LIGHTGRAY), attrib(MONO_
NORMAL, MONO_BLACK), PTN_SOLID_FILL, BLACK, WHITE, BW_BLACK, BW_WHITE, GS_
BLACK, GS_WHITE} }
```

6. Event devices

Move logic for derived devices from the Event( ) function of those devices to the Poll( ) function.

The event function of devices attached to the event manager is not called in UI_EVENT_MANAGER::Get function to notify devices of the messages received. For SPY-type devices check the event queue in the Poll( ) routine using:

```
ccode = eventManager->Get(event, Q_NO_BLOCK | Q_NO_POLL | Q_NO_DESTROY);
```

In this example, ccode will be 0 if there is an event and negative if there isn't. (See UI_EVENT_MANAGER::Get in the Zinc Interface Library Programmer's Reference Volume 1.) Also notice that SOLID_FILL has been changed to PTN_SOLID_FILL.

7. UI_DISPLAY

Check calls to display methods to make sure that they follow the new paramter lists.

The functionality of the UI_DISPLAY class has been expanded. Many of the member functions have a different parameter list or do not exist in their original form. See UI_DISPLAY in the Programmer's Reference Volume 1 for specific information on procedures and functions as they now exist.

8. Help files

Move all help for your application into the .DAT file that your application uses.

Help is now stored in the .DAT files rather than in .HLP files. Also the method for converting is now to chose Context | Import from the Help Editor window. All help files will need to be generated from their .TXT files using the import utility from within the designer.

9. Icon format

The bitmap format for UIW_ICON's has changed. Read the chapter on UIW_ICON in the Programmer's Reference Volume 2 for information on the new format.

10. Country information

Change all references to the UI_COUNTRY_INFO strucurre to appropriate calls to the ZIL_INTERNATIONAL class.

The structure ui_country_info has been replaced by the class ZIL_INTERNATIONAL. The new class will allow for greater flexibility and robustness for handling country-specific information.

11. .DAT file

Convert any .DAT files that were created before Zinc 3.0 to the new format using the convert utility available from Zinc.

The .DAT file structure has changed significantly. Existing Zinc 2.0 .DAT files can be converted to version 3. 0 format using the convert utility CONVERT.ZIP found on the Zinc BBS. After doing this they can be loaded into the Zinc 4.1 designer and converted to a format useful to Zinc 4.1. More objects can now be stored in the data files and can be accessed within a quicker access time. A data file can contain up to 16,000 objects with the file size being up to 16 megabytes. A single object has a maximum size of 4 megabytes.

12. Device

Change all references to devices to use the new naming format.

The names of the devices have been changed, as follows:

```
UI_CURSOR               ->      UID_CURSOR
UI_BIOS_KEYBOARD        ->      UID_KEYBOARD
UI_MS_MOUSE             ->      UID_MOUSE
```

This change was made to provide a better relation between the device classes. All device classes will have the UID_ prefix.

13. Display

Change all references to display classes to conform to the new naming format.

The names of the displays have been changed, as follows:

```
UI_DOS_BGI_DISPLAY        ->     UI_BGI_DISPLAY
UI_DOS_FG_DISPLAY         ->     UI_FG_DISPLAY
UI_DOS_TEXT_DISPLAY       ->     UI_TEXT_DISPLAY
```

The _DOS_ portion of the above class names was considered to be redundant. The UI_MSC_DISPLAY class was added to allow display support for Microsoft C/C++.

14. Error system

Replace UI_ERROR_WINDOW_SYSTEM with UI_ERROR_SYSTEM, and UI_ERROR_SYSTEM with UI_ERROR_STUB.

The UI_ERROR_WINDOW_SYSTEM class has been renamed to be the UI_ERROR_SYSTEM class. The old UI_ERROR_SYSTEM class has been renamed to UI_ERROR_STUB. The error system window will display the error text, an "Ok" button, and a "Cancel" button. Selecting the "Ok" button will restore the text that was on the field before the current text was entered. Selecting "Cancel" will keep the text as was entered, regardless of the error message. This allows the error system to function as a dialog window rather than simply reporting the error. This interaction is more standardized with other interface environments.

15. Event manager

Add the same devices to the Event Manager in all environments. The UI_MSWINDOWS_MESSAGE class has been deleted and is no longer required. For an example of how to start an application see the "Getting Started" manual.

16. Help system

Replace references to UI_HELP_WINDOW_SYSTEM with UI_HELP_SYSTEM, and references to UI_ HELP_SYSTEM with UI_HELP_STUB.

The UI_HELP_WINDOW_SYSTEM class has been renamed to the UI_HELP_SYSTEM class. The old UI_HELP SYSTEM class has been renamed to the UI_HELP_STUB class.

17. Hotkeys

Instead of using the hotkey member of the UI_WINDOW_OBJECT class, use the HotKey( ) function.

UI_WINDOW_OBJECT::hotkey is now private. Use UI_WINDOW_OBJECT::HotKey( ). Most member variables should not be changed at random. However, the HotKey( ) function is provided to allow a means of changing the hotkey.

18. Icons and windows

To use an icon as the minimize icon for a window pass a pointer to it to the constructor of the window.

When an icon is passed in as the minimize object as part of the UIW_WINDOW constructor, it will be displayed when the window is minimized. If the WOS_MINIMIZED flag is set on the window before it is added to the window manager, the window will appear in a minimized state (i.e., as the icon).

19. Jump list

Link in the generated .CPP files that the Zinc Designer writes when it saves your .DAT file.

Zinc Designer 2.0 created a .CPP file with a UI_JUMP_LIST object that was used to provide a jump to the constructors of the objects created in the designer. Zinc Designer 4.1 creates a similar table called _ objectTable. _objectTable is an array of UI_ITEM structures. In addition to _objectTable, Zinc Designer 4.1 creates _userTable. _userTable is a table of user functions that were assigned to specific objects in the designer. For example, if a button was created (in the designer), and "Function1" was entered for the user function, _userTable will create an entry for "Function1." This change simplifies the process by which objects (created using Zinc Designer) can be used in your code. User functions need only be implemented and they will be called automatically.

20. Matrix

Change references to UIW_MATRIX to one of the UIW_HZ_LIST, UIW_VT_LIST, or UIW_TABLE.

The UIW_MATRIX class was divided into the UIW_HZ_LIST (horizontal list) and the UIW_VT_LIST (vertical list). A vertical list will display a single scrollable column of objects. A horizontal list will display multiple columns of objects. The horizontal list is scrollable in the horizontal direction only. For example, if the horizontal list is 5 cell heights tall and 4 cell widths wide, it will have a viewable area of 4 columns containing up to 5 objects each. Any objects added to the lists will be non-editable. These changes were made to provide more standard objects across platforms. This will take advantage of the existing objects (e.g. , MS Windows defined objects). Another alternative is to use the UIW_TABLE introduced in Zinc 4.0. For examples on how to use the UIW_TABLE see the "Getting Started" manual.

21. Numbers

Use ZIL_BIGNUM and UIW_BIGNUM instead of UIW_NUMBER.

UIW_NUMBER has been replaced by ZIL_BIGNUM and UIW_BIGNUM. This change was to allow greater flexibility regarding numbers. The bignum classes can handle fixed-point numbers that default to 30 digits to the left and 8 digits to the right of the decimal point. The number of allowable digits can be changed by changing the values of ZIL_NUMBER_WHOLE and ZIL_NUMBER_DECIMAL which are #define values located in UI_GEN.HPP. For example, changing ZIL_NUMBER_WHOLE to a value of 60 will allow the existing code to support 60 digits to the left of the decimal point. ZIL_BIGNUM supports the following operator overloads: =, +, -, ++, --, +=, -=, ==, !=, >, >=, <=, <. The additional operators will allow greater flexibility in manipulating numerical values. Number formatting (currency, percent, etc.) is supported by the UIW_BIGNUM class only. The UIW_INTEGER class is used to handle integer values only. The UIW_REAL class handles double values and scientific notation. Scientific notation is only used if the length of the number is longer than the length of the visible UIW_REAL field. Limiting the number formatting to the UIW_BIGNUM class reduces the size of the library and the amount of code duplicated in the other number classes. This allows for smaller executable programs.

22. Path

If you are instantiating your own copy of UI_PATH use the new constructor and methods for the UI_PATH class.

The UI_PATH class has been changed. It now implements a linked-list of UI_PATH_ELEMENT objects. The actual path information is contained in UI_PATH_ELEMENT. This change allows new paths to be, more easily, added and deleted from the complete search path (i.e., UI_PATH).

23. Redisplay

Call the Event( ) function with an S_REDISPLAY to redisplay an object.

In version 2.0, window objects were redisplayed by calling DataSet(NULL). Now objects should be redisplayed by calling their Event( ) function with an S_REDISPLAY message. Since NULL is equivalent to 0, doing a DataSet(0) will change the number field to 0 rather than re-displaying the field.

24. Scroll bars

Add scroll bars directly to the lists that they are to control.

UIW_SCROLL_BAR objects should be added directly to the object that they will control. In version 2.0, if a scroll bar was added to a parent window directly before a list box, it would control the list box. In version 4.1, the scroll bar should be added to the list rather than before it. This allows the controlling object to have better communication with the scrollbar object.

25. Status flags

Change references to WOAS_* flags to the appropriate WOS_* flags.

The window object advanced status (WOAS_) flags have been changed to window object status (WOS_) flags in order to consolidate the status flags. There were so few of these flags that they were consolidated.

26. Time

Use the new functionality of the ZIL_TIME class.

The ZIL_TIME class is now derived from ZIL_INTERNATIONAL. This will aid with the conversion between country- specific time formats. The =, +, -, ++, --, >=, <=, !=, +=, -= operator overloads have been added. The additional operators will allow for more ways to manipulate times.

27. User functions

Modify user functions to use the new format.

In version 2.0, user functions were of the following format:

```
void userFunction(void *object, int ccode);
```

In version 4.1, user functions use the following format:

```
EVENT_TYPE userFunction(UI_WINDOW_OBJECT *object, UI_EVENT &event, EVENT_
TYPE ccode);
```

The user function declaration was changed to allow user functions to receive the actual event that caused the function to be called. In version 4.1, user functions will also be called when the associated window object receives the L_SELECT (i.e., <ENTER> is pressed or the object is clicked with the mouse), S_CURRENT (the field becomes current), and S_NON_CURRENT (the field becomes non-current) messages. This will allow user functions greater flexibility. Additionally, user functions are now used as validation routines (e.g., for strings, dates, times, etc.). NOTE: Since existing user functions will now be called three times (on select, current, non-current), it will be necessary to a check the ccode at the beginning of each user function to see why it was called. In order to constrain the user function to only execute the body of its code when an L_ SELECT message is sent, the following check should be made:

```
if (ccode != L_SELECT)
    return (ccode);
```

28. ui_parse_range

Derive from UIW_STRING or a class derived from UIW_STRING in order to use the ParseRange( ) function. The parse range function became a protected member of UIW_STRING. This change was made since range parsing is only handled by UIW_STRING and objects derived from UIW_STRING.

29. Validate functions

If you provide a user function for an object, and you need the Validate( ) function called for that object, then call the Validate function directly.

User functions are now used to validate input fields. The validate functions are no longer used. Please see the "User function" section for details. Having a single function for both purposes eliminates some of the confusion as to the purpose and usage of each function. There is a new function Validate( ), that was added to UIW_BIGNUM, UIW_DATE, and UIW_TIME. This provides the programmer with a pre-defined validation routine. If the userFunction variable for the particular object is NULL, Validate( ) will be called to validate the value when the object receives the S_CURRENT, S_NON_CURRENT, or L_SELECT messages.

Validate( ) will call UI_ERROR_SYSTEM::ReportError( ) to report a validation error. If a user function is provided, Validate( ) is not called to allow the programmer to either do specialized validation or call the object's Validate( ) function directly from within the provided user function.

30. UI_STORAGE and UI_STORAGE_OBJECT

Replace UI_STORAGE and UI_STORAGE_OBJECT with the new classes.

The class UI_STORAGE_ELEMENT had been replaced by the class UI_STORAGE_OBJECT. The UI_ STORAGE class has been split up and renamed. It now consists of the following classes:

```
ZIL_STORAGE_READ_ONLY
ZIL_STORAGE
```

The UI_STORAGE_OBJECT class has been split up and renamed. It now consists of the following classes:

```
ZIL_STORAGE_OBJECT_READ_ONLY
ZIL_STORAGE_OBJECT
```

If no storage functionality is needed or if only read capability is required, only the necessary storage code need be linked in. The inclusion of read or write code is controlled by the ZIL_LOAD and ZIL_STORE macros at compile time.

31. Range strings

Change all range strings to use the newformat.

The format for specifying a range for the UIW_DATE, UIW_TIME, and UIW_BIGNUM objects has changed. A date range must be specified using the following format:

```
YYYY-MM-DD
```

where YYYY is the full year, MM is the month and DD is the day of the month. A time range must be specified using the following format:

```
HH:MM:SS.TT
```

where HH is the hour in 24 hour notation, MM is the minutes, SS is the seconds, and TT are the hundredths (seconds and hundredths are optional). A bignum range must be specified using the following format:

```
[-][nnn].[nnn]
```

where negative numbers are marked with a minus sign, the decimal separator is a period, and no currency sign is used. Along with the change in how ranges are specified, objects read from a persistent object file are assumed to be in the new format if the file has been saved using the 4.1 storage functions (or created with the 4.1 Designer). If the file is still a 3.6 file (look at the first few characters in the file to see of it is not a 4.x file) then it will be read assuming the range format to be a U.S. format if the ZIL_3x_COMPAT macro was defined when the library was built. This macro is defined by default in UI_ENV.HPP to provide a smoother upgrade path. Range formats should be updated as soon as possible. You should use the Designer to update your objects, then run GC on the file to convert the file version. After you have done this, you may undefine ZIL_3x_COMPAT and rebuild the library to remove the excess code.

32. New names

Change all old names to use the new names.

Many names have changed in the library. Among these are the following:

Old name	*New name*
UI_BIGNUM	ZIL_BIGNUM
UI_DATE	ZIL_DATE
UI_TIME	ZIL_TIME
UI_STORAGE	ZIL_STORAGE and ZIL_STORAGE_READ_ONLY
UI_INTERNATIONAL	ZIL_INTERNATIONAL
ichar_t	ZIL_ICHAR
ibignum	ZIL_IBIGNUM
rbignum	ZIL_RBIGNUM
information requests	now have an I_ prefix
ZIL_OLDDEFS	ZIL_OLD_DEFS
SCREENID	ZIL_SCREENID
HBITMAP	ZIL_BITMAP_HANDLE
HICON	ZIL_ICON_HANDLE
IGNORE_UNDERSCORE	FNT_IGNORE_UNDERSCORE
NULLP	ZIL_NULLP
NULLF	ZIL_NULLF
NULLH	ZIL_NULLH
VOIDF	ZIL_VOIDF
VOIDP	ZIL_VOIDP
int8	ZIL_INT8
int16	ZIL_INT16

int32	ZIL_INT32
uint8	ZIL_UINT8
uint16	ZIL_UINT16
uint32	ZIL_UINT32
Max	MaxValue
Min	MinValue
Abs	AbsValue

See the sections of the .HPP files defined for ZIL_OLD_DEFS for a more complete list. Most changes should not affect an application if ZIL_OLD_DEFS is defined when compiling the application. We recommend, however, that applications be fully ported as soon as possible. Most changes were made to avoid the possibility of namespace collisions with other libraries.

33. Internationalization

Use the new internationalization classses.

Many member functions and member variables pertaining to internationalization have been moved from individual classes to the ZIL_LOCALE_MANAGER, ZIL_LOCALE, ZIL_LOCALE_ELEMENT, ZIL_LANGUAGE_MANAGER, ZIL_LANGUAGE, ZIL_LANGUAGE_ELEMENT, ZIL_DECORATION_MANAGER, ZIL_DECORATION, ZIL_BITMAP_ELEMENT, ZIL_TEXT_ELEMENT, ZIL_I18N_MANAGER, and ZIL_I18N classes. There are now global instances of the ZIL_LOCALE_MANAGER class (called localeManager), the ZIL_LANGUAGE_MANAGER class (called languageManager), and the ZIL_DECORATION_MANAGER class (called decorationManager). Individual instances of an object can now more easily use different locale and language information.

34. MS Windows screenID

If you are using native windows API calls for a window, make sure that you use the appropriate handle.

In MS Windows a UIW_WINDOW object now has a "client window." A program written at the Zinc level will not be affected, but if the application is taking advantage of some Windows API functionality it may need to be adjusted. The Zinc parent of an object added to the window will still be the window. The MS Windows parent will be the client window, though. Some objects, such as a status bar or tool bar on an MDI parent window, need to be displayed outside the user-region (client-region) of the window. This change makes this possible.

35. UNICODE.DAT

Make sure the I18N.DAT file is in your path for unicode applications.

The UNICODE.DAT, LANGUAGE.<ISO> and LOCALE._<ISO> data files have been replaced by the I18N.DAT file. This file must be in the path at run-time if internationalization, including character mapping, locale formatting and language translation, is to occur. The global instances of these classes will be created before main starts.

36. UI_MOTIF_DISPLAY

Replaces references to the UI_MOTIF_DISPLAY class with UI_XT_DISPLAY.

The UI_MOTIF_DISPLAY class introduced in Zinc 3.5 has been renamed to UI_XT_DISPLAY. The name is more appropriate and will allow easier support for other X-based windowing systems.

37. S_CHANGED

An S_CHANGED event has been added to the library. This event is sent when an object's size or position has changed. When an object receives this event it should update its region as necessary. This event will often be sent in cases where an S_SIZE event used to be sent, so you should trap for S_CHANGED wherever you previously trapped for S_SIZE.

6.18 Deriving a thermometer-type object ZD-TN4005

Keywords:	bar chart
Versions:	3.5 and later
Components:	Library
Platforms:	All
Issued:	November 8, 1994
File:	**Thermo.zip**

Question

How to create an object that behaves like a thermometer, such as a bar chart–type object that sizes at run time.

Answer

This can be accomplished by deriving your own class from Zinc's **UI_WINDOW_OBJECT** class and creating your own **DrawItem( )** function and your own **Event( )** function.

The **Event( )** function receives a size event, modifying the size parameters of the bar chart object and issues a call to the **DrawItem( )** function, which redraws the object with the new parameters.

Note:

For an example see **thermo.zip** on the Zinc BBS.

6.19 Using the dot matrix printer ZD-TN4026

Keywords:	UI_PRINTER; dot matrix printer
Versions:	Zinc 4.1+
Components:	UI_PRINTER
Platforms:	DOS
Issued:	April 11, 1995

Question

How do I use the dot matrix printer under DOS?

Answer

Under DOS, Zinc 4.1 now supports text output to the dot matrix printer. Previously, dot matrix printer support was only available on non-DOS platforms. The functions to accomplish this are Text( ) and TextFormat( ).

Before using Text( ) or TextFormat( ), the UI_PRINTER instance must be instantiated, and the BeginPrintJob( ) and BeginPage( ) functions must be called. Printing to a dot matrix printer can be specified by setting the ZINC_PRINTER environment variable to DM9 or DM24, or by passing PRM_DOTMATRIX9 or PRM_DOTMATRIX24 as the first parameter to the BeginPrintJob( ) function. PRM_DOTMATRIX9 and PRM_DOTMATRIX24 are interchangable when printing text to a dot matrix printer under DOS.

The Text( ) function prints a word or a line to a specified line and column on the printer page. All Text( ) output must be done from left to right, top to bottom. In other words, you can't output text to the end of a page and then go back to print text at the top.

The TextFormat( ) function prints multiple lines of text. TextFormat( ) word wraps the string automatically and allows you to specify the number of columns to indent the paragraph as well as the starting line for the text.

There are three variables that can be used to adjust output to a dot matrix printer. These are currently private in the UI_PRINTER class and should be public in a future release. To modify these for your application, move them from private to public in ui_dsp.hpp.

The three variables are:

- dotMatrixBottomMargin

  Number of lines to leave for spacing at the end of each page. The default is 8.
- dotMatrixColumnsPerPage

  Number of columns for the page for word wrapping. The default is 80 characters, but specifying 60, for example, would cause word wrapping to start at column 60.
- dotMatrixRowsPerPage

  Number of rows per page. This determines when the printer form feeds to the next page. The default is 66.

The top margin is the physical position of the top of the paper in the printer.

See *Reference Manual, Vol. 1* for more information on the UI_PRINTER class.

6.20 Differences in platforms—Windows ZD-TN4031

Keywords:	Crossplatform issues; porting; Windows
Versions:	Zinc 4.1+
Components:	LIBRARY
Platforms:	Windows
Issued:	May 3, 1995

Question

How do I port an application to Windows or Windows NT?

Answer

In general, porting an application to Windows or Windows NT means recompiling your source code with a compiler supporting the target environment.

The following are some differences and customization issues to be aware of.

1. Application Icon. You can specify the icon for the application in the .rc file.

```
minIcon ICON iconPath
```

2. Changing the application name in the task list. Use the following:

```
windowManger->Information(I_SET_TEXT, "new Name");
```

3. If the system button is not on a window, it cannot be moved, sized, etc. Also, if the system button does not have a move option (MNIF_MOVE) for example, the window cannot be moved.

4. Preventing the user from closing down Windows. In exitFunction, return S_CONTINUE. When a user tries to shut down Windows, the exitFunction can prompt the user to really exit. Returning S_CONTINUE from the exitFunction tells Windows not to shut down.

5. Disk reads from text file; outputting carriage return to text object. Under Windows, a carriage return and line feed must be specified by a \r\n combination. When reading text from disk, make sure the file is opened as binary.

6. Buttons in a UIW_VT LIST. When a button is selected, normally it does not change color to reflect that it is selected. To get this effect, set the two-state flag for the button, or make sure the BTF_NO_TOGGLE flag is off.

7. System events. The event.type of any system specific event, such as a mouse click or keyboard press, has event.type equal to E_OS2. event.message.message contains the system event type, such as WM_MOUSE-MOVE; event.InputType( ) returns the Zinc event type, which could be E_MOUSE, E_KEY, etc.

6.21 Differences in platforms—OS/2 ZD-TN4033

Keywords: Crossplatform issues; porting application; OS/2
Versions: Zinc 4.1+
Components: LIBRARY
Platforms: OS/2
Issued: May 3, 1995

Question

How do I port an application to OS/2?

Answer

In general, porting an application to OS/2 means recompiling your source code with a compiler supporting the target environment.

However, there are some differences and customization issues to be aware of.

1. Application Icon. You can specify an icon for the application in the resource (.rc) file by adding the line shown below.

```
DEFAULTICON iconPath.ico
```

2. Drag and Drop. Drag and Drop is done with the mouse button assigned to drag and drop in the OS\2 setup. OS\2 uses the right button by default.

3. Preventing user from closing down the window. In exitFunction, return S_CONTINUE. When a user tries to shut down Windows, the exitFunction can prompt the user to really exit. Returning S_CONTINUE from the exitFunction tells Windows not to shut down.

4. Disk reads from text file; outputting carriage return to text object. Under OS\2 a carriage return\line feed must be specified by a \r\n combination. When reading text from disk, make sure that the file is opened as "binary." This is the standard in all environments.

5. Buttons in a UIW_VT LIST. When a button is selected, it normally does not change color to reflect that it is selected. To get this effect, set the 2 state flag for the button (or make sure the BTF_NO_TOGGLE flag is off).

6. Notebooks. The notebook tabs adjust their width automatically.

7. Palette Mapping. This only works when changing the background color of a window. You can, however, derive your own objects with their own DrawItem( ) function which draws the object with the palettes you specify.

8. System events. The event.type of any system-specific event, such as a mouse click or keyboard press, has an event.type equal to E_OS2; event.message.message contains the system event type, for example, WM_ MOUSEMOVE, whereas event.InputType( ) returns the Zinc event type, for example, E_MOUSE, E_KEY.

9. OS\2 Designer. When running the Designer, if the editor icons do not show up, modify the OS\2 system setup. In the OS\2 system folder, under System Settings | System | Window, select Minimize window to desktop.

6.22 Platform differences—Motif, Macintosh, NEXTSTEP, Curses ZD-TN4034

Keywords:	Crossplatform issues; porting application; Motif, Macintosh, NEXTSTEP, Curses
Versions:	Zinc 4.1+
Components:	LIBRARY
Platforms:	Motif, Macintosh, NEXTSTEP, Curses
Issued:	May 3, 1995

Question

How do I port an application to the Motif, Macintosh, NEXTSTEP and Curses platforms?

Answer

There is a text file for each of these platforms describing the specific things to be aware of when developing for these environments. They also cover some compiler issues with these platforms. The files are:

- mac.txt (Apple Macintosh, PowerPC).
- motif.txt (OSF/Motif). Also available: port.txt and motif.white.paper on the FTP site in pub\doc.
- nextstep.txt (NEXTSTEP).
- curses.txt (Unix Curses).

You can find all the text files in Zinc\ as well as the bulletin board under the 4.0 conference.

6.23 MDI application guidelines ZD-TN4035

Keywords: MDI
Versions: Zinc 4.1+
Components: LIBRARY
Platforms: ALL
Issued: 5-03-95

Question

How do I write an MDI application?

Answer

The following are some guidelines for writing MDI applications:

1. The WOAF_MDI_OBJECT flag must be set on both the parent and child windows.

2. The MDI parent should have a menu. It can also have a toolbar and a status bar. If a toolbar is added it should have its WOAF_SUPPORT_OBJECT flag set (default). It should not have other client area objects, such as buttons, strings, etc., added to it.

3. Events put on the queue that are intended for an MDI child should have the S_MDICHILD_EVENT constant added to it.

   For example, to close the current MDI child window:

   ```
   eventManager->Put(UI_EVENT(S_CLOSE + S_MDICHILD_EVENT));
   ```

4. To get a pointer to the current MDI child use the following:

   ```
   currentChild = mdiParent->Last();
   ```

5. To enable the use of hotkeys on MDI children, use the following:

   ```
   childWindow->HotKey(HOT_KEY_SUB_WINDOW);
   ```

6.24 DGROUP exceeding 64K ZD-TN4036

Keywords:	DGROUP; DOS Compilers
Versions:	Zinc 3.5+
Components:	LIBRARY
Platforms:	ALL
Issued:	5-03-95

Question

How do I get around the linker error of "DGROUP exceeds 64k limit"?

Answer

The DGROUP, which is limited to 64k, is used for global data variables, embedded strings,the stack and the heap.

Here are some ways to free up DGROUP space.

1. Make global variables far.

```
    char far *stringName;
  int far someArray[50][50];
```

2. Assign embedded strings to a far char. Instead of ...

```
  FILE *fh = fopen("dataFile.txt", "r+");
```

... use the following:

```
    char far file[] = "dataFile";
  char far mode[] = "r+";
  FILE *fh = fopen(file, mode);
```

3. Also, when linking, use the -zH compiler option. (See your compiler manual if you need more info.)

4. The stack and heap size can also be decreased, although if your program requires a larger stack or heap size, this solution is unworkable.

5. Another solution is to use a 32-bit extender, which eliminates the problem altogether.

6.25 Creating vertical lists with buttons, fonts, and centered text ZD-TN5000

Keywords:	bitmap children, button, font, ownerdraw, vertical list
Versions:	3.5 and later
Components:	Library
Platforms:	Windows, OS/2, Motif, Macintosh, NEXTSTEP
Issued:	July 27, 1994

Question

How do I create a vertical list with buttons, where each button uses a different font and has its text centered?

Answer

In non-DOS environments we create native window objects and in most cases, we let the environment draw the objects for us. But in order to create a vertical list with several buttons, where each button uses a different font and has its text centered, we must have Zinc draw the buttons for us. The following code sample shows how to create such a list in Windows, OS/2, Motif, Macintosh and NEXTSTEP.

```
// Create a vertical list and four buttons.
UIW_VT_LIST list = new UIW_VT_LIST(2, 1, 20, 4, NULL, WNF_BITMAP_CHILDREN,
WOF_BORDER);
UIW_BUTTON *btn1 = new UIW_BUTTON(0, 0, 20, "Button A", BTF_NO_3D,
WOF_JUSTIFY_CENTER);
UIW_BUTTON *btn2 = new UIW_BUTTON(0, 0, 20, "Button B", BTF_NO_3D,
WOF_JUSTIFY_CENTER);
UIW_BUTTON *btn3 = new UIW_BUTTON(0, 0, 20, "Button C", BTF_NO_3D,
WOF_JUSTIFY_CENTER);
UIW_BUTTON *btn4 = new UIW_BUTTON(0, 0, 20, "Button D", BTF_NO_3D,
WOF_JUSTIFY_CENTER);
// Set the ownerdraw status for each button in order to call its DrawItem().
  // These Flags must be set before the buttons are added to the list.
btn1->woStatus |= WOS_OWNERDRAW;
btn2->woStatus |= WOS_OWNERDRAW;
btn3->woStatus |= WOS_OWNERDRAW;
btn4->woStatus |= WOS_OWNERDRAW;
// Assign a different font to each button.
btn1->Font(0);
btn2->Font(1);
btn3->Font(2);
btn4->Font(3);
// Add the buttons to the vertical list.
*list
+ btn1
+ btn2
+ btn3
+ btn4;
```

The above code assumes that the display has its font table initialized with the desired fonts. See other tech notes which explain how to assign fonts to the display's font table in each environment.

6.26 Inserting a new object into a vt. or hz. list at run time ZD-TN5001

Keywords:	list, object, run time
Version:	3.0 and later
Component:	Example
Platforms:	All
Issued:	July 7, 1994
File:	None

Question

How do you insert a new object into a vertical or horizontal list at runtime?

Answer

Inserting a new object into a vertical or horizontal list at runtime requires the use of UI_LIST::Add( ). This overloaded function does not do any of the initialization provided by the UIW_WINDOW::Add( ), so the programmer must provide it. Below is some sample code showing how to insert a new object (e.g., button) into a vertical list, initialize the object, and redisplay the list.

```
// Create a new button.
UIW_BUTTON *button = new UIW_BUTTON(...);

// Get the current object in the vertical list.
UI_WINDOW_OBJECT *current = vtList->Current();

// Insert the button before the current object.
vtList->UI_LIST::Add(current, button);

// Assign the vertical list as the button's parent.
button->parent = vtList;

// Redisplay the vertical list.
vtList->Information(CHANGED_FLAGS, NULL);
```

See the *Programmer's Reference* for more information on **UI_LIST::Add(UI_ELEMENT *element, UI_ELEMENT *newElement).**

6.27 Drag and drop in 4.0 ZD-TN5003

Keywords:	drag and drop
Versions:	4.0
Components:	Library
Platforms:	All
Issued:	September 9, 1994

Question

How does drag and drop work in Zinc 4.0?

Answer

Objects that may be dragged, or that may receive drops, must be indicated by setting flags on the objects. Flags may be set either in code or in Zinc Designer. Relevant flags are:

WOAF_MOVE_DRAG_OBJECT	Object may be move-dragged
WOAF_COPY_DRAG_OBJECT	Object may be copy-dragged (both may be selected)
WOAF_ACCEPTS_DROP	Object may accept the drop of another object

Drag messages

On a mouse down-click, the object under the mouse cursor receives an *L_BEGIN_SELECT* (usually <left-mouse-button>), *L_BEGIN_MOVE_DRAG* message (usually <Shift+left-mouse-button>), or *L_ BEGIN_COPY_DRAG* (usually <Ctrl+left-mouse-button>). When this message is received, the object performs two operations immediately:

The object sets *windowManager->dragObject* to point to itself;

The object sets the mouse cursor to the proper image by calling

```
eventManager-> DeviceImage(E_MOUSE, DM_*).
```

Mouse cursor images

Standard mouse cursor images are:

DM_CANCEL	Drop not allowed at this location
DM_DRAG_MOVE	Move of single object allowed to this location
DM_DRAG_COPY	Copy of single object allowed to this location
DM_DRAG_MOVE_MULTIPLE	Move of multiple objects allowed to this location
DM_DRAG_COPY_MULTIPLE	Copy of multiple objects allowed to this location

Drop operations

As the user drags the mouse over objects, Zinc does the following:

Checks objects under the drag cursor to see if the object is flagged as *WOAF_ACCEPTS_DROP*. If not, the mouse cursor is set to *DM_CANCEL*.

If the object is flagged as *WOAF_ACCEPTS_DROP*, Zinc sends the object's **Event( )** function one of the following messages (depending on the *windowManager->dragObject* flags):

L_CONTINUE_SELECT	For default (usually left-mouse-button) drags
L_CONTINUE_MOVE_DRAG	For move (usually Shift+left-mouse-button) drags
L_CONTINUE_COPY_DRAG	For copy (usually Ctrl+left-mouse-button) drags

If the object has a user function, the user function is called. The message passed to the user function depends on the flags of the *windowManager->dragObject* and the message received by the object's **Event( )** function. It will be one of the following:

S_DRAG_DEFAULT	Informs the user function of a default drag
S_DRAG_MOVE_OBJECT	Informs the user function of a move drag
S_DRAG_COPY_OBJECT	Informs the user function of a copy drag

In the user function, the programmer decides whether to accept a drop request, and informs Zinc of the decision by returning one of the following result codes:

0	User processed message, drop allowed
S_ERROR (-1)	User processed message, drop not allowed
S_UNKNOWN (-2)	User did not process message

If the programmer returns 0 or *S_ERROR*, the user function should set the appropriate mouse cursor image (see cursors above). If the programmer returns *S_UNKNOWN*, or if there is no user function, Zinc will send the *S_DRAG_** message to the object's **Event( )** function, which will choose the appropriate mouse cursor.

When the user up-clicks, Zinc sends one of the following messages to the **Event( )** function for the object under the cursor:

L_END_SELECT	End default drag
L_END_MOVE_DRAG	End move drag
L_END_COPY_DRAG	End copy drag

If the object under the up-click is flagged as *WOAF_ACCEPTS_DROP*, and if it has a user function, the user function will be called with one of the following messages:

S_DROP_DEFAULT	Object dropped using “default” drop

S_DROP_MOVE_OBJECT	Object dropped using "move" drop
S_DROP_COPY_OBJECT	Object dropped using "copy" drop

Then, the programmer can decide what to do in the target object's user function when the user drops an object there. The user function should return the same values as the drag queries (section 4 above). If the user function returns *S_UNKNOWN*, or if there is no user function, Zinc will send the *S_DROP_** message to the object's **Event( )** function, which will perform the default action for a drop on the object.

The following is an overview of the MOVE and COPY actions for different types of Zinc library objects:

Move operations

List to List	All objects in the source list flagged as *WOS_SELECTED* are subtracted from the source list and added to the target list.
List Item to List	The source list item is subtracted from its parent list and added to the target list.
Field to List	This operation is not allowed.
List to Field	If there is one item selected in the source list, then that item is removed from the source list, the text from the item replaces the text on the target field and the item is deleted. If there is more than one item selected in the source list, the target field disallows dropping.
List Item to Field	The source list item is removed from its parent list, its text replaces the text in the target field and the item is deleted.
All others	The text from the source object is used to set the text for the target object, then the text for the source object is blanked out

Copy operations

List to List	All objects in the source list flagged as *WOS_SELECTED* are duplicated and added to the target list.
List Item to List	The source list item is duplicated and added to the target list.
Field to List	The source field is duplicated and added to the target list.
List to Field	If there is one item selected in the source list, then that item's text replaces the target field's text. If there is more than one item selected in the source list, the target field disallows dropping.
List Item to Field	The list item's text replaces the target field's text.
All others	The text from the source object is used to set the text for the target object.

Notes

- Images for the mouse cursors and key/mouse actions for *MOVE*, *COPY*, and *DEFAULT* are environment dependent, but they are consistent with that environment.
- Unless overridden by the programmer, Zinc treats *S_DRAG_DEFAULT* the same as *S_DRAG_MOVE_OBJECT*
- Unless overridden by the programmer, Zinc treats *S_DROP_DEFAULT* the same as *S_DROP_MOVE_OBJECT*
- For MOVE actions, set the *WOAF_MOVE_DRAG_OBJECT* flag on the source and the *WOAF_ACCEPTS_DROP* flag on the target.
- For moves of a list item to a list, set the *WOAF_MOVE_DRAG_OBJECT* flag on the items in the source list, not on the source list itself.
- For COPY actions, set the *WOAF_COPY_DRAG_OBJECT* flag on the source and the *WOAF_ACCEPTS_DROP* flag on the target.

- For copies of a list item to a list, set the *WOAF_COPY_DRAG_OBJECT* flag on the items in the source list, not on the source list itself.
- For all others set *WOAF_DRAG_OBJECT* on the source and *WOAF_ACCEPTS_DROP* on the target.

6.28 Enabling table navigation using keyboard and mouse ZD-TN5004

Keywords: table interaction
Versions: 4.0
Components: Library
Platforms: All
Issued: September 21, 1994

Question

How do you enable navigation through a **UIW_TABLE** object using the keyboard and mouse?

Answer

The **UIW_TABLE** class will have an "edit" mode, which can be toggled on and off at run time.

When the edit mode is on, all Zinc standard keyboard interaction will be supported within the current **UIW_TABLE_RECORD** object, unless otherwise specified.

Pressing <Tab> will always move the focus to the next field in a record, unless the last field is current. If the last field is current, and if the table has multiple columns, pressing <Tab> will move the focus from the last field in one record to the first field in an adjacent record. In this manner, pressing <Tab> will always cycle horizontally through the fields and records in a table.

Pressing <Shift+Tab> does the opposite of pressing <Tab>.

When the edit mode is off, the arrow keys will always move the focus between the records in the table and the edit mode will remain off.

When the edit mode is on, the arrow keys will move the focus between the records in the table, only if the arrow keys are not used by a child of the record. If the arrow keys do move the focus between records, the edit mode will remain on.

Pressing the left mouse-button, with the mouse cursor over any field within the table, will cause the table to enter edit mode, and will make that field the current field.

Pressing the left mouse-button, with the mouse cursor over any record other than the current record, but not over any field within that record, will cause the record under the mouse cursor to become current and edit mode to be turned off.

Pressing the left mouse-button, with the mouse cursor over the current record, but not over any field within the current record, will have no effect.

Pressing <Enter> will cause validation of the current record (by sending an *L_SELECT* message to the record's **Event( )** function and/or user function) and will toggle the edit mode of the table.

If a **UIW_TEXT** object is the current field in the record, and the table is in edit mode, <Ctrl+Enter> will be required to cause validation and to toggle the edit mode of the table.

Pressing <PageUp> or <PageDown> will scroll the table up or down according to the number of visible records.

See the *Programmer's Reference Volume 2* for more information on the **UIW_TABLE** and **UIW_TABLE_RECORD** objects.

6.29 Working with UIW_TABLE_RECORD ZD-TN2008

Keywords: UIW_TABLE, *S_SET_DATA*, *S_NON_CURRENT*, *L_SELECT*, user function
Versions: 4.0
Components: Library
Platforms: All
Issued: February 6, 1995

Question

What are the similarities and differences between a using a user function with a UIW_TABLE_RECORD and deriving my own table record?

Answer

One way using a user function with a UIW_TABLE_RECORD and deriving your own table record are similar is that they must process the same messages. Both must process *S_SET_DATA* to update data in the table record, as well as S_NON_CURRENT and/or *L_SELECT* to update the data in memory or in a database.

An advantage of the user function over deriving a table record is the user function is simpler to use and requires less overhead. However, getting pointers to objects in the table record is required before their data can be retrieved or set. To get the pointers, use the **Get**( ) or the **Information**( ) functions. (Because these functions use a linear search they are not very fast.)

The following is an example of a user function:

```
EVENT_TYPE CarRecordFunction(UI_WINDOW_OBJECT *object, UI_EVENT &event, EVENT_TYPE
  ccode)
{
//Type cast event.data to be the proper type of data structure.
  CAR_ENTRY *carEntry = (CAR_ENTRY*)event.data;
//Update data in memory or in the database.
  if((ccode == S_NON_CURRENT) || (ccode == L_SELECT))
  {
//Use the Get function to get a pointer to a field.
    UI_WINDOW_OBJECT *ownerField = object->Get("OWNER_FIELD");
//Retrieve the data from the field and update the memory or database.
    ownerField->Information(I_COPY_TEXT, carEntry->owner);
    UI_WINDOW_OBJECT *losses = object->Get("LOSSES");
    losses->Information(I_GET_VALUE, &carEntry->losses);
    break;
  }
//Set the data into the table record.
  else if(ccode == S_SET_DATA)
  {
    UI_WINDOW_OBJECT *ownerField = object->Get("OWNER_FIELD");
    ownerField->Information(I_SET_TEXT, carEntry->owner);
```

```
        UI_WINDOW_OBJECT *losses = object->Get("LOSSES");
        losses->Information(I_SET_VALUE, &carEntry->losses);
        break;
      }
    }
```

Deriving from **UIW_TABLE_RECORD** is a powerful way to incorporate database support into the table record. However, this requires the additional overhead of including a class declaration and persistence functions. The following is an example of a class declaration:

```
    class CAR_RECORD: public UIW_TABLE_RECORD
    {
    public:
      CAR_RECORD(int width, int height, ZIL_ICHAR *entryOwner);
      virtual ~CAR_RECORD(){}
      virtual EVENT_TYPE Event(const UI_EVENT &event);

    #if defined(ZIL_LOAD)
      virtual ZIL_NEW_FUNCTION NewFunction(void) { return (CAR_RECORD::New); }
      static UI_WINDOW_OBJECT *New(const char *name,
        ZIL_STORAGE_READ_ONLY *file = ZIL_NULLP(ZIL_STORAGE_READ_ONLY),
        ZIL_STORAGE_OBJECT_READ_ONLY *object =
        ZIL_NULLP(ZIL_STORAGE_OBJECT_READ_ONLY), UI_ITEM *objectTable =
        ZIL_NULLP(UI_ITEM), UI_ITEM *userTable = ZIL_NULLP(UI_ITEM))
        { return (new CAR_RECORD(name, file, object, objectTable, userTable)); }
      CAR_RECORD(const char *name, ZIL_STORAGE_READ_ONLY *file =
        ZIL_NULLP(ZIL_STORAGE_READ_ONLY), ZIL_STORAGE_OBJECT_READ_ONLY *object =
        ZIL_NULLP(ZIL_STORAGE_OBJECT_READ_ONLY), UI_ITEM *objectTable =
        ZIL_NULLP(UI_ITEM), UI_ITEM *userTable = ZIL_NULLP(UI_ITEM));
    #endif

    protected:
      UIW_STRING *ownerField;
      UIW_INTEGER *losses;
    };
```

Because all tables require persistence, you must define ZIL_LOAD in the library and include persistence functions in your derived table record. These functions include a NewFunction( ), which returns the address of the static New( ) function, also declared in the class; and a persistence constructor. The following is an example of a persistence constructor:

```
    #if defined(ZIL_LOAD)
    CAR_RECORD::CAR_RECORD(const char *name, ZIL_STORAGE_READ_ONLY *directory,
      ZIL_STORAGE_OBJECT_READ_ONLY *file, UI_ITEM *objectTable, UI_ITEM *userTable) :
      UIW_TABLE_RECORD(name, directory, file, objectTable, userTable)
    {
    //Get pointers to members declared in the class.
      ownerField = (UIW_STRING *)Get("OWNER_FIELD");
      losses = (UIW_INTEGER*)Get("LOSSES");
```

```
}
#endif
```

In a derived class, the events S_SET_DATA, S_NON_CURRENT, and L_SELECT are handled in the event function instead of the user function. Declare members in the class, that point to the child objects of the table record. This eliminates the need to use the Get( ) or Information( ) functions each time one of these events is processed. The following is an example of an Event( ) function for a derived class:

```
EVENT_TYPE CAR_RECORD::Event(const UI_EVENT &event)
{
//Map the event. Only keyboard and mouse events need to be mapped. Since many events //are
processed it is good to avoid mapping when possible. If this function was not //trapping
for L_SELECT it would be possible to use EVENT_TYPE ccode = event.type //instead.
  EVENT_TYPE ccode = LogicalEvent(event);
  switch(ccode)
  {
//Update data in memory or in a database.
  case S_NON_CURRENT:
  case L_SELECT:
    {
//Pass event to the base class so the base can do any necessary operations.
    UIW_TABLE_RECORD::Event(event);
    CAR_ENTRY *carEntry = (CAR_ENTRY*)data;
//Retrieve the data from the fields.
    ownerField->Information(I_COPY_TEXT, carEntry->owner);
    losses->Information(I_GET_VALUE, &carEntry->losses);
    break;
    }
//Update data in the fields on the record.
  case S_SET_DATA:
    {
    UIW_TABLE_RECORD::Event(event);
    CAR_ENTRY *carEntry = (CAR_ENTRY*)data;
    ownerField->Information(I_SET_TEXT, carEntry->owner);
    losses->Information(I_SET_VALUE, &carEntry->losses);
    break;
    }
//Pass any events not handled to the base class.
  default:
    ccode = UIW_TABLE_RECORD::Event(event);
  }
  return (ccode);
}
```

6.30 Displaying MDI children after adding to MDI parent ZD-TN2010

Keywords: MDI, S_REDISPLAY, S_DISPLAY_ACTIVE
Versions: 3.5 or later
Components: library
Platforms: All
Issued: February 6, 1995

Question

How do I display a MDI child after it has been added to a MDI parent?

Answer

To display an MDI child after it has been added to its parent, tell the parent to redisplay itself. In Zinc 3.5 and 3.6 you did this by sending an S_REDISPLAY to the parent.

```
UIW_WINDOW *mdiChild = new UIW_WINDOW("test.dat~MDI_CHILD");
*mdiParent
  + mdiChild;
mdiParent->Event(S_REDISPLAY);
```

In Zinc 4.0, the entire parent does not need to be redisplayed. You can send the parent an S_DISPLAY_ ACTIVE and the region of the child that needs to be displayed. This results in faster performance. Following is an example:

```
UIW_WINDOW *mdiChild = new UIW_WINDOW("test.dat~MDI_CHILD");
*mdiParent
  + mdiChild;
mdiParent->Event(UI_EVENT(S_DISPLAY_ACTIVE, 0, mdiChild->true));
```

6.31 Graying out a bitmap on a button when it is nonselectable ZD-TN4016

Keywords:	Toolbar; button, swapping bitmaps
Version:	3.6, 4.0
Component:	Persistent Storage; Bitmaps
Platforms:	All
Issued:	January 31, 1995
Obsolete:	NA

Question

How can the bitmap on a button to be grayed out when it is made nonselectable?

Answer

To gray out a bitmap on a button when it becomes nonselectable, replace the existing bitmap with another bitmap that has the desired gray scale such that it gives the visual appearance of being nonselectable.

To get a new bitmap from the Designer, create a button in code that has the bitmap "grayed out" bitmap that you want. This button is never added to the window. It is used only to access our new bitmap.

```
    // tempButton is a temporary button that only exists in memory.
    // It is never added to the screen.
    tempButton = new UIW_BUTTON(0, 0, 0, "", 0, 0, 0, 0, "new_bitmap");
```

Then get the width and height of the new bitmap:

```
  int width, height;
    tempButton->Information(I_GET_BITMAP_WIDTH, &width);
    tempButton->Information(I_GET_BITMAP_HEIGHT, &height);
```

Then set the width and height for this new bitmap using the Information( ) function.

```
    button->Information(I_SET_BITMAP_WIDTH, width);
    button->Information(I_SET_BITMAP_HEIGHT, height);
```

Get a pointer to the new bitmap:

```
    char *newBitmapArray;
     tempButton->Information(I_GET_BITMAP_ARRAY, newBitmapArray);
```

Then set *newBitmap* as the bitmap for the button:

```
     button->Information(I_SET_BITMAP_ARRAY, newBitmapArray);
```

Since you never add *tempButton* to the window, delete it before exiting the application.

For a complete example on toggling the selectability and bitmap of a button on a toolbar, see **sbitmap.zip** on the bulletin board, main conference, tech support listing.

6.32 Displaying geometric objects on a window ZD-TN4017

Keywords: ellipse, rectangle, text
Version: 3.6, 4.0
Component: DrawItem( ), Derived Objects
Platforms: All
Issued: January 31, 1995

Question

How can I display geometric objects on a window without creating a user-defined DrawItem( ) function for that window?

Answer

You can create geometric objects with their own unique display features by creating a geometric object class from the UI_WINDOW_OBJECT base class, and adding instances of this class directly to a window using the Add( ) function.

We model our constructor after the display->Ellipse( ) function such that the parameters passed to the constructor are similar to the parameters passed to the Ellipse( ) function.

Thus our end usage of our ELLIPSE class will be:

```
*window
  + new UIW_ELLIPSE(200, 200, 50, 100, 0, 360, WOF_NO_FLAGS, BLUE, BLUE);
```

Adding this ellipse to the window would put an ellipse on the window at position (200, 200) with respect to the top left of the window. The ellipse would have an x radius of 50 pixels, and a y radius of 100 pixels. Its start angle would be 0 degrees and its ending angle would be 360 degrees. Its drawing palette would be blue. In designing an ellipse class, first create a common base class, UIW_GEOMETRY_OBJECT. This is used not only as a base class for our ellipse, but it also as a base class for the other geometric objects that we create.

The following is the class declarations for the UIW_GEOMETRY_OBJECT and UIW_ELLIPSE classes.

```
// ellipse.hpp - class declaration for an UIW_GEOMETRY_OBJECT, UIW_ELLIPSE
#include <ui_win.hpp>

class UIW_GEOMETRY_OBJECT : public UI_WINDOW_OBJECT
{
  public:
  UIW_GEOMETRY_OBJECT(int _left, int _top,int _right, int _bottom,
    WOF_FLAGS _woFlags, ZIL_COLOR _colorForeground,
    ZIL_COLOR _colorBackground, UI_REGION *_clipRegion);
  EVENT_TYPE Event(const UI_EVENT &event);

  void *Information(ZIL_INFO_REQUEST request, void *data,
      ZIL_OBJECTID objectID = ID_WINDOW_OBJECT);

    UI_PALETTE *palette;
    UI_REGION *clipRegion;
  };

  class UIW_ELLIPSE : public UIW_GEOMETRY_OBJECT
  {
    public:
    UIW_ELLIPSE(int _column, int _line, int _startAngle,
      int _endAngle, int _xRadius, int _yRadius, WOF_FLAGS woFlags = WOF_NO_FLAGS,
      ZIL_COLOR colorForeground = BLACK, ZIL_COLOR colorBackground = WHITE,
      int _fill = FALSE, int _xor = FALSE,
      UI_REGION *_clipRegion = ZIL_NULLP(UI_REGION));

    EVENT_TYPE Event(const UI_EVENT &);
    EVENT_TYPE DrawItem(const UI_EVENT &, EVENT_TYPE );

    int column,line;
    int startAngle,endAngle;
    int xRadius,yRadius;
    int fill,xor;
  };
```

The DrawItem( ) function gets called whenever the object needs to draw itself on the screen. The display->Ellipse( ) function gets called from within the DrawItem( ) function.

For a complete example program on creating and using an ellipse, line, rectangle, and geometry text object, see geo.zip on the bulletin board, user contributions conference, Zinc 4.0 listing.

6.33 Deriving a window ZD-TN1013

Keywords:	UIW_WINDOW, Designer, derive
Versions:	3.0+
Components:	UIW_WINDOW
Platforms:	All.

Question

I can't modify the derived name of a window in the Designer. How do I derive a window that was created with the Designer?

Answer

The way to derive a window from Designer is to create the class definition for your window class as you would create any other derived class, then call the persistence constructor for UIW_WINDOW in the base class constructor. The following snippet of code illustrates the simplest method for this.

```
class WINDOW : public UIW_WINDOW
{
public:
  WINDOW();
  virtual ~WINDOW() {}
  virtual EVENT_TYPE Event(const UI_EVENT &event);
};
WINDOW::WINDOW() : UIW_WINDOW("p_main.dat~WINDOW")
{
  // Center the window.
  windowManager->Center(this);
}
```

If you prefer passing in a pointer to default storage, you can do it as well.

```
class WINDOW : public UIW_WINDOW
{
public:
  WINDOW(ZIL_ICHAR *name, ZIL_STORAGE_READ_ONLY *storage);
  virtual ~WINDOW() {}
  virtual EVENT_TYPE Event(const UI_EVENT &event);
};

WINDOW::WINDOW(ZIL_ICHAR *name, ZIL_STORAGE_READ_ONLY *storage) :
  UIW_WINDOW(name, storage)
{
  // Center the window.
  windowManager->Center(this);
}
```

6.34 Interfacing the UIW_TABLE object to a database ZD-TN2006

Keywords: UIW_TABLE, database
Versions: 4.0
Components: Library
Platforms: All
Issued: January 19, 1995

Question

How do I interface the UIW_TABLE object to a database?

Answer

Here's how to interface UIW_TABLE to a database.

Set the *WOF_NO_ALLOCATE_DATA* flag on the table.

Setting the *WOF_NO_ALLOCATE_DATA* flag tells the table that you will be responsible for keeping track of the data and not to allocate any space. Setting this flag also makes several parameters in the UIW_TABLE constructor irrelevant. They are: *recordSize*, *maxRecords*, and *data*. Set these parameters as follows:

```
recordSize = 0,
 maxRecords = -1, and
 data = ZIL_NULLP(void).
```

Use InsertRecord( ) and DeleteRecord( ) to add and delete records from the table.

InsertRecord( ) and **DeleteRecord**( ) add and remove records from the table. When the *WOF_NO_ALLOCATE_DATA* flag is set, **InsertRecord**( ) and **DeleteRecord**( ) only adjust the number of records in the table and which record is current. Because they have no effect on the data, records should always be added or removed from the database before either of these functions are called. **DataSet**( ) can be used to add or remove all records at once. This function also requires all records to be added or removed from the database before it is called.

Use the *S_SET_DATA* message in the attached user function or the derived table record's Event( ) function to move data from the database to the table.

Data is moved from the database to the table during processing of the *S_SET_DATA*. The *S_SET_DATA* will be generated whenever a record is added to the table, becomes current or needs to be redrawn. This message should be processed in the user function attached to the table record or in the Event( ) function of a derived table record. When this message is received *event.rawCode* contains the based index of the record that needs its data updated. This number can then be used to access the proper database record and the data can be retrieved. Any necessary conversions can be done and the data place in the proper fields in the table record.

Use the *S_NON_CURRENT* and *L_SELECT* messages in the attached user function or the derived table record's Event( ) function to move data from the table to the database.

Data is moved from the table to the database during processing of the *S_NON_CURRENT* and *L_SELECT* events in much the same way. The user function or the **Event( )** function of a derived table record must process the *S_NON_CURRENT* and L_SELECT messages. The data in the table record should be updated to the database when either of these messages are received. This will require getting the data from each field on the table record, doing any necessary conversions and then writing the data out to the database. This must also be done any time that a record's data is changed regardless of wether the data is changed by the end user or programmatically.

Consider the data types needed by the database and the table and match them up as appropriate.

When interfacing the table to a database, consider the type of data stored by the database and the type of data needed by the objects in the table. For example, the database may contain a list of employees, their addresses and salaries. The employees' names and addresses could be stored in the database as a string and the salary could be stored as a double. To display the information, the **UIW_TABLE_RECORD** can contain two **UIW_STRING**s and a **UIW_BIGNUM**. The strings from the database can easily be placed in a UIW_ STRING. The real however, cannot be directly placed in a **UIW_BIGNUM**. The real must be converted to a *ZIL_BIGNUM* before it can be placed in the **UIW_BIGNUM**. The conversion of the real to a *ZIL_BIGNUM* and the placing of the data in the table record occurs when you use *S_SET_DATA*. When the data is transferred back to the database, you can remove the text from the *UIW_STRINGs* and place it in the database, but you will also need to remove the *ZIL_BIGNUM* data from the *UIW_BIGNUM*, then export it to a double before storing it in the database. Do this with *S_NON_CURRENT* and *L_SELECT.*

6.35 Viewing system resources at run time ZD-TN4018

Keywords:	Resource monitor; memory monitor
Version:	3.6, 4.0
Component:	Event Manager; derived device
Platforms:	DOS
Issued:	January 31, 1995

Question

How can I monitor a system resource such as available memory when a Zinc application is running?

Answer

You can monitor a system resource such as available memory by deriving a device that queries the system for the resource status, and displaying this information top, left corner of the screen in a user created resource monitor window.

Query the system resource in the Poll( ) function of the resource monitor device. The function for getting the amount of memory in use with the Borland compiler is the heapwalk( ) function. (Similar functions are available with other compilers.)

From within the Poll( ) function, use the results of the heapwalk function to compute the total amount of available memory. Send this result directly to a display field in the resource monitor window.

Create the resource monitor window in the constructor of our resource monitor device. Then add the resource monitor window directly to the windowManager from within the constructor.

For a complete example on how this is done for DOS, see **resource.zip** on the bulletin board, user contributions conference, Zinc 4.0 listing. It is also available at ftp.zinc.com under pub\contrib\zinc_4.0.

6.36 User functions that are members of a class ZD-TN4019

Keywords:	userFunction; callback function
Version:	3.6, 4.0
Component:	Callback function; user function
Platforms:	All
Issued:	January 31, 1995

Question

How can a user function be assigned to a Zinc object and also be a member of a class?

Answer

A user function, also referred to as a callback function, must be a standard C function with the predefined parameter list that the userFunction declaration expects. Any function that is a member of a class by default is not a standard C function, because it contains a hidden member called the "this" pointer that is a pointer to the class of which the function is a member. When this function is prefaced with the keyword "static," it forces the hidden "this" pointer to be removed from the function. However, static functions can only access other static data members of the class. This makes the non static data member inaccessible to the static function. Also, Zinc Designer does not allow user functions that are members of a class to be assigned to an object when in the Designer.

A simple way to resolve both of these problems is by assigning a standard C userFunction to an object, and from within this userFunction, call a nonstatic function that is a class member, passing to the function the same arguments passed to the standard C userFunction.

If you have created a window with a button on it, and you had assigned to the button userFunction MyFunction( ), do the following:

```
// Create a standard C userFunction
EVENT_TYPE MyFunction(UI_WINDOW_OBJECT *object, UI_EVENT &event, EVENT_TYPE ccode)
{
  ((MY_WINDOW *)object->parent)->MyFunction1(object, event, ccode);
}
```

Declare the MY_WINDOW class as follows, creating a nonstatic function, MyFunction1( ), that is called by the C userFunction assigned to the button.

```
class MY_WINDOW : public UIW_WINDOW
{
public:
  MY_WINDOW();
  ~MY_WINDOW() {};
  // MyFunction1() has complete access to all class members.
  EVENT_TYPE MyFunction1(UI_WINDOW_OBJECT *object,
        UI_EVENT &event, EVENT_TYPE ccode);
private:
   // any variables
};
```

The code definition for MyFunction1( ) would then take some action and return ccode.

```
EVENT_TYPE MY_WINDOW::MyFunction1(UI_WINDOW_OBJECT *object,
 UI_EVENT &event, EVENT_TYPE ccode)
{
   // take some action...
   return ccode;
}
```

See usrfunc3.zip on the user contributions conference, Zinc 4.0 listing, on the bulletin board.

6.37 Displaying timed window on application startup ZD-TN4021

Keywords: UID_TIMER; dialog window
Version: 3.6, 4.0
Component: UIW_WINDOW; UID_TIMER
Platforms: ALL
Issued: January 31, 1995

Question

How can an introduction window be displayed at application startup that automatically closes after a set number of seconds?

Answer

This can be done by creating a derived window and adding it to the Window Manager. A UID_TIMER device is then created and added to the Event Manager. This timer device would be told to post a timer message on the queue at a given time interval.

In the Event( ) function of the derived window we would look for the E_TIMER event. When this occurs, we would create an S_ADD_OBJECT event, setting data equal to a new window that we want to appear on the screen after our introduction window is deleted. We put this S_ADD_OBJECT event on the queue.

We then create a user defined close event, setting data equal to the "this" pointer. We then put this event on the queue. When the Window Manager gets the S_ADD_OBJECT event, it adds the window specified by data to the screen. This new window is now the current window on the screen.

Next, the Window Manager gets our user-defined close event and sends it to the Event( ) function of the current window. Inside the Event( ) function of the current window, when we see this user defined close event, we subtract from the windowManager the window specified by data, and then delete this window.

This way, we can put a new window on the screen and close the window behind it.

For a complete example on doing this, see introwin.zip on the user contributions conference, Zinc 4.0 listing of the bulletin board.

6.38 Using UIW_TABLE with a database ZD-TN4026

Keywords: UIW_TABLE; Database
Versions: Zinc 4.0+
Components: LIBRARY
Platforms: All
Issued: 5-11-95

Question

How do I use the UIW_TABLE object with a database package?

Answer

Here's how to create and use a table in an application using the Designer and a third-party database tool.

This example program creates a table with the following design:

Social Security Number	Name	Address
555-55-5555	John Q Smith	1122 Some Street Dr.

The program requires the following structure to read and write information to the database file.

```
struct SDATA
{
 char firstName[11],
    mi[1],
    lastName[12],
    ssn[9],
    streetData[22],
    city[20],
    state[11],
    zip[6],
    grades[30][7];// not used
};
```

Database management functions

The program uses the following functions for database management:

```
long StudentViewRecord(SDATA &sdata, int mode = 0);
```

Pass an SDATA variable into this function with a SSN. If it finds a match, the function returns its index in the database. If no match is found, it returns RECORD_NOT_FOUND (-2.

```
int StudentAddRecord(SDATA sdata);
```

Pass this function an SDATA variable with an SSN; this adds it to the database according to its SSN.

```
int StudentModifyRecord(SDATA sdata,int modifySSN);
```

```
SDATA StudentGetRecord(long recNum);
```

Pass this function an index into the data base, and it returns the associated record.

```
int  StudentDeleteRecord(SDATA sdata);
```

Pass this function an SDATA variable with a SSN, and the with a matching SSN gets deleted from the database.

```
void StudentInitOriginal( );
```

Creates a new random student database.

```
void StudentInitExisting();
```

Uses existing student database.

```
void StudentSave();
```

Saves database info to disk.

Using the Designer to build a table object

(TABLE_WINDOW inside p_event2.dat shows the appearance of the window.)

1. Create a window. Give it the name TABLE in its General page. Add a table object to it. Size the window to the size desired.

2. Size the table. Grab the bottom-right corner of the table with the mouse and size the table to the desired size. You can also size the table in the table's Position page by specifying the desired size. In our example, we size the window to about 75 x 23 cells , almost the entire screen size.

3. Size the table record. Grab the bottom-right corner of the record—the field within the table that looks like a string—with the mouse and size it. (You can size it both vertically and horizontally.) You can also size the table record in the table record's Position page by specifying the desired size.

4. Add fields to the column header. The area that has xxx on it above the table record is the column header. You can drag prompts, strings etc. to the column header. They can then be edited to display the desired text for the column headings of the table. In our example we set the column headings to SSN, Name, Address.

You can also add items to the header from the subobjects notebook page of the header. If a column entry is to be off the screen, the position of the item can be changed from within the position notebook page of the item.

5. Add fields to the table record. From the control panel toolbar, select a formatted string and add it below the SSN column header prompt. Set the delete and mask characters so it looks like a SSN field. Give it a name of SSN. (This name is used with the StringID( ) function to get a pointer to the object.) Add the following seven more strings to the table record. Assign to them the names

Strings	*Names*
first name	FIRST
middle initial	MI

last name	LAST
street address	STREET_DATA
city	CITY
state	STATE
zip code	ZIP

6. Customize the table parameters. Double-click on the empty area of the table to bring up its notebook editor. On its General page, set columns to 1. (One table record is equivalent to one column. Within the table record you can specify multiple columns as done in step 4.) Set record size equal to the struct used to interface with the data base package. In our example we set this to 71. Also give a unique name to the table. In our example we set Name to TABLE. (This is used with the StringID( ) function to get a pointer to the table.)

7. Customize the table record. Double click on the table record area. On the Advanced notebook page, assign a callback Function. In our example we use "RecordFunction." This function sets data in the table record from the database and is explained below.

At this point we are done with the Designer aspect of the table program. The following explains what we need to do in code.

Writing code to interface our table object to the database

8. Create the callback function. See RecordFunction( ) in the event2.cpp module.

9. Create the TABLE_WINDOW class. In the constructor for TABLE_WINDOW, we Get( ) a pointer to the table and call its DataSet( ) function. The first parameter is ignored and should be NULL. The second parameter is the number of elements initially used in the table; in our example we set this to 900. The third parameter of the DataSet( ) function is the maximum number of records. In our example we set this to 1000. You can call the DataSet( ) function at run time to change these parameters.

10. The Event( ) function of the TABLE_WINDOW is designed to handle the event processing of the table. It has functionality to

- find a record based on either its index or SSN
- insert a new record
- delete a record based its index or SSN
- delete the record.

See dbase.zip on the Main Conference, Tech Support listing on the bulletin board. See pub\tech_support\dbase1.zip on the Zinc FTP site.

Section 7

Zinc and third-party libraries

7.1 MetaWINDOW display class ZD-TN2015

Keywords: graphics display, MetaWINDOW, METAGRAPHICS
Versions: 4.0+
Components: graphics library
Platforms: DOS
Issued: May 1, 1995

Question

How do I interface the METAGRAPHICS graphics library with Zinc?

Answer

If you are using Zinc 4.1, you must do two things to interface METAGRAPHICS's MetaWINDOW graphics library.

First, compile D_METDSP.CPP into the library.

You can find D_METDSP.CPP in TN2015.ZIP. To add this to a library, change the library makefile.

Here is an example of how to do this for a 16 bit library in the Borland makefile:

Add the graphics library to the makefile so it will be built.

```
dos16: copy gfx_copy d16_gfx.lib d16_bgi.lib bc_16gfx.lib d16_met.lib test16.exe
```

Specify how to build the d16_met.lib and copy it to the proper lib directory.

```
d16_met.lib : d_metdsp.o16 d_metprn.o16 z_appmet.o16

    -@del d16_met.lib

    $(D16_LIBRARIAN) $(D16_LIB_OPTS) @&&!

$* &

+d_metdsp.o16+d_metprn.o16+z_appmet.o16

!

    @del zil.sym

    -@md ..\lib\$(VERSION)

    copy d16_met.lib ..\lib\$(VERSION)
```

Specify how to build Z_APP.CPP and D_PRINT.CPP for the METAGRAPHICS graphics library.

```
z_appmet.o16: z_app.cpp $(D16_CPP) -DMETA $(D16_CPP_OPTS) -o$@ $?

d_metprn.o16: d_print.cpp $(D16_CPP) -DMETA $(D16_CPP_OPTS) -o$@ $?
```

Specify which graphics library to use at link time.

```
# --- Use the next line for UI_META_DISPLAY ---
D16_LIBS=phapi d16_zil d16_met met_xp2d graph286 emu286 emu mathl bcl286
```

Next, place the font files in your path.

Included in the file TN2015.ZIP are the Zinc fonts converted to the METAGRAPHICS .FNT file format. Make sure that these files are in your path before the font files for Borland. The Borland font files and the METAGRAPHICS fonts files have the same name. If the Borland fonts precede the METAGRAPHICS fonts in your path the METAGRAPHICS display class will try and load them first and your system will crash. If you wish to use fonts supplied by METAGRAPHICS load the following structure and set it into the font table.

```
METAFONT newMetaFont;//Structure definition
newMetaFont.fontPtr = ZIL_NULLP(char);//font pointer
newMetaFont.fontName = "ROMANSIM.FNT";//Font file name
newMetaFont.size =2830;//Size of font file
newMetaFont.maxWidth =8;//Max width of the loaded font.
newMetaFont.maxHeight = 13;//Max height of the loaded font
UI_META_DISPLAY::fontTable[4] = newMetaFont;// Set font into font table.
```

If you are using Zinc 4.0, add D_METDSP.CPP to your library as above. You will also need to add the class declaration to UI_DSP.HPP. The class declaration can be found in TN2015.ZIP.

Zinc added two new functions to the library for 4.1 that were not available in 4.0: DestroyBitmapHandle( ) and DestroyIconHandle( ). Comment these functions out of D_METDSP.CPP. Finally, add the constructor of the display class to Z_APP.CPP. Add this around line 169, where the different graphics display constructors for DOS are called.

```
#   elif defined(META)
  // ----- Code for the Metawindow graphics display -----
  if (!display)
    display = new UI_META_DISPLAY;
```

7.2 General Protection Faults ZD-TN3008

Keywords:	General Protection Fault
Versions:	3.5 and later
Components:	Library
Platforms:	Windows
Issued:	September 7, 1994

Question

My program quits with a General Protection Fault. What am I doing wrong?

Answer

General Protection Faults are usually related to the following problems:

Problem

The program was compiled without a **.DEF** file to increase the stack and heap size. This causes a GP Fault because of a heap or stack overflow.

Solution

Copy one of the **.DEF** files from the Zinc examples.

Problem

The program was compiled with the Borland 4.0 compiler and exception handling and run-time type information was not turned off. Zinc's libraries were made with these options turned off. Applications must be internally consistent or they crash frequently.

Solution

Turn off all exception handling and options for your project related to run-time type information. If you are using the Borland IDE see the technote on using the Borland IDE.

An object was added to more than one list. The problem with this is that it causes one of the lists to become corrupted. Each object contains only one set of pointers (parent, previous, next).

Solution

Don't add an object to more than one list.

Problem

A window or an object was deleted from within a user function called by that object or one of its children. You must not delete the object which originates a function. Otherwise, the function will return to an invalid address and crash your application.

Solution

Rather than delete the calling object directly, instead send an event to do the same thing. For example, to close the current window put an *S_CLOSE* event on the event manager's queue:

```
EVENT_TYPE myFunction(UI_WINDOW_OBJECT *object, UI_EVENT &, EVENT_TYPE ccode)
{
  if (ccode != L_SELECT)
    return (ccode);
  ...
  object->eventManager->Put(S_CLOSE);
  return (ccode);
  ...
}
```

Or to delete an object, put an event on the Event Manager's queue that will tell the object's parent to delete it.

```
const EVENT_TYPE DELETE_BUTTON = 10009;
EVENT_TYPE myFunction(UI_WINDOW_OBJECT *object, UI_EVENT &, EVENT_TYPE ccode)
{
  if (ccode != L_SELECT)
    return (ccode);
  ...
  object->eventManager->Put(DELETE_BUTTON);
  ...
  return (ccode);
}


MY_WINDOW::Event(const UI_EVENT &event)
{
  EVENT_TYPE ccode = LogicalEvent(event);

  switch (ccode)
  {
    case DELETE_BUTTON:
    {
      UI_WINDOW_OBJECT *button = Get("BUTTON_STRING_ID");
      *this - button;
      delete button;
    }
    default:
      ccode = UIW_WINDOW::Event(event);
  }
  return (ccode);
}
```

7.3 Eliminating optional library components ZD-TN3009

Keywords:	internationalization, persistence, storage, Unicode
Versions:	4.0
Components:	Library
Platforms:	All
Issued:	September 15, 1994

Question

How do I make the libraries without internationalization, persistence, etc.?

Answer

Zinc Application Framework has many components which can be compiled in or out of the library depending on the status of specific **#define** switches. To remove an optional component, comment out the related **#define**. To include a component, make sure the appropriate **#define** is active.

The following switches include or remove load and store capability for each object.

```
// Optimization switches for object persistence.
#define ZIL_LOAD// Object Load() member functions.
#define ZIL_STORE// Object Store() member functions.
#define ZIL_STORAGE_IMAGE// Zinc UI_STORAGE class.
```

These switches include or remove internationalization capability.

```
// Switches for the international language versions.
#define ZIL_REARRANGEARGS// Support for argument rearrangement in
            // sprintf() and sscanf().
#define ZIL_DO_FILE_I18N// Support for Internationalization
#define ZIL_3x_COMPAT// Compatibility for 3x .dat files.
#define ZIL_DO_OS_I18N// Do possibly broken OS i18n support
```

To compile for Unicode support uncomment the following in UI_ENV.HPP. *Note*: Unicode support requires the Unicode Key and basic internationalization support (above).

```
//#define ZIL_UNICODE// Support for UNICODE
//#define ZIL_DECOMPOSE// Support to decompose compound Unicode
//#define ZIL_HARDWARE// Support for Non-AT MS-DOS machines.
```

The **#define** switches can be found in **ZINC\SOURCE\UI_ENV.HPP**. After setting or unsetting the appropriate switches the libraries need to be remade. To remake the libraries change to the **ZINC\SOURCE** directory and run make with the appropriate make file for your compiler. For instance if the compiler was Borland 4.0 and the target was DOS you would type:

```
make -f btcpp400 dos
```

7.4 Using PharLap 286 with Zinc ZD-TN4004

Keywords: DOS extender, PharLap 286
Versions: 3.6 and later
Components: Library
Platforms: DOS
Issued: October 28, 1994
File: None

Question

How do I use the PharLap 286 DOS extender with Zinc?

Answer

To compile and run a program using PharLap 286, use the following procedure:

- Rebuild the Zinc libraries:

  —Make sure that the Zinc include and library files can be found in your path.

  —Make sure that the PharLap include, library, and bin files can be found in your path.

  —Change directories to **ZINC\SOURCE**.

  —Execute the **DOS16** makefile for your compiler

  ```
  make -fbtcpp400.mak dos16).
  ```

- Modify your makefile to include information for PharLap 286:

  —To bind PharLap to your executable, add the following to the top of your makefile:

  ```
  D16_BIND=bind286
  PHARLAP_RTL=c:\phar286\rtl
  D16_LOAD=run286a
  ```

  —After the section of the makefile which builds your executable, add:

  ```
  $(D16_BIND) @&&!
  $(PHARLAP_RTL)\$(D16_LOAD)
  $*
  -dll$(PHARLAP_RTL)\moucalls
    $(PHARLAP_RTL)\int33
    $(PHARLAP_RTL)\doscalls
  !
  @del *.sym
  ```

Note:

See **ZINC\SOURCE\DESIGN** for an example makefile.

Section 8

Unicode and i18n

8.1 Decreasing the shipping size of Unicode.dat ZD-TN4003

Keywords:	unicode.dat
Version:	3.6, 4.0
Component:	**UNICODE.DAT**
Platforms:	ALL
Issued:	October 5, 1994
Obsolete:	NA
File:	4003.wp

Question

How do I decrease the size of the my shipping copy of **UNICODE.DAT**?

Answer

When your application is ready to ship, you may use **rrmdir** to remove character map tables, locale information, and language strings that won't be used by your application.

If your application is compiled for Unicode you may remove ISO character map tables using:

```
rrmdir i18n.dat ~ZIL_INTERNATIONAL~ISO
```

If your application is NOT compiled for Unicode you may remove the Unicode character map tables:

```
rrmdir i18n.dat ~ZIL_INTERNATIONAL~UNICODE
```

Here is a brief description of each object that you might remove:

Unicode tables:

Shift-JIS (Japanese DOS, Windows, OS/2)	**~ZIL_INTERNATIONAL~UNICODE~IBM_932**
IBM 5550 (Chinese DOS for Taiwan)	**~ZIL_INTERNATIONAL~UNICODE~IBM_938**
KSC 5601 (Korean DOS, Windows)	**~ZIL_INTERNATIONAL~UNICODE~IBM_949**
BIG 5 (Chinese DOS, Windows for Taiwan)	**~ZIL_INTERNATIONAL~UNICODE~IBM_950**
GB 2312 (Chinese DOS, Windows)	**~ZIL_INTERNATIONAL~UNICODE~IBM_1381**
US CP 437	**~ZIL_INTERNATIONAL~UNICODE~IBM_437**
Greek DOS	**~ZIL_INTERNATIONAL~UNICODE~IBM_737**
Latin 1 DOS	**~ZIL_INTERNATIONAL~UNICODE~IBM_850**
Slavic DOS	**~ZIL_INTERNATIONAL~UNICODE~IBM_852**
Cyrillic DOS	**~ZIL_INTERNATIONAL~UNICODE~IBM_855**

Turkish DOS	**~ZIL_INTERNATIONAL~UNICODE~IBM_857**
Portuguese DOS	**~ZIL_INTERNATIONAL~UNICODE~IBM_860**
Iceland DOS	**~ZIL_INTERNATIONAL~UNICODE~IBM_861**
Canadian-French DOS	**~ZIL_INTERNATIONAL~UNICODE~IBM_863**
Nordic DOS	**~ZIL_INTERNATIONAL~UNICODE~IBM_865**
Cyrillic DOS	**~ZIL_INTERNATIONAL~UNICODE~IBM_866**
Greek DOS	**~ZIL_INTERNATIONAL~UNICODE~IBM_869**
Eastern European Windows	**~ZIL_INTERNATIONAL~UNICODE~IBM_1250**
Cyrillic Windows	**~ZIL_INTERNATIONAL~UNICODE~IBM_1251**
ANSI/Latin I Windows	**~ZIL_INTERNATIONAL~UNICODE~IBM_1252**
Greek Windows	**~ZIL_INTERNATIONAL~UNICODE~IBM_1253**
Turkish Windows	**~ZIL_INTERNATIONAL~UNICODE~IBM_1254**
Hebrew Windows	**~ZIL_INTERNATIONAL~UNICODE~IBM_1255**
Arabic Windows	**~ZIL_INTERNATIONAL~UNICODE~IBM_1256**
Japanese Solaris	**~ZIL_INTERNATIONAL~UNICODE~EUC_JIS**
Macintosh	**~ZIL_INTERNATIONAL~UNICODE~MACINTOSH**
NEXTSTEP	**~ZIL_INTERNATIONAL~UNICODE~NeXT**

ISO 8859-1 tables (see above descriptions):

~ZIL_INTERNATIONAL~ISO~IBM_437

~ZIL_INTERNATIONAL~ISO~IBM_737

~ZIL_INTERNATIONAL~ISO~IBM_850

~ZIL_INTERNATIONAL~ISO~IBM_852

~ZIL_INTERNATIONAL~ISO~IBM_855

~ZIL_INTERNATIONAL~ISO~IBM_857

~ZIL_INTERNATIONAL~ISO~IBM_860

~ZIL_INTERNATIONAL~ISO~IBM_861

~ZIL_INTERNATIONAL~ISO~IBM_863

	~ZIL_INTERNATIONAL~ISO~IBM_865
	~ZIL_INTERNATIONAL~ISO~IBM_866
	~ZIL_INTERNATIONAL~ISO~IBM_869
	~ZIL_INTERNATIONAL~ISO~IBM_1250
	~ZIL_INTERNATIONAL~ISO~IBM_1251
	~ZIL_INTERNATIONAL~ISO~IBM_1252
	~ZIL_INTERNATIONAL~ISO~IBM_1253
	~ZIL_INTERNATIONAL~ISO~IBM_1254
	~ZIL_INTERNATIONAL~ISO~IBM_1255
	~ZIL_INTERNATIONAL~ISO~IBM_1256
	~ZIL_INTERNATIONAL~ISO~MACINTOSH
	~ZIL_INTERNATIONAL~ISO~NeXT

Delete the languages you aren't supporting:

Catalan	**~ZIL_INTERNATIONAL~LANGUAGE~ca**
Danish	**~ZIL_INTERNATIONAL~LANGUAGE~da**
German	**~ZIL_INTERNATIONAL~LANGUAGE~de**
English	**~ZIL_INTERNATIONAL~LANGUAGE~en**
Spanish	**~ZIL_INTERNATIONAL~LANGUAGE~es**
Finish	**~ZIL_INTERNATIONAL~LANGUAGE~fi**
French	**~ZIL_INTERNATIONAL~LANGUAGE~fr**
Italian	**~ZIL_INTERNATIONAL~LANGUAGE~it**
Dutch	**~ZIL_INTERNATIONAL~LANGUAGE~nl**
Norwegian	**~ZIL_INTERNATIONAL~LANGUAGE~no**
Swedish	**~ZIL_INTERNATIONAL~LANGUAGE~sv**

The following languages are all Unicode. You may delete them if you aren't using the Unicode key.

Greek	**~ZIL_INTERNATIONAL~LANGUAGE~el**
Japanese	**~ZIL_INTERNATIONAL~LANGUAGE~ja**

Korean	**~ZIL_INTERNATIONAL~LANGUAGE~ko**

Delete the locales you aren't using:

Austria	**~ZIL_INTERNATIONAL~LOCALE~AT**
English Canada	**~ZIL_INTERNATIONAL~LOCALE~CA**
French Canada	**~ZIL_INTERNATIONAL~LOCALE~fr_CA**
Germany	**~ZIL_INTERNATIONAL~LOCALE~DE**
Denmark	**~ZIL_INTERNATIONAL~LOCALE~DK**
Spain	**~ZIL_INTERNATIONAL~LOCALE~ES**
Finland	**~ZIL_INTERNATIONAL~LOCALE~FI**
France	**~ZIL_INTERNATIONAL~LOCALE~FR**
Great Britain	**~ZIL_INTERNATIONAL~LOCALE~GB**
Greece	**~ZIL_INTERNATIONAL~LOCALE~GR**
Italy	**~ZIL_INTERNATIONAL~LOCALE~IT**
Mexico	**~ZIL_INTERNATIONAL~LOCALE~MX**
Netherlands	**~ZIL_INTERNATIONAL~LOCALE~NL**
Norway	**~ZIL_INTERNATIONAL~LOCALE~NO**
Sweden	**~ZIL_INTERNATIONAL~LOCALE~SE**
United States	**~ZIL_INTERNATIONAL~LOCALE~US**

These locales are all Unicode. Delete them if you aren't using the Unicode key.

China	**~ZIL_INTERNATIONAL~LOCALE~CN**
Japan	**~ZIL_INTERNATIONAL~LOCALE~JP**
Korea	**~ZIL_INTERNATIONAL~LOCALE~KR**
Taiwan	**~ZIL_INTERNATIONAL~LOCALE~TW**

To create an i18n.dat for Japanese DOS/V, Windows, and for English in the US and Canada (because this is Japanese, the code is compiled for Unicode support):

rrmdir i18n.dat	**~ZIL_INTERNATIONAL~UNICODE~IBM_938**
rrmdir i18n.dat	**~ZIL_INTERNATIONAL~UNICODE~IBM_949**
rrmdir i18n.dat	**~ZIL_INTERNATIONAL~UNICODE~IBM_950**

```
rrmdir i18n.dat     ~ZIL_INTERNATIONAL~UNICODE~IBM_1381
rrmdir i18n.dat     ~ZIL_INTERNATIONAL~UNICODE~IBM_737
rrmdir i18n.dat     ~ZIL_INTERNATIONAL~UNICODE~IBM_852
rrmdir i18n.dat     ~ZIL_INTERNATIONAL~UNICODE~IBM_855
rrmdir i18n.dat     ~ZIL_INTERNATIONAL~UNICODE~IBM_857
rrmdir i18n.dat     ~ZIL_INTERNATIONAL~UNICODE~IBM_860
rrmdir i18n.dat     ~ZIL_INTERNATIONAL~UNICODE~IBM_861
rrmdir i18n.dat     ~ZIL_INTERNATIONAL~UNICODE~IBM_863
rrmdir i18n.dat     ~ZIL_INTERNATIONAL~UNICODE~IBM_865
rrmdir i18n.dat     ~ZIL_INTERNATIONAL~UNICODE~IBM_866
rrmdir i18n.dat     ~ZIL_INTERNATIONAL~UNICODE~IBM_869
rrmdir i18n.dat     ~ZIL_INTERNATIONAL~UNICODE~IBM_1250
rrmdir i18n.dat     ~ZIL_INTERNATIONAL~UNICODE~IBM_1251
rrmdir i18n.dat     ~ZIL_INTERNATIONAL~UNICODE~IBM_1252
rrmdir i18n.dat     ~ZIL_INTERNATIONAL~UNICODE~IBM_1253
rrmdir i18n.dat     ~ZIL_INTERNATIONAL~UNICODE~IBM_1254
rrmdir i18n.dat     ~ZIL_INTERNATIONAL~UNICODE~IBM_1255
rrmdir i18n.dat     ~ZIL_INTERNATIONAL~UNICODE~IBM_1256
rrmdir i18n.dat     ~ZIL_INTERNATIONAL~UNICODE~EUC_JIS
rrmdir i18n.dat     ~ZIL_INTERNATIONAL~UNICODE~MACINTOSH
rrmdir i18n.dat     ~ZIL_INTERNATIONAL~UNICODE~NeXT
rrmdir i18n.dat     ~ZIL_INTERNATIONAL~LANGUAGE~ca
rrmdir i18n.dat     ~ZIL_INTERNATIONAL~LANGUAGE~da
rrmdir i18n.dat     ~ZIL_INTERNATIONAL~LANGUAGE~de
rrmdir i18n.dat     ~ZIL_INTERNATIONAL~LANGUAGE~es
rrmdir i18n.dat     ~ZIL_INTERNATIONAL~LANGUAGE~fi
rrmdir i18n.dat     ~ZIL_INTERNATIONAL~LANGUAGE~fr
rrmdir i18n.dat        ~ZIL_INTERNATIONAL~LANGUAGE~it
rrmdir i18n.dat        ~ZIL_INTERNATIONAL~LANGUAGE~nl
rrmdir i18n.dat        ~ZIL_INTERNATIONAL~LANGUAGE~no
rrmdir i18n.dat        ~ZIL_INTERNATIONAL~LANGUAGE~sv
rrmdir i18n.dat        ~ZIL_INTERNATIONAL~LOCALE~AT
rrmdir i18n.dat        ~ZIL_INTERNATIONAL~LOCALE~fr_CA
rrmdir i18n.dat        ~ZIL_INTERNATIONAL~LOCALE~DE
rrmdir i18n.dat        ~ZIL_INTERNATIONAL~LOCALE~DK
rrmdir i18n.dat        ~ZIL_INTERNATIONAL~LOCALE~ES
rrmdir i18n.dat        ~ZIL_INTERNATIONAL~LOCALE~FI
rrmdir i18n.dat        ~ZIL_INTERNATIONAL~LOCALE~FR
rrmdir i18n.dat        ~ZIL_INTERNATIONAL~LOCALE~GB
rrmdir i18n.dat        ~ZIL_INTERNATIONAL~LOCALE~GR
rrmdir i18n.dat        ~ZIL_INTERNATIONAL~LOCALE~IT
rrmdir i18n.dat        ~ZIL_INTERNATIONAL~LOCALE~MX
rrmdir i18n.dat        ~ZIL_INTERNATIONAL~LOCALE~NL
rrmdir i18n.dat        ~ZIL_INTERNATIONAL~LOCALE~NO
rrmdir i18n.dat        ~ZIL_INTERNATIONAL~LOCALE~SE
rrmdir i18n.dat        ~ZIL_INTERNATIONAL~LOCALE~CN
rrmdir i18n.dat        ~ZIL_INTERNATIONAL~LOCALE~KR
rrmdir i18n.dat        ~ZIL_INTERNATIONAL~LOCALE~TW
rrmdir i18n.dat        ~ZIL_INTERNATIONAL~LANGUAGE~el
```

Section 9

Help and error system

9.1 Integrating native Windows help with Zinc ZD-TN3013

Keywords: Help
Versions: 3.5 and later
Components: Help system
Platforms: Windows
Issued: February 3, 1995

Question

How do I integrate the native Windows help system with Zinc?

Answer

To integrate the native Windows help system with Zinc, create a Windows-compatible help file, then derive a new class from **UI_HELP_STUB** to call the Windows help engine. To make this as transparent as possible, use Zinc Designer to specify help contexts for each object, then pass the contexts programmatically to the native help engine as hypertext lookups.

1. Design your help contexts in the help editor for each object that needs one. Store the keyword for that help context in the title portion of the help. (It would be easiest if you chose the same keywords for the help contexts as the ones for keywords being used.)

2. Using the Designer, design your windows and add the help contexts to the objects.

3. Create a Windows help file. Zinc does not provide tools to assist this process. One way to create a Windows help file is to prepare a document in RTF format and compile it using a Windows help compiler. (For more information on how to do this, see the windows programming guide). Alternatively you may use commercial software for preparing help files, such as robohelp.

4. Compile the Windows help file with a help compiler.

5. Derive a new help system from UI_HELP_STUB and provide a virtual DisplayHelp( ) function. In this function, Zinc will call WinHelp.

The following example will not remove the help window from the screen if the application doesn't have a control window; for example, assign a Windows screenID to windowManager->screenID.

If the record size is set incorrectly in the **.DAT** file and you use **DataSet**( )to initialize the table, then you will get unpredictable results. To determine the size of your data structure, write a simple program that prints out the size of the structure. If you are setting the size of the records on multiple platforms and the size of the structure is different on each platform, then you could use #ifdefs to make the size of the structures the same across platforms. (This is only important if you are setting the data's size and aren't using the "don't allocate data" flag.) We are in the process of improving the ability to set the record size, and it will probably not need to be read in from the **.DAT** file.

The following is an example of how to integrate native Windows help with Zinc.

```
class ZIL_EXPORT_CLASS MY_HELP_SYSTEM: public UI_HELP_STUB
{
public:
  MY_HELP_SYSTEM(ZIL_ICHAR *winHelpFile, ZIL_ICHAR *zincDatFile,
    UI_HELP_CONTEXT helpContext = NO_HELP_CONTEXT);
  ~MY_HELP_SYSTEM();
  virtual void DisplayHelp(UI_WINDOW_MANAGER *windowManager,
    UI_HELP_CONTEXT helpContext = NO_HELP_CONTEXT);
protected:
  ZIL_ICHAR *winHelpFile;
  ZIL_STORAGE_READ_ONLY *storage;
  UI_HELP_CONTEXT defaultHelpContext;
  ZIL_SCREENID screenID;
};


static ZIL_ICHAR ZIL_FARDATA _helpDirectory[]= { '~','U','I','_','H','E','L','P', 0 };
static ZIL_ICHAR ZIL_FARDATA _parentDirectory[]= { '.','.', 0 };
static ZIL_ICHAR ZIL_FARDATA _currentDirectory[] = { '.', 0 };

MY_HELP_SYSTEM::MY_HELP_SYSTEM(ZIL_ICHAR *_winHelpFile, ZIL_ICHAR *zincDatFile,
  UI_HELP_CONTEXT _helpContext): UI_HELP_STUB(),
  storage(0), defaultHelpContext(_helpContext), winHelpFile(_winHelpFile),
  screenID(0)
{ // Create the storage for the help class to load the help contexts out of
  // the .DAT file
  if (zincDatFile)
    storage = new ZIL_STORAGE_READ_ONLY(zincDatFile);
}

MY_HELP_SYSTEM::~MY_HELP_SYSTEM()
{
  delete storage;
  if (screenID) // only nonzero if help has been used
    WinHelp(screenID, (LPSTR)winHelpFile, HELP_QUIT, (DWORD)0);
}

void MY_HELP_SYSTEM::DisplayHelp(UI_WINDOW_MANAGER *windowManager,
  UI_HELP_CONTEXT helpContext)
{
  if (windowManager->screenID)
    screenID = windowManager->screenID;
  else
    screenID = windowManager->First()->screenID;

  if (storage)
  {
    storage->ChDir(_helpDirectory);
    if (helpContext == NO_HELP_CONTEXT)
      helpContext = defaultHelpContext;
    ZIL_ICHAR *helpName = storage->FindFirstID(helpContext);
    // If the context was fond in the .DAT file then load it otherwise display
    // the index from the help file.
    if (helpName && strcmp(helpName, _parentDirectory) &&
      strcmp(helpName, _currentDirectory))
    {
      ZIL_STORAGE_OBJECT_READ_ONLY hFile(*storage, helpName, helpContext);
      ZIL_ICHAR *text;
      hFile.Load(&text);
      if (text) // If text has a value then call WinHelp for that context.
        WinHelp(screenID, (LPSTR)winHelpFile, HELP_KEY, (DWORD)text);
      else
        WinHelp(screenID, (LPSTR)winHelpFile, HELP_INDEX, (DWORD)0);
      delete text;
    }
    else
      WinHelp(screenID, (LPSTR)winHelpFile, HELP_INDEX, (DWORD)0);

  }
    // Display the help index if there was no associated .DAT file to get the
    // help contexts from
  else
    WinHelp(screenID, (LPSTR)winHelpFile, HELP_INDEX, (DWORD)0);
}
UI_APPLICATION::Main()
{

  UI_WINDOW_OBJECT::helpSystem = new MY_HELP_SYSTEM("calc.hlp", "p_test.dat");

  UIW_WINDOW *win = new UIW_WINDOW("p_test.dat~RESOURCE_1");
  UIW_WINDOW *win2 = new UIW_WINDOW("p_test.dat~RESOURCE_2");

  *windowManager
    + win
    + win2
    ;

  windowManager->screenID = win->screenID;
  Control();

  delete UI_WINDOW_OBJECT::helpSystem;
  return (0);
}
```

In lex