Zinc™ Interface Library™

Addendum

Version 1.01

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CONTENTS

NEW FEATURES OVERVIEW

UI_DOS_BGI_DISPLAY arguments

The UI_DOS_BGI_DISPLAY constructor now allows display modes other than the default. For a list of the available modes, refer to function 'initgraph' of the Turbo C++ Reference Guide.

The syntax of the UI_DOS_BGI_DISPLAY constructor is:

UI_DOS_BGI_DISPLAY(int *display*, int *mode*);

The arguments of the constructor are:

- *display* is an integer value that specifies the graphics driver to be used.
- *mode* is an integer value that specifies the graphics mode to be used.

For example, the following code would be used to construct a new UI_DOS_BGI_DISPLAY object that uses a CGA display with a CGAC2 mode:

```
#include <graphics.h>
main()
{
    UI_DOS_BGI_DISPLAY display(CGA, CGAC2);
    .
    .
    .
}
```

Using VROOMM with ZIL

The large memory model library has now been compiled with the *-Y* option so that programs can be linked with Borland's Turbo C++ VROOMM, allowing overlay support. For more information about using VROOMM, refer to the Turbo C++ Programmer's Guide.

New sample programs

Several new example programs have been added. The default directory for the sample programs is \ZINC\EXAMPLES. To make the new examples, enter:

make xcalc.exe—An example of a simple calculator.

make xclock.exe—An example of deriving a new device to create a clock.

make xgraphics.exe—An example of extended graphics using graph and pie charts.

make xwscroll.exe—An example using scroll bars.

Event Mapping

Extended documentation of Zinc Interface Library's event mapping is included in this addendum.

Scroll bar

Zinc Interface Library now supports text and matrix scrolling. Documentation for this new class is included in this addendum.

Generic Static Functions

A GENERIC function has been added to Zinc Interface Library that simplifies the creation of basic windows and system buttons. This new function is also explained in this addendum.

INSTALLATION

Installation of Zinc Interface Library requires DOS 2.1 or later (DOS 3.1 or later is recommended), 640K RAM and a hard disk drive. Before installing Zinc Interface Library, we recommend that you back-up your distribution disks.

Insert the first distribution disk into the desired drive, make it the current drive and invoke the installation program. For example, to install Zinc Interface Library from drive A, insert the first disk and type: **a:<Enter>**, then **install<Enter>**.

Pressing <Esc> at any time will cause the installation program to abort.

The install process is accomplished in five steps:

Confirmation of license agreement—If you wish to proceed and accept the agreement, select "yes." Otherwise, select "no" and the program will abort.

Selecting a drive—Select a hard disk drive for installation.

Selecting a subdirectory—Simply press <Enter> to select the default directory (\ZINC) or type in the desired directory and then press <Enter>.

Selecting portions to install—Selecting "yes" for any of the following options will install that portion of the library to your hard drive:

Demo	Utility Programs
Examples	Library Files
Include Files	Tutorials

Installation—The program now commences installing the selected material from the distribution disks to your hard drive. Periodically, a prompt for a new disk will appear. Remove the current disk from the drive, insert the disk requested and press any key to continue the installation.

At the end of this process, a message appears on your screen indicating that installation of Zinc Interface Library is now complete.

LIBRARY UPDATES

The following revisions have been made in Zinc Interface Library:

1. The mouse position now performs correctly when switching between graphics and text modes.

2. Moving among large numbers of elements in a matrix is now possible.

3. The text editor now allows sizing windows from very small to large.

4. Filling a string buffer to its maximum no longer causes problems.

5. The float and double number objects now allow fixed point calculations.

6. The UI_TIME_EXPORT now allows hundredths to default to null.

EVENT MAPPING

Event mapping within Zinc Interface Library consists of communication between at least two objects. One object sends a message, and eventually it is received by the object that can process the information. The receiving object attempts to perform the indicated action and then returns a message to the sender. The return message will fall into one of the four categories: 1) detection of an error; 2) unrecognized event; 3) absence of window object; or 4) confirmation of action completed. Since each object is independent from all others, this type of communication is necessary so that events will be processed efficiently.

Each event processed by Zinc Interface Library is contained in a UI_EVENT structure. The specific messages are contained in a *type* member variable of this structure. In addition to the *type* member variable, the following members are included in the UI_EVENT structure:

```
struct UI_EVENT
{
    int type;
    USHORT rawCode;
    union
    {
        UI_KEY key;
        UI_REGION region;
        UI_POSITION position;
        UI_SCROLL_INFORMATION scroll;
        void *data;
    }
};

struct UI_KEY
{
    UCHAR shiftState;
    UCHAR value;
};

struct UI_REGION
{
    int left;
    int top;
    int right;
    int bottom;
};

struct UI_POSITION
{
    int column;
    int line;
};
```

```
struct UI_SCROLL_INFORMATION
{
    int current;
    int showing;
    int maximum;
    int delta;
};
```

The logical and system event mapping of Zinc Interface Library handles the following messages (contained in the *type* member variable of the UI_EVENT structure):

S_ALT_KEY—Indicates that the keyboard <Alt> key was pressed and then released without another key being pressed. This message is only sent by the keyboard device, and it causes the window's system menu (if any) to become current.

S_CANCEL—Can be processed by the programmer to cancel operations done to the current window. Unless this event is implemented by the programmer, it is ignored by the window manager, since complete backup copies of a window's field data are not available within the library itself.

S_CHANGE—Is passed by a window object to the window manager to tell it that the size of its parent window (the window to which it is attached) should be automatically changed without any user input. The new size of the window object is determined by the UI_REGION portion of the UI_EVENT structure.

S_CHECK_HOT_KEY—Is a message sent by a parent window to a child object (an object attached to the window), telling it to check the passed event with the its list of hot keys to see if any match. Typically this message is used by a window with a menu field where hot keys may be used to change the position of the highlight within the window. In other words, if a hot key is pressed by an end user, the message is sent through the window manager to the current window. The parent window passes the message to each of its window objects until a match is confirmed by one of the objects or else is disconfirmed by all objects. If a match is confirmed, the object containing the hot key match becomes current and selected.

S_CONTINUE—This message is sent by the programmer to the event manager, allowing it time to poll its devices (e.g., keyboard and cursor). The message is sent to the current object but does not have any effect on program execution other than to allow the system time to poll the devices. For example, this event is necessary if a continuous clock device has been implemented, because it ensures that the clock will change every second even if another time-consuming event is in progress.

S_CREATE—Tells each window object to initialize its internal information, such as its size and position within the parent window. The S_CREATE message is always succeeded by an S_CURRENT, S_DISPLAY_ACTIVE or S_DISPLAY_INACTIVE message. This message is sent to all of the window objects associated with a window whenever the window is attached to the window manager.

S_CURRENT—Is a message, sent through the window manager, which tells the receiving window object that it is the current (or highlighted) window object on the screen. This message is sent instead of the S_DISPLAY_ACTIVE message, which applies to all other objects within the window. The S_CURRENT message uses the UI_REGION portion of the UI_EVENT structure to indicate the coordinates of any region that overlaps a part of the previously current window object. This region will need to be refreshed, or repainted, to the foreground of the display. If no region is overlapping, the object will simply be shown in a current mode, without any repainting. Once the S_CURRENT message is sent, the window object will receive all relevant event information passed through the window manager, since event messages are most often intended for the current object.

S_DELETE—Tells each window object to uninitialize its internal information. This message is sent by the window manager whenever a window is removed from the screen display (such as when the close option is selected by the end-user). This message can also be sent directly to the window manager, telling it to remove the current window from its list of windows and to destroy it. As a result, the window is removed from the screen. If a temporary window (a window with the WOAF-_TEMPORARY flag set, such as a pull-down menu) is present on the screen, it will remove it and the next window in the window manager's list

of windows. If the current window is locked (i.e., it cannot be removed from the window manager) the S_DELETE message makes the next object on the screen current. If the WOAF_NO_DESTROY flag is set on any window, the S_DELETE message will cause that window to be subtracted from the window manager, which will cause it to disappear from the screen as well, but it will not be destroyed.

S_DELETE_LEVEL—Is the same as S_DELETE, except that it always removes only one window from the screen. Thus, if the top window is a temporary window (as determined by the WOAF_TEMPORARY flag), it is the only window removed from the screen. For example, if an end user presses <Esc> (the default key associated with S_DELETE_LEVEL) while a pull-down menu is the current window, only the pull-down menu will be removed. Any other windows will remain on the screen. In all other instances, the current window is removed from the screen.

S_DISPLAY_ACTIVE—Is sent through the parent window to a window object, telling the object to re-display itself according to an active state. In other words, one of the other objects within the parent window has become current, so the rest of the objects must be re-displayed according to an active state. This message is passed with the affected region (contained in the UI_REGION portion of the UI_EVENT structure). The object only needs to re-display its screen information when the region passed by the event overlaps the region of the object.

S_DISPLAY_INACTIVE—Is sent through a parent window to a window object, telling the object to redisplay itself according to an inactive state. In other words, the parent window is no longer active (meaning that none of its objects are current), and all objects within it must be re-displayed as inactive. This message is passed with the affected region (contained in the UI_REGION portion of the UI_EVENT structure). The object only needs to re-display its screen information when the region passed by the event overlaps the region of the object.

S_ERROR—Is returned by the object to the window manager, indicating that an error has been identified by the object and that the event should not be processed. In the meantime, the object also calls the error system, which performs in one of the following two ways:

1—If the default error system is in effect, calling the error system will cause a "beep."

2—If the window error system has been initialized by the programmer, a modal error window will appear, which remains current until the end user chooses an option—either continue, unanswered or invalid.

For example, if an end-user enters an out-of-range date in a date field and then presses <Enter>, the object detects an error, tells the window manager to halt the process, and calls the error system. When the end-user responds to the error warning appropriately, the error system sends the S_ERROR_RESPONSE to the object, withdraws, and the next window object is made current.

S_ERROR_RESPONSE—Is sent by the error system to the object where the error occurred when the end-user responds to an error message. This in turn causes the modal error window or the default error system to withdraw.

S_MAXIMIZE—Is sent through the window manager to the parent window, telling it to either enlarge the current window on the screen to its maximum size (normally the size of the screen), or to restore the window to its normal state if it is already maximized.

S_MINIMIZE—Is sent through the window manager to the parent window, telling it to either reduce the current window on the screen to its minimum size, or to restore the window to its normal state if it is already minimized.

S_MOVE—Is sent from the window manager to the window object, telling it that the parent window has been moved. The delta position of the object is contained in the *position* field of UI_EVENT, which is passed within this message. For example, an *event.position.line* of -10 and an *event.position.column* of 15 says that the window object coordinates need to be moved 10 lines up and 15 columns to the right.

S_NO_OBJECT—Is sent back to the programmer from the window manager, indicating that no window object is attached to it. An event was

passed that was intended for a particular window object, but since no object is attached to the window manager, no processing can occur.

S_NON_CURRENT—Tells the receiving window object that it is no longer the current window object. The only exception to this is when the receiving object sends back an S_ERROR message (e.g., a date field with an out-of-range date). In this case, the current window object does not change its status until the error is resolved.

S_REDISPLAY—Is handled by the window manager. It tells the system to re-display the background and all windows attached to the screen. This message is converted to S_CURRENT, S_DISPLAY_ACTIVE and S_DISPLAY_INACTIVE messages by the window manager and is sent as such to each window that is attached to the window manager.

S_SCROLL_VERTICAL—Tells the receiving window object to scroll its information the total number of lines specified by *event.scroll.delta*. For example, a value of -5 tells the receiving object to scroll the information up five lines.

S_SIZE—Is passed by window objects to the window manager in order to initiate a size operation. In this case, the window manager allows the end-user to size the window according the size operations permitted by the application. The UI_REGION portion of UI_EVENT structure is used to indicate which sides of the window can be modified. The available selections (M_RIGHT_CHANGE, M_TOP_CHANGE, M_BOTTOM-_CHANGE, M_LEFT_CHANGE) are OR'ed together to give the allowed size operations. Once a window is sized, the S_SIZE message is passed on to the affected window to indicate the new size of the window. The new window size is once again contained in the UI_REGION portion of the UI_EVENT structure.

S_UNKNOWN—The event (keyboard, mouse or system) was not recognized by the receiving window object. If this message is passed back, no action was taken by the current window object.

L_BEGIN_SELECT—Begins the selection process of a window or window object. (This message is normally sent by the mouse driver.) For

example, if the end-user clicks down on the left mouse button, the selection of the object is initiated. When the mouse button is released (L_END_SELECT), the selection will be completed.

L_CONTEXT_HELP—Requests help about a particular window. The current window calls the window manager, which in turn displays context sensitive help in its information window.

L_CONTINUE_SELECT—Is a drag operation sent by the mouse driver, indicating that L_BEGIN_SELECT was already sent and the mouse is presently being dragged as part of the selection process.

L_END_SELECT—Indicates that the selection process, initiated with the L_BEGIN_SELECT message, is complete. For example, the end-user has pressed and released the left mouse button.

L_EXIT—Tells the programmer that all program flow should discontinue between the event manager and the window manager. The window manager treats this message as a no-op; that is, no windows are removed from the window manager until its destructor is called.

L_GENERAL_HELP—Asks for general help associated with the application. This message is processed by the window manager, which in turn calls the global help system.

L_SELECT—Selects the current object or completes a selection process. For example, if you are positioned on a menu item and press <Enter> the message is converted to an L_SELECT logical event, and the item is selected and any associated action procedure is called.

L_WINDOW_MOVE—Is the same as S_MOVE, except that the event is initiated by the end-user rather than by another window object. For example, if the end-user presses <Alt F7>, which is the default key associated with this operation, the window manager will pass the message down to each window object so that it knows its new coordinates.

L_WINDOW_NEXT—Makes the next window object the current window object on the screen.

L_WINDOW_RESTORE—Restores the window object to its original size.

L_WINDOW_SIZE—Is the same as S_SIZE, except that the event is generated by the end-user rather than by another window object. For example, if the end-user presses <Alt F8>, which is the default key associated with this operation, the message is passed to the window for resizing.

L_VIEW—Is an interpreted event which indicates that no mouse buttons are currently pressed but the mouse is being moved across the screen.

All of the following are movement for window objects which are attached to a window:

L_FIELD_DOWN—If the field occupies a single line on the screen, or if the cursor is positioned on the bottom line of a multi-line field, L_FIELD_DOWN moves from the current window field to the window field immediately *below* the current field. The left or right boundary of the field must be aligned vertically with the left or right boundary of the current field. If the field is a multi-line field and the cursor is not positioned on the bottom line, L_FIELD_DOWN moves the cursor *down* one line on the display.

L_FIELD_FIRST—Moves to the first field of the current window.

L_FIELD_LAST—Moves to the last field of the current window.

L_FIELD_LEFT—Moves the cursor to the beginning of the field or object to the left of the current field. The border of the left field must be aligned horizontally with the border of the current field.

L_FIELD_NEXT—Moves from the current window field to the *next* selectable window field (i.e., the next window field that is attached to the window manager). If the last window field is currently selected, L_FIELD_NEXT cycles to the *first* selectable window field.

L_FIELD_PREVIOUS—Moves from the current window field to the *previous* selectable window field (i.e., the window field attached

immediately before in the window manager). If the first window field is currently selected, L_FIELD_PREVIOUS cycles to the *last* selectable window field.

L_FIELD_RIGHT—Moves the cursor to the beginning of the field or object to the right of the current field. The border of the right field must be aligned horizontally with the border of the current field.

L_FIELD_UP—If the field occupies a single line on the screen, or if the cursor is positioned on the top line of a multi-line field, L_FIELD_UP moves from the current window field to the window field immediately *above* the current field. The left or right boundary of the field must be aligned vertically with the left or right boundary of the current field. If the field is a multi-line field and the cursor is not positioned on the top line, L_FIELD_UP moves the cursor *up* one line on the display.

All of the following are movement for menu items:

L_ITEM_DOWN—Moves to the menu item immediately *below* the current menu item.

L_ITEM_FIRST—Moves to the first item of the current menu, or, if the first item is already current, it moves to the first item of the previous selectable menu.

L_ITEM_LAST—Moves to the last item of the current menu, or, if the last item is already current, it moves to the last item of the next selectable menu.

L_ITEM_LEFT—If the current menu has more than one column of items, L_ITEM_LEFT moves the cursor (highlight) to the item immediately to the left of the current item.

L_ITEM_NEXT—Moves from the current menu item to the next selectable menu item.

L_ITEM_PREVIOUS—Moves from the current menu item to the previous selectable menu item.

L_ITEM_RIGHT—If the current menu has more than one column of items, L_ITEM_RIGHT moves the cursor (highlight) to the item immediately to the right of the current item.

L_ITEM_UP —Moves to the menu item immediately above the current menu item.

The remaining logical events are processed by the edit objects (UIW_STRING, UIW_TEXT, UIW_NUMBER, UIW_DATE, UIW_TIME).

L_BEGIN_MARK—Determines the beginning position in marking a region.

L_CONTINUE_MARK—Indicates that the marking procedure (initiated by L_BEGIN_MARK) is in progress and that the marked area is being enlarged or reduced.

L_COPY_MARK—Copies the marked region and places it in the global paste buffer.

L_CUT—Removes the marked region and places it in the global paste buffer.

L_CUT_PASTE—If a region is marked, this message cuts the marked region and places it in the global paste buffer. If a region is not marked, this message pastes the contents of the global paste buffer at the current cursor position.

L_DELETE—Deletes the character at the cursor position. The cursor position remains the same after the operation.

L_DELETE_EOL—Deletes from the cursor position to the end of the line.

L_DELETE_WORD—Deletes the word at the current cursor position.

L_END_MARK—Completes the mark operation (initiated by L_BEGIN_MARK) of a specific region within the field.

L_INSERT_TOGGLE—Toggles between *insert* and *overstrike* edit modes in a field.

L_MARK—Marks *all* of the information contained in the field. This message is generally only interpreted by one line edit objects.

L_MOVE_BOL—Moves the cursor to the beginning of the current line within the current object.

L_MOVE_BOTTOM—Moves the cursor to the bottom of the current field.

L_MOVE_DOWN—If the field occupies a single line of the screen, or if the cursor is positioned on the bottom line of a multi-line field, L_MOVE_DOWN moves from the current window field to the window field immediately below the current field. The left or right edge of the field above must be aligned vertically with the boundary of the current field. If the field is a multi-line field and the cursor is not positioned on the bottom line, L_MOVE_DOWN moves the cursor down one line on the display.

L_MOVE_EOL—Moves the cursor to the end of the current line within the current object.

L_MOVE_LEFT—Moves the cursor to the previous character.

L_MOVE_PAGE_DOWN—If the field occupies a single line on the screen, or if the cursor is positioned on the bottom line of a multi-line field, L_MOVE_PAGE_DOWN moves the cursor from the current window field to the last window field. If the field is a multi-line field and the cursor is not positioned on the bottom line, L_MOVE_PAGE_DOWN moves the cursor down one page in the current field.

L_MOVE_PAGE_UP—If the field occupies a single line on the screen, or if the cursor is positioned on the top line of a multi-line field, L_MOVE_PAGE_UP moves the cursor from the current window field to the first window field. If the field is a multi-line field and the cursor is not positioned on the top line, L_MOVE_PAGE_UP moves the cursor up one page in the current field.

L_MOVE_RIGHT—Moves the cursor to the next character.

L_MOVE_TOP—Moves the cursor to the top of the current field.

L_MOVE_UP—If the field occupies a single line of the screen, or if the cursor is positioned on the top line of a multi-line field, L_MOVE_UP moves form the current window field to the window field immediately above the current field. The left or right edge of the field above must be aligned vertically with the boundary of the current field. If the field is a multi-line field and the cursor is not positioned on the top line, L_MOVE_UP moves the cursor up one line on the display.

L_PASTE—Copies the contents of the global paste buffer (placed there by the L_CUT or L_COPY_MARK procedures) into the current field. The copy will only occur if the data matches the type of information that the field can receive.

L_REDO—Restores, in the current field, the most recent changes executed by the L_UNDO procedure.

L_UNDO—Undoes the last operation of the field.

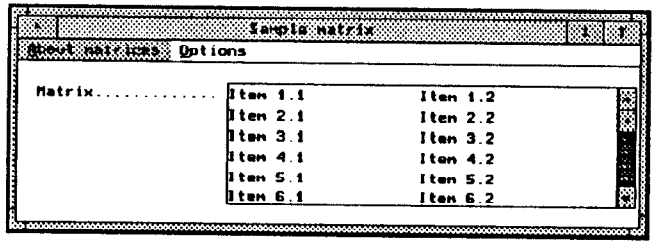
L_WORD_TAB_LEFT—Moves the cursor to the beginning of the previous word.

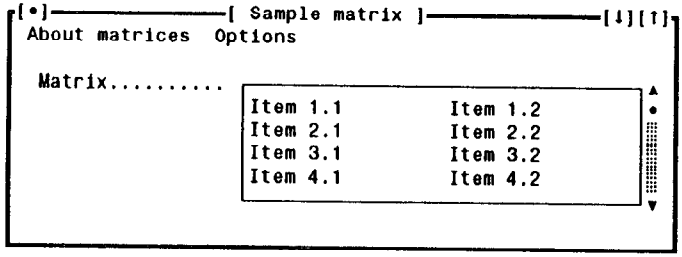
L_WORD_TAB_RIGHT—Moves the cursor to the beginning of the next word.

UIW_SCROLL_BAR

Overview

The UIW_SCROLL_BAR class is used to change displayed information in an associated text or matrix field so that additional data which is hidden above or below the displayed portion can be seen. The figures below show graphic and textual implementations of a window with a UIW_SCROLL-_BAR class object:





Mouse interaction with the scroll bar produces the following effects:

Clicking on the up arrow (▲) causes the data to scroll up one line.

Clicking on the down arrow (▼) causes the data to scroll down one line.

Clicking on and dragging the slider box (identified by a '•' character) causes the data to scroll to a position

proportional to the new slider box position. (The position is changed when the mouse button is released.)

Clicking on empty space above the slider box causes the data to scroll one page up. Likewise, clicking on empty space below the box causes the data to scroll one page down.

When the scroll bar detects input from the mouse, it sends the **L_SCROLL_VERTICAL** message to the receiving window object (i.e., the text or matrix field with which it interacts). The *event.scroll.delta* portion of the UI_EVENT structure (which is used in communicating the **L_SCROLL_VERTICAL** message) specifies the total number of lines that the information should scroll. For example, a value of -5 tells the receiving object to scroll the information **up** five lines.

Declaration The public and inherited members of the UIW-_SCROLL_BAR class (declared in **UI_WIN.HPP**) are:

```
class UIW_SCROLL_BAR : public UIW_WINDOW
{
public:
USHORT sbFlags;

    UIW_SCROLL_BAR(int left, int top, int width,
        int height, USHORT sbFlags, USHORT woFlags;
    virtual ~UIW_SCROLL_BAR(void) {}

    virtual int Event(const UI_EVENT &event);
};


class UIW_WINDOW : public UI_WINDOW_OBJECT
{
public:
    UIW_WINDOW(int left, int top, int width,
        int height, USHORT woFlags,
        USHORT woAdvancedFlags,
        int helpContext = NO_HELP_CONTEXT);
    virtual ~UIW_WINDOW(void);

    void Add(UI_WINDOW_OBJECT *object);
    UI_WINDOW_OBJECT *First(void);
    UI_WINDOW_OBJECT *Last(void)
    void Subtract(UI_WINDOW_OBJECT *object);
```

```
        UIW_WINDOW &operator + (void *object);
        UIW_WINDOW &operator - (void *object);
    };

class UI_WINDOW_OBJECT : public UI_ELEMENT
{
public:
    static UI_EVENT_MAP *eventMapTable;
    static int defaultDepth;

    USHORT woFlags;
    USHORT woStatus;
    UI_REGION true;
    UI_WINDOW_OBJECT *parent;
    UI_DISPLAY *display
    UI_EVENT_MANAGER *eventManager;
    UI_WINDOW_MANAGER *windowManager;
    UI_PALETTE_MAP *paletteMapTable;

    UI_WINDOW_OBJECT *Next(void);
    UI_WINDOW_OBJECT *Previous(void);
};

class UI_ELEMENT
{
public:
    UI_ELEMENT *previous;
    UI_ELEMENT *next;

    UI_ELEMENT(void);
    virtual ~UI_ELEMENT(void);
};
```

See also The example file **XWSCROLL.CPP**, which gives a complete example of the UIW_SCROLL_BAR class.

UIW_SCROLL_BAR::UIW_SCROLL_BAR

Syntax

```
#include <ui_win.hpp>

UIW_SCROLL_BAR::UIW_SCROLL_BAR(int left, int top,
int width, int height, USHORT sbFlags, USHORT woFlags);
```

Remarks This constructor returns a pointer to a new UIW_SCROLL_BAR class object.

- *width*$_{in}$ is the width of the scroll bar. This value is determined automatically by the UIW_SCROLL_BAR class object when the SBF_VERTICAL flag is set. A value, however, must be entered, even though it will be ignored.

- *height*$_{in}$ is the height of the scroll bar. This value will be ignored if the WOF_NON_FIELD_REGION flag is set.

- *sbFlags*$_{in}$ gives information on how to display the scroll bar. The following flag (declared in **UI_WIN.HPP**) controls the general presentation of a UIW-_SCROLL_BAR class object:

  SBF_VERTICAL—Displays a vertical scroll bar.

- *woFlags*$_{in}$ are flags (common to all window objects) that determine the general presentation of the scroll bar object. The following flags (declared in **UI_WIN.HPP**) control the general presentation of a UIW-_SCROLL_BAR class object:

  WOF_BORDER—Draws a single line border around the scroll bar object. This flag should only be used when the WOF_NON_FIELD_REGION flag is set.

  WOF_NO_FLAGS—Does not associate any special flags with the scroll bar object. This flag should not be used in conjunction with any other WOF flag.

  WOF_NON_FIELD_REGION—The scroll bar object is not a form field. If this flag is set the scroll bar object will occupy all of the remaining space of its parent window. Note: If the text or matrix field to which the scroll bar is attached has a WOF_NON-_FIELD_REGION flag set, the scroll bar must also set this flag. Likewise, if the text or matrix field does

not have the WOF_NON_FIELD_REGION set, the scroll bar cannot have it set either.

To ensure that the scroll bar is drawn correctly, it must be created immediately *before* the object it affects. The following example shows the correct and incorrect order of scroll bar creation:

```
1)  // CORRECT construction order.
    UIW_WINDOW *menuWindow = new UIW_WINDOW(5, 5, 50, 12,
            WOF_NO_FLAGS, WOAF_NO_FLAGS);
    *menuWindow
        + new UIW_BORDER
        + new UIW_MAXIMIZE_BUTTON
        + new UIW_MINIMIZE_BUTTON
        + new UIW_SYSTEM_BUTTON
        + new UIW_TITLE("Sample Menu")
        + new UIW_SCROLL_BAR(14, 1, 1, 5, SBF_VERTICAL,
            WOF_BORDER)
        + new &(*new UIW_MATRIX(2, 1, 12, 5, 10,
            12, 1, 0, MXF_SELECT_ONE, WOF_BORDER,
            WOAF_NO_FLAGS)
            + new UIW_POP_UP_ITEM(0, 0, 12,
                " Option 1", MNIF_NO_FLAGS,
                BTF_CHECK_MARK, WOF_NO_FLAGS, 0)
            + new UIW_POP_UP_ITEM(0, 1, 12,
                " Option 2", MNIF_NO_FLAGS,
                BTF_CHECK_MARK, WOF_NO_FLAGS, 0)
              .
              .
              .

2)  // INCORRECT construction order.
    UIW_WINDOW *menuWindow = new UIW_WINDOW(5, 5, 50, 12,
        WOF_NO_FLAGS, WOAF_NO_FLAGS);
    *menuWindow
        + new UIW_BORDER
        + new UIW_MAXIMIZE_BUTTON
        + new UIW_MINIMIZE_BUTTON
        + new UIW_SYSTEM_BUTTON
        + new UIW_SCROLL_BAR(14, 1, 1, 5, SBF_VERTICAL,
            WOF_BORDER)
        + new UIW_TITLE("Sample Menu")
        + new &(*new UIW_MATRIX(2, 1, 12, 5, 10,
            12, 1, 0, MXF_SELECT_ONE, WOF_BORDER,
            WOAF_NO_FLAGS)
            + new UIW_POP_UP_ITEM(0, 0, 12,
                " Option 1", MNIF_NO_FLAGS,
                BTF_CHECK_MARK, WOF_NO_FLAGS, 0)
            + new UIW_POP_UP_ITEM(0, 1, 12,
                " Option 2", MNIF_NO_FLAGS,
                BTF_CHECK_MARK, WOF_NO_FLAGS, 0)
              .
              .
              .
```

NOTE: If the scroll bar is added to a parent window, it will automatically be destroyed when the parent window is destroyed.

Example

```
#include <ui_win.hpp>

ExampleFunction1()
{
    UIW_SCROLL_BAR *scrollBar =
        new UIW_SCROLL_BAR(14, 1, 1, 5,
            SBF_VERTICAL, WOF_BORDER);

    // Add the window objects to the window.
    *menuWindow
        + new UIW_BORDER
        + new UIW_MAXIMIZE_BUTTON
        + new UIW_MINIMIZE_BUTTON
        + new UIW_SYSTEM_BUTTON
        + new UIW_TITLE("Sample Menu",
            WOF_JUSTIFY_CENTER)
        + scrollBar
        + &(*new UIW_MATRIX(2, 1, 12, 5, 10,
            12, 1, 0, MXF_SELECT_ONE,
            WOF_BORDER, WOAF_NO_FLAGS)
            + new UIW_POP_UP_ITEM(0, 0, 12,
                " Option 1", MNIF_NO_FLAGS,
                BTF_CHECK_MARK,
                WOF_NO_FLAGS, 0)
            + new UIW_POP_UP_ITEM(0, 1, 12,
                " Option 2", MNIF_NO_FLAGS,
                BTF_CHECK_MARK,
                WOF_NO_FLAGS, 0)
        .
        .
        .

}
```

UIW_SCROLL_BAR::~UIW_SCROLL_BAR

Syntax

```
#include <ui_win.hpp>

virtual UIW_SCROLL_BAR::~UIW_SCROLL_BAR(void);
```

Remarks

This virtual destructor destroys the class information associated with the UIW_SCROLL_BAR object. Care should be taken to only destroy scroll bar objects that are not attached to a parent window.

Example

```
#include <ui_win.hpp>

ExampleFunction1()
{
    UIW_SCROLL_BAR *scrollBar =
        new UIW_SCROLL_BAR(14, 1, 1, 5,
            SBF_VERTICAL, WOF_BORDER);

    // Add the window objects to the window.
    *menuWindow
        + new UIW_BORDER
        + new UIW_MAXIMIZE_BUTTON
        + new UIW_MINIMIZE_BUTTON
        + new UIW_SYSTEM_BUTTON
        + new UIW_TITLE("Sample Menu",
            WOF_JUSTIFY_CENTER)
        + scrollBar
        + &(*new UIW_MATRIX(2, 1, 12, 5, 10,
            12, 1, 0, MXF_SELECT_ONE,
            WOF_BORDER, WOAF_NO_FLAGS)
            + new UIW_POP_UP_ITEM(0, 0, 12,
                " Option 1", MNIF_NO_FLAGS,
                BTF_CHECK_MARK,
                WOF_NO_FLAGS, 0)
            + new UIW_POP_UP_ITEM(0, 1, 12,
                " Option 2", MNIF_NO_FLAGS,
                BTF_CHECK_MARK,
                WOF_NO_FLAGS, 0)
        .
        .
        .

    // Remove the scroll bar.
    *menuWindow - scrollBar;
    delete scrollBar;
}
```

GENERIC STATIC FUNCTIONS

To simplify the code associated with windows, the concept of GENERIC static functions has been added to Zinc Interface Library. Currently, two high level objects have a static member function called GENERIC, namely UIW_WINDOW and UIW_SYSTEM BUTTON. The GENERIC function creates the object, automatically including several objects that are commonly attached to it. Besides simplifying the code, this new function saves time and memory.

The GENERIC function returns a pointer to the newly created object. The new operator is not needed, since the GENERIC function uses it internally.

The UIW_WINDOW object's creation using the UIW_WINDOW::GENERIC function includes a border, a maximize button, a minimize button, a system button, and a title. For example, the original code for creating a window that contains these window objects is:

```
// Create the hello world window.
UIW_WINDOW *window =
    new UIW_WINDOW(5, 5, 40, 6, WOF_NO_FLAGS, WOAF_NO_FLAGS,
        HELP_HELLO_WORLD);

// Add the window objects to the window.
*window
    + new UIW_BORDER
    + new UIW_MAXIMIZE_BUTTON
    + new UIW_MINIMIZE_BUTTON
    + new UIW_SYSTEM_BUTTON
    + new UIW_TITLE("Hello World Window", WOF_JUSTIFY_CENTER)
    + new UIW_TEXT("Hello, World!", 256, TXF_NO_FLAGS,
        WOF_NON_FIELD_REGION);
```

Using the UIW_WINDOW::GENERIC function, the above code can be replaced with:

```
// Create the standard Hello World! window.
UIW_WINDOW *window = UIW_WINDOW::GENERIC(2, 2, 40, 6,
    WOF_NO_FLAGS,   WOAF_NO_FLAGS, HELP_HELLO_WORLD,
    "Hello World Window");

// Add the window objects to the window.
*window
    + new UIW_TEXT("Hello, World!", 256, TXF_NO_FLAGS,
        WOF_NON_FIELD_REGION);
```

Creating a system button with the UIW_SYSTEM_BUTTON::GENERIC function, the button is first created, and then the following menu option objects are added: Restore, Move, Size, Minimize, Maximize, and Close. For example, the original code for creating such a system button is:

```
*window
    + &(*new UIW_SYSTEM_BUTTON
        + new UIW_POP_UP_ITEM("~Restore", MNIF_RESTORE,
            BTF_NO_TOGGLE, WOF_NO_FLAGS, 0)
        + new UIW_POP_UP_ITEM("~Move", MNIF_MOVE, BTF_NO_TOGGLE,
            WOF_NO_FLAGS, 0)
        + new UIW_POP_UP_ITEM("~Size", MNIF_SIZE, BTF_NO_TOGGLE,
            WOF_NO_FLAGS, 0)
        + new UIW_POP_UP_ITEM("Mi~nimize",
            MNIF_MINIMIZE, BTF_NO_TOGGLE, WOF_NO_FLAGS, 0)
        + new UIW_POP_UP_ITEM("Ma~ximize",
            MNIF_MAXIMIZE, BTF_NO_TOGGLE, WOF_NO_FLAGS, 0)
        + new UIW_POP_UP_ITEM
        + new UIW_POP_UP_ITEM("~Close", MNIF_CLOSE, BTF_NO_TOGGLE,
            WOF_NO_FLAGS, 0));
```

Using the UIW_SYSTEM_BUTTON::GENERIC function, the above code can be replaced with:

```
*window  + UIW_SYSTEM_BUTTON::GENERIC();
```

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