

Desaware

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Thank you for visiting our online catalog. We are pleased to present you with detailed information and demonstrations on our products.

In addition to the normal marketing material you would expect, we're pleased to offer some special bonuses:

- Back issues of our technical newsletter: The [The Desaware Visual Basic Bulletin](#). By the way: subscriptions to our newsletter are free - just drop us a line.
- A 5000 word feature article by Daniel Appleman, author of the [Visual Basic Programmer's Guide to the Win32 API](#), on the various techniques available to Visual Basic programmers for storing data - and the tradeoffs involved on choosing the correct solution for particular applications (see [Persistence Of Data](#)).
- Finally, you will also find demo programs, demonstration editions of our controls and sample applications - all of which will run directly off this CD without copying any files onto your system. Note however, that due to the relatively slow performance of CD-ROM drives, the demo programs will run considerably more slowly than normal.

We hope you enjoy this edition of our online catalog. Please don't hesitate to contact us if you have any questions.

SPECIAL OFFER!! to readers of the **Visual Basic Programmer's Journal Buyer Guide!**

We would really appreciate your help in determining whether or not you find this type of catalog valuable and whether we should continue to participate in this type of advertising in the future. If you could select the link below when you are finished and send or fax us a copy of the subscription order form, we'll not only sign you up for a free copy of our advanced technical newsletter, we'll send you a discount coupon for future purchases as well.

[Click Here to sign up for the Visual Basic Bulletin and Receive a discount coupon on our products:](#) 

New OCX Based Products!

[SpyWorks 4.0 Professional Edition](#) - The ultimate low level programming toolkit for Visual Basic. A Subscription based product including the 2.1 VBX, the Common Dialog Toolkit and the Desaware API Class Library.

[SpyWorks 4.0 Standard Edition](#) -- The ultimate low level programming toolkit for Visual Basic.

[StorageTools 1.0](#) - *New Product!* The ultimate data storage and file manipulation toolkit. StorageTools is your key to the OLE 2.0 Structured Storage Technology.

[VersionStamper 4.0](#) -- The best way to resolve file incompatibilities, now available as an OLE custom control.

[Custom Control Factory 4.0](#) - The ultimate button factory: completely customizable including 3D effects, animation and virtually unlimited states. Now an OLE Control.

Desaware's VBX Based Products

[**SpyWorks 2.1**](#) - New VBX upgrade! - Updated for Windows95 and Windows NT. The ultimate low level programming toolkit for Visual Basic.

[**The Common Dialog Toolkit**](#) - Tap into the full power of the Windows common dialog from Visual Basic.

[**VersionStamper**](#) - The best way to resolve file incompatibilities, now available as a VBX and OLE custom controls.

[**CCF-Cursors**](#) - Create and use customer cursors (Mousepointers) in your Visual Basic applications.

[**The Custom Control Factory**](#) - The ultimate button factory: completely customizable including 3D effects, animation and virtually unlimited states.

Books by Daniel Appleman - President of Desaware

[**Visual Basic Programmer's Guide to the Win32 API**](#) - Learn to use the 32 bit Windows API from Visual Basic.

[**Visual Basic Programmer's Guide to the Windows API \(16Bit\)**](#) - Learn to use the 16 bit Windows API from Visual Basic.

[**How Computer Programming Works**](#) - A book for non-programmers and beginners.

Other Products and Information:

[**The Desaware API Class Library**](#) - Combine the power of the Windows API with the ease of use of Visual Basic. The Desaware API Class Library encapsulates hundreds of Windows API functions into Visual Basic classes that are both easy and safe to use. Compatible with the API Foundation Object standard sponsored by Desaware, The Crescent Division of Progress Software and Viewpoint Technologies. Included with SpyWorks 4.0!

[**The Desaware Visual Basic Bulletin**](#) - Access recent issues of our advanced technical newsletter.

[**White Paper: Persistence of Data**](#)

[**Technical Notes**](#)

[**Desaware Order Form**](#) - How to order These advanced developments tools.

[**Demo Controls**](#) - Demo controls included on this CD.

SpyWorks 4.0 Professional for 32 bit OLE Containers

The Professional Edition: A subscription that Includes 3 free updates!

We know that OLE controls are a new technology, that the containers that you will be using such as Visual Basic 4.0 have only just appeared, as have the operating systems that you will be using: Microsoft Windows® 95 and Windows NT™ 3.51. What new capabilities are built into the operating systems that SpyWorks can help you utilize? What kind of features will your customers demand? There is a lot to learn, and the Professional Edition is intended to not only help you learn it, but to evolve to meet your needs. Every four months you will receive a complete update of the entire SpyWorks series, 16 and 32 bit OLE Control and 16 bit VBX along with the latest utilities, application notes and so on. We will be adding features to the controls based on the most often requested (and most intriguing) features. **Plus, it includes the full [SpyWorks 2.1](#) package [and Common Dialog Toolkit](#) and the [Desaware API Class Library](#) !**

SpyWorks 4.0 Custom Controls

[SpyWorks Philosophy](#)

[DWSBCxx.ocx](#)

[DWSHKxx.ocx](#)

[DWCBKxx.ocx](#)

[DWEASYxx.ocx](#)

[DWSPYxx.dll](#)

[SpyWorks Debugging Tools](#)

[The Desaware API Class Library](#)

[Other SpyWorks 4.0 Features:](#)

[Run the SpyWorks 4.0 Demo](#) (note: you may need to register the demo controls using the [Installation](#) program in order for this demo to run).

A ONE YEAR SPYWORKS 4.0 PROFESSIONAL SUBSCRIPTION FOR ONLY \$249

DWSBCxx.ocx

The **DWSBCxx.ocx** subclassing control provides you with complete access to the underlying Windows message stream for the forms, controls and other windows in your application or other applications. It allows you to modify the behavior of forms or controls, to detect system notifications and to perform easy messaging between applications. You can use it to subclass other applications - to create system utilities or add-ins to other programs.

DWSHKxx.ocx

The **DWSHKxx.ocx** hook control allows you to take advantage of Windows hooks. Detect messages for groups of controls, for entire applications or for the entire system. Detect keystrokes on a task or systemwide basis to create “hot keys”. Use journaling to create macro recorders or computer assisted training sessions - or to monitor user interaction to test your user interface. The applications are limitless.

DWCBKxx.ocx

The **DWCBKxx.ocx** control allows you to use windows callbacks. These are Windows API and DLL functions that require a procedure address in order to work. These functions call the procedure either to notify the application that something has occurred, or to enumerate objects such as windows or objects in a metafile. **DWCBKxx.ocx** provides you with procedure addresses to pass to these API and DLL functions, and maps their calls into events, allowing you to take advantage of this powerful technique from languages such as Visual Basic that do not provide function addresses.

DWEASYxx.ocx

The **DWEASYxx.ocx** control provides an easy to use implementation of common subclassing tasks including virtual forms, MouseEnter/MouseExit detection, rollup windows, caption buttons and much more.

DWSPYxx.dll

The **DWSPYxx.dll** dynamic link library provides an array of library functions designed to help you take full advantage of both the Windows API and the SpyWorks controls. It also includes indirect property access capabilities, which let you programmatically access properties of other forms and controls in your application.

Other SpyWorks 4.0 Features:

The first release of the professional edition includes 32 bit OLE controls and the SpyWorks 2.1 VBX based package. 16 bit OLE controls and additional utilities and application notes will follow in the second release currently scheduled for February '96. *As always, applications created with any SpyWorks edition may be distributed without royalties.*

A ONE YEAR SPYWORKS 4.0 PROFESSIONAL SUBSCRIPTION IS ONLY \$249

SpyWorks Debugging Tools

SpyWorks contains a full suite of debugging and system monitoring tools to help you take full advantage of the capabilities of the package and even debug your own programs. It includes the **SpyMem** which can track memory usage for your application and detect resource leaks. The **SpyMsg** application is a message spy program with a twist - it is fully Visual Basic aware and can even detect internal Visual Basic messages. **SpyWin** lets you explore the windows hierarchy for any application and includes complete source code.

SpyWorks comes with extensive on-line help, application notes and lots of Visual Basic source examples.

SpyWorks Philosophy

One of the great advantages of Visual Basic over any other Windows development language is that it is extremely "safe" to use. In theory, it is impossible for a Visual Basic programmer to crash the system or to cause a General Protection Fault, Exception or other system error from within Visual Basic. This makes programming extremely efficient - you can quickly experiment and modify your code, examining intermediate values in the immediate window as needed. This differs markedly from other development systems where bugs frequently cause memory corruption, use of invalid pointers, and other errors that require sophisticated debuggers and many reboot/restart cycles.

Visual Basic protects you from your mistakes, but there is a price to pay for this safety. Visual Basic only implements a subset of the features that are available under Windows. As a result, there are many tasks that are difficult or impossible to do with Visual Basic directly. There are currently two methods for extending Visual Basic. You can directly access Windows API functions from VB, or you can write Dynamic Link Libraries or VB custom controls using C or C++ and traditional Windows programming techniques.

SpyWorks provides a third approach to extending Visual Basic. It consists of a number of tools and programs to support extending the capabilities of Visual Basic from within the VB environment. No C or C++ language or other tools are required. These tools take two forms: Extension tools and Debugging tools.

The extension tools consist of four custom controls and a dynamic link library: `dwsbc.ocx` (Generic subclass) `dwcbk.ocx` (Generic callback), `dwshk.ocx` (Windows and Keyboard hooks) and `dweasy.ocx` (Subclassing solutions).

[Dwsbc???.ocx](#) is a powerful custom control that allows you to intercept and manipulate the underlying Windows message stream for any Visual Basic form or control (including custom controls).

[Dwcbk???.ocx](#) is a custom control that contains a pool of function addresses that can be used as "callback" functions for Windows API functions. With these two controls and access to the Windows API functions, you can do virtually anything in Visual Basic that you could do using a dynamic link library.

[Dwshk???.ocx](#) contains a task or system keyboard event detector which allows you to intercept keyboard entries before they are received by Visual Basic or another application. `Dwshk.ocx` also supports Windows "hooks" and is ideal for intercepting Windows messages on a global basis.

[Dweasy???.ocx](#) implements common subclassing tasks including Mouse tracking, scrolling and virtual forms, tiny captions and rollup windows. `Dwspy32.dll` contains a set of functions that help you take advantage of advanced API techniques and work with the various controls. It is also used by the controls themselves to perform their tasks.

SpyWorks also includes a set of debugging and extension tools that are not included in this initial release of SpyWorks 4.0. They will appear in the 4.1 edition of the package which is expected to ship in April March 96 to all professional edition subscribers.

There is a price to pay for the power provided by the SpyWorks components. SpyWorks is one of the few products you will ever buy that proudly and clearly claims to make it much easier to crash your program. This tradeoff is common in the programming world: with power and flexibility comes a reduction in the level of protection provided by the environment. SpyWorks, by intercepting the Windows message stream and improving access to the Windows API makes it very easy to crash not only the application that uses it, but other applications as well.

SpyWorks 4.0 Standard - for 32 bit OLE Containers

The Standard Edition

The original **SpyWorks** package became one of the most successful Visual Basic add-on products of all time by allowing programmers to do virtually anything in Visual Basic that is possible with other languages. It does this by supporting powerful Windows programming techniques that are not part of Visual Basic.

SpyWorks 4.0 extends this philosophy to the new world of 32 bit programming for not only Visual Basic 4.0, but other full OLE control containers as well. It does this by providing easy access to low level system capabilities such as subclassing, callbacks and hooks that are rarely built in to higher level programming systems such as Visual Basic and VBA applications. In fact, **SpyWorks** makes these tasks so easy, that it will often be more economical to use **SpyWorks** for these tasks even with languages such as C and C++!

SpyWorks 4.0 Custom Controls

[SpyWorks Philosophy](#)

[DWSBCxx.ocx](#)

[DWSHKxx.ocx](#)

[DWCBKxx.ocx](#)

[DWEASYxx.ocx](#)

[DWSPYxx.dll](#)

[SpyWorks Debugging Tools](#)

[Run the SpyWorks 4.0 Demo](#)

Version 4.0 standard edition is a 16 and 32 bit OLE Control based edition of the SpyWorks series.

ONLY \$129 plus shipping and handling.

SpyWorks 2.1

SpyWorks allows you to do virtually anything in Visual Basic that is possible with other languages. It does this by supporting powerful Windows programming techniques that are not part of Visual Basic. Subclassing allows you to intercept any Windows message going to a form or control. Callbacks allow you to provide function pointers to Windows and other DLL's which trigger VB events when called. Hooks give you system or task access to keyboard and mouse events.

- [Philosophy of SpyWorks](#)- An unusual approach to extending Visual Basic. progman.hlp
- [Run the SpyWorks 2.1 Demo](#)

Custom Controls:

- [SBC.VBX](#) - Generic subclassing custom control.
- [CBK.VBX](#) - Callback custom control.
- [SBCKBD.VBX](#) - Keyboard hook custom control.
- [SBCHOOK](#) - Windows hooks custom control.
- [SBCEASY.VBX](#) - Scrolling forms, rollups and more.
- [DWTIMER.VBX](#) - A more reliable timer than the standard timer control. Supports unlimited timers and it will not miss timer events.
- [DWSPYDLL.DLL](#) - Extensive function library.

Debugging Tools:

- [SpyMsg](#) - View Windows messages and Visual Basic events.
- [SpyParam](#) - Detect Windows API parameter errors.
- [SpyWin](#) - Determine windows hierarchy.
- [SpyMem](#) - Analyze Windows memory, resource use, etc.
- [SpyMenu](#) - Read the menu structure for any window.
- [SwlniEdt](#) - Organize messages into groups.
- [SpyNote #1](#) - Application notes

SpyWorks 2.1 is \$129 plus shipping and handling.

SpyWorks 2.1 Philosophy

One of the great advantages of Visual Basic over any other Windows development language is that it is extremely "safe" to use. In theory, it is impossible for a Visual Basic programmer to crash the system or to cause a General Protection Fault or other system error from within Visual Basic. This makes programming extremely efficient - you can quickly experiment and modify your code, examining intermediate values in the immediate window as needed. This differs markedly from other development systems where bugs frequently cause memory corruption, use of invalid pointers, and other errors that require sophisticated debuggers and many reboot/restart cycles.

Visual Basic protects you from your mistakes, but there is a price to pay for this safety. Visual Basic only implements a subset of the features that are available under Windows. As a result, there are many tasks that are difficult or impossible to do with Visual Basic directly. There are currently two methods for extending Visual Basic. You can directly access Windows API functions from VB, or you can write Dynamic Link Libraries or VB custom controls using C or C++ and traditional Windows programming techniques.

SpyWorks provides a third approach to extending Visual Basic. It consists of a number of tools and programs to support extending the capabilities of Visual Basic from within the VB environment. No C or C++ language or other tools are required. These tools take two forms: Extension tools and Debugging tools.

The extension tools consist of five custom controls: SBC.VBX (Generic subclass) CBK.VBX (Generic Callback), SBCKBD.VBX (Keyboard hook), SBCHOOK.VBX (Windows hooks) and SBCEASY.VBX (subclassing solutions). SBC.VBX is a powerful custom control that allows you to intercept and manipulate the underlying Windows message stream for any Visual Basic form or control (including custom controls). CBK.VBX is a custom control that contains a pool of function addresses that can be used as "callback" functions for Windows API functions. With these two controls and access to the Windows API functions, you can do virtually anything in Visual Basic that you could do using a dynamic link library. SBCKBD.VBX is a task or system keyboard event detector which allows you to intercept keyboard entries before they are received by Visual Basic or another application. SBCHOOK.VBX uses Windows "hooks" and is ideal for intercepting windows messages on a global basis. SBCEASY.VBX implements common subclassing tasks including Mouse tracking, scrolling and virtual forms, tiny captions and rollup windows.

The debugging tools are designed to help you to work with the extension tools and with the Windows API. The SPYPARAM.VBX custom control detects Windows API parameter errors to help track down elusive bugs in the API interface. SpyMsg.exe is a powerful detection program that allows you to detect and record both the Windows messages and Visual Basic events that are sent to a form or control. SpyMem.exe is a memory browsing tool to help track memory usage - indispensable for making sure that all memory blocks and GDI objects are properly released. SpyMenu.exe helps you to understand the menu structure for a window. SpyVBX.exe can be used to analyze any VB form or control.

There is a price to pay for this power. SpyWorks is one of the few products you will ever buy that proudly and clearly claims to make it much easier to crash your program. This tradeoff is common in the programming world: with power and flexibility comes a reduction in the level of protection provided by the environment. SpyWorks, by intercepting the Windows message stream and improving access to the Windows API makes it very easy to crash not only the application that uses it, but other applications as well.

SpyWorks is designed for the intermediate to advanced Visual Basic programmer who has a knowledge of how to use the Windows Application Programmer's Interface (API). Some components of the package are useful to anyone (the SpyMsg.exe program, for example, by tracing all VB events that occur in an application, provides a useful debugging tool even for beginners). However, a good understanding of Windows is required to really use this package successfully.

If you already know Windows well, you will find SpyWorks extremely easy to use. Simply consider the task you wish to perform and how you would do it in C or C++, then write it in Visual Basic. Any code that you would normally write in a Windows procedure in response to a Windows message, you can place in an event in an appropriately configured SBC.VBX custom control. Any time you need a

function pointer to use as a callback function, simply use a CBK.VBX custom control to obtain one. Where you would use Windows hooks, use SBCHOOK.VBX.

If you have never programmed in Windows, you must learn about it in order to use this package effectively. The professional version of Visual Basic comes with the help file for the Windows API - this can be used as a reference for all available Windows API functions and Windows messages.

There are other references available. Desaware strongly recommends "[PC Magazine's Visual Basic Programmer's Guide to the Windows API](#)" as a supplementary text for working with SpyWorks. This book was written by the author of SpyWorks, and in fact includes a subset of the SpyWorks package (including a limited subset of the CBK.VBX custom control). You can order this book at a 20% discount directly from Desaware.

SpyWorks is a tool. Most add-on programs have a clearly defined set of operations that they can perform. Their documentation can, and often does, include extensive examples to show the capabilities of the product. A dozen books and manuals could not begin to do this with SpyWorks, because it has no clearly defined set of operations. It is a can-opener that enables you to tap the full power of Windows from within Visual Basic. The manual includes a number of examples of how the extension controls can be used, but we cannot even begin to guess at the potential of what can be accomplished. Try running the SpyDemo demonstration program to get a taste of some of the possibilities.

SBC.VBX - Generic Subclass Control

Detect windows messages for any window, form or control in the system and trigger a VB event when it occurs.

- Detect messages before the Windows default processing, after the Windows default processing, or simply post it to yourself for later examination.
- When detecting messages before the default processing, you can change the message or its parameters, or cause the message to be completely ignored.
- Detect messages that are sent from Windows, or those sent directly by Visual Basic - this allows you to see the internal VB messages in VB forms and controls.
- Even detect messages for the new VB2/VB3 graphical controls.
- Subclass windows in other applications - you can effectively create VB programs that add their own menu commands to another application so that your VB program acts as an Add-on to that application.
- Specify exactly which messages to detect - this minimizes the overhead to provide the fastest possible performance.
- Detect registered windows messages.
- Delayed event processing - allows you to "post" an event to yourself without setting up a timer control.
- Each SBC.VBX control can subclass multiple windows or controls (limited only by memory).
- The SBC.VBX control can be configured to queue up messages received while a message box is visible (overcoming a limitation in VB).

CBK.VBX - Generic Callback Control

- Provides a pool of function addresses which can be passed to the Windows API or any Dynamic Link Library for use as callback functions.
- Over a dozen standard parameter sequences (callback function types) are provided, along with Desaware's guarantee: If you need a callback type that is not provided we'll add it and send you and update - *fast*.
- Over 100 function addresses in the internal function pool (far more than you're ever likely to need, but we'll add more if you need them).
- Support for both the standard 'Pascal' and the 'C' calling convention.
- Cross task callbacks makes it possible to use callbacks that occur in the context of a different task.
- Posted callbacks allows use of the CBK control even with callbacks which restrict use of API functions to PostMessage only (low or interrupt level).
- Can be page locked for use with low level multimedia API callbacks.

SBCKBD.VBX - Keyboard Hook Control

- Receive all keystrokes sent to any task. Keystrokes are detected before they are sent to the application, thus you can even trap the enter key, control break, and tab key.
- Place a system wide keyboard hook. This allows your VB program to be a "hotkey" type application which is triggered by a specific key sequence regardless of which application is active.

SBCHOOK.VBX - Windows Hooks Control

- Implementation of Windows hooks including WH_MOUSE, WH_GETMESSAGE, WH_MSGFILTER, WH_SYSMSGFILTER and WH_CALLWNDPROC, *New hooks supported in Version 2.1* - WH_CBT, WH_JOURNALPLAYBACK, WH_JOURNALRECORD - Allows interception of messages going to many controls without subclassing each one.
- Full control over scope of message detection - per form, per task, or System-wide.
- Can be configured to queue up messages received while a message box is visible (overcoming a limitation in VB).
- Specify exactly which messages to detect - this minimizes overhead to provide the fastest possible performance.
- Detect registered windows messages.
- Detect messages as they occur, or post them for later processing.
- Ability to change or discard messages (depending on the hook and message)

SBCEASY.VBX - Windows Hooks Control

- True 'MouseEnter', 'MouseExit' event for every form or control in your application - including Visual Basic graphical controls. Ideal for status bars.
- Easy detection of menu select events - also ideal for status bars.
- Determine update area of a window during VB Paint events.
- Create 'Tiny' captioned windows similar to the VB control toolbar out of forms and most container controls.
- Ability to modify or draw your own window captions.
- Create rollup windows (drop down form) out of forms and most container controls.
- Intercept, block or modify system menu commands.
- Turn on scrollbars for any form, picture control and many container controls.
- Perform automatic scrolling on any form, picture control and many container controls.
- Turn forms, picture controls and most container controls into "virtual" controls where control acts as a window to a larger area than is visible.

DWSPYDLL.DLL - Function Library

- Dozens of functions that allow you to access Windows API functions easily and to manipulate data.
- Functions for obtaining the address of VB variables, performing huge memory calculations, splitting integer and long variables into component parts, and so on.
- Functions to provide access to the DeviceCapabilities, DeviceMode and ExtDeviceMode functions in any printer driver.
- A subset of the Visual Basic API including functions to obtain the name of a form or control, to determine the hierarchy of forms and controls, and so on.
- Indirect property access - read/write property values to any VB form or control in any application.
- Read/write picture properties. Allows easy combination of API picture functions with VB properties.
- Complete set of functions for analyzing the internal structure of any VB form or control.

SpyMsg

- View any or all of the messages and events going to a form, control or task.
- Your choice of detection technologies to use: subclassing, SendMessage hooks or GetMessage hooks.
- Set the scope of message and event detection: Any combination of one or more windows, any task, or system wide.
- Detect VB events for any form or control. Events are detected even if there is no code attached to the event.
- View detailed information on the form or control that received the message or event.
- View information on the parameters to the message or event.
- Easy selection of Windows to subclass - use a Windows hierarchy "tree" or point at a window and click.
- Detects messages and events for VB2 graphical controls.
- Write output to a file to create a complete history of the messages and events that occur in your application.
- Parameter descriptions for most standard windows messages.

SpyParam

- Detect API parameter errors as they occur (under Windows 3.1, many parameter errors are simply ignored).
- Trigger a VB runtime error when an API parameter error occurs. This can save hours in trying to track down an obscure problem.

SpyWin

- The first truly Visual Basic aware window/form/control browser.
- Windows are organized by task, making it easy to track down the windows for a given application.
- Provides a great deal of information about each window/form or control, including VB specific information such as control name and model information, styles, class information and so on.
- Allows you to select windows for further processing by your own programs.
- SpyWin includes complete Visual Basic source code!

SpyMem

- Browse the Windows global heap, and any local heap (including USER and GDI). View any block of memory.
- Browse the Windows task and module list. Free any module (ideal for cleaning up after a GPF).
- View the GDI resource list. View information about each resource (for example: if it is a brush, you will see an area painted by the brush - if it is a bitmap, you can view the bitmap).
- Automatic comparison of the current heap with a saved reference - makes it easy to track down global memory or resources that are not being freed.

SpyMenu

- Analyze the system menu and regular menu for any window in the system.
- Includes complete Visual Basic source code.

SpyVBX

- Analyze the model, property and event structures for any Visual Basic form or control including custom controls.
- Direct analysis of VBX files that export MODEL information using VBModelInfo.
- Dump complete analysis of a form, control or custom control to a text file.
- Supports version 1.0 through 3.0 of Visual Basic.
- Demonstrates how to read or write properties of any VB form or control.
- Includes complete Visual Basic source code.

SwIniEdt

Provides easy editing of the SpyWorks.ini initialization file. Used for creating groups of messages that are used by the other SpyWorks-VB applications and debugging tools.

StorageTools - Version 1.0

The ultimate data storage and file manipulation toolkit! Change the way you work with files and data forever!

You may have heard about OLE 2.0 with its ability to control applications and embed objects from one application into another. But there's another feature built into OLE 2.0 that until now was not accessible to Visual Basic programmers. It's called "Structured Storage" and StorageTools is your key to this powerful technology.

Structured Storage allows you to create files that organize information easily. Blocks of data can be placed in hierarchical form, just as files are placed in directories. It's like having an entire file system in each file. You can also create and work with compound documents - a new standard for document storage.

OLE 2.0 takes care of allocating and freeing space within a file, so just as you need not concern yourself with the physical placement of files on disk, you can disregard the actual location of data in the file. Plus: with its support for transactioning you can easily implement undo operations and incremental saves in your application.

StorageTools allows you to take advantage of the same file storage system used by Microsoft's own applications. Includes sample programs (with source) that let you examine the structure of any OLE 2.0 based file so you can see exactly how they do it!

[StorageTools Storage Control:](#)

[StorageTools - Registry Control](#)

[Persistence Of Data: A Technology White Paper](#) - Contains an in depth explanation of OLE Structured Storage.

[Run the StorageTools Structured Storage Demo](#)

[Run the StorageTools Registry Demo](#)

(note: you may need to register the demo controls using the [Installation](#) program in order for these demos to run).

StorageTools is only \$129 plus shipping and handling.

StorageTools Storage Control:

The Storage control uses Visual Basic OLE Objects to represent storages and streams, creating a familiar interface for manipulating those elements. Within the Structured Storage standard are a number of functions that let you upgrade your file handling procedures easily: you can detect whether files are in Structured Storage format or not, and you can read any normal file as if it was a Structured Storage file. The Storage control also adds a number of features specifically for Visual Basic programmers. It lets you read and write information in any of the styles Visual Basic uses, such as “Sequential”, “Binary” or “Random”, including arrays.

StorageTools is the key to unlocking the following Structured Storage capabilities:

- Utilize a powerful new method for organizing information within a file or compound document.
- Buffered file modifications allow you to easily undo modifications to a file using Transactioning.
- Expose important information to outside applications by including a standard document information stream.
- You can organize information in memory exactly like you organize information on disk. Only one function call is required to copy information between a Storage in memory and a Storage on disk.
- Reduce disk access time by only saving the parts of the document that have changed.
- All disk space allocation and organization are done for you.
- **And more....**

StorageTools - Registry Control

The Registry Control makes it easy to access the Registry and the Registration Database. It provides all the power of Windows API calls and more. Keys within the Registry are accessed like directories. Values are converted to data types compatible with Visual Basic. Powerful search capabilities are included, allowing you not to only search among keys and value names, but within the value data itself. The documentation includes descriptions of areas in the Registry that might be useful and how to access them.

Using StorageTools - the Registry becomes the key to transforming your Visual Basic program into a truly professional application. Here are just some of the thing you can do:

- Register the filename extension to your documents, so your program is automatically launched when a user activates one.
- Create user-specific and machine-specific configuration settings, dramatically improving your user interface.
- Expose DDE links to your program.
- Interface with Windows 95: set icons, register an uninstaller, update reference counts for DLL's you use, and much more.
- Expose your program's version information.
- Read and modify system settings.
- **And more....**

StorageTools includes 16 & 32 bit OLE controls, documentation and sample code. *only* \$129.

VersionStamper

You get a technical support call....

"Your program has stopped working!"

Did someone install an older version of a DLL, VBX or OCX required by your application?

Is another program using an incompatible version of a DLL, VBX or OCX that it loaded from a private directory, preventing yours from loading?

Is an incompatible version of a DLL, VBX or OCX present somewhere in the PATH and being loaded before the one that is required?

Did the user delete a component that is needed?

Did the user reinstall your application using an older release disk - copying over your most recent files because your VB application does not contain version information?

If only your application could tell you what was wrong....

Now it can....

[Solving the Installation Problem](#)

[Solving the Distribution Problem](#)

[Additional Tools and Information](#)

[Run the VersionStamper Demo](#)

(note: you may need to register the demo controls using the [Installation](#) program in order for this demo to run).

VersionStamper is only \$129 plus shipping and handling.

Solving the Installation Problem.

Make no mistake - there is no simple "fix" to the problem of safely distributing Visual Basic applications. However, if you have complete information about the incompatibilities that occur and the versions of both components and VB executables, it is possible to quickly determine exactly what problems exist. Once you have this information, it becomes easy to find the correct solution.

VersionStamper allows you to easily embed into your Visual Basic executable or other OLE container information about all of the dynamic link libraries and custom controls used by that application, along with required current versions, file date and time, and your choice of warning conditions. The **VersionStamper** OLE custom control can use this information to check the versions of the actual modules that are available on the target system.

dwvstp??.ocx - The 16 and 32 bit OLE control includes extensive dialog box support for embedding version information for selected DLLs, OCXs, VBXs and other files. Each control can embed two file lists so you can use a single control to create dual platform executables. It also has the ability to scan Visual Basic 4.0 -based projects to automatically create a list of DLLs, OCXs, and VBXs required by the application. The OLE version even allows you to scan for files not specified in your file list during run-time. The run-time distributable control is royalty free. **These controls are fully compatible with Visual Basic 4.0 and other true OLE Control containers!**

If you are working with Visual Basic 3.0 -

The first, and most obvious need is to embed a standard Windows version resource into executables created by Visual Basic. This will make it possible for any standard Windows installation program to correctly handle your Visual Basic programs and prevent the accidental overwriting of later versions of your executables.

VersionStamper contains the dwvstamp.vbx custom control which makes the process of embedding a version resource into your executable completely automatic. The version information is entered by setting the control's properties at design time just as you would set the properties for any custom control. This information will be converted into a standard version resource automatically during the compilation process.

Solving the Distribution Problem.

The key to eliminating problems relating to the distribution of Visual Basic applications is to be able to determine, quickly, whether all of the components required by the application are, in fact, present in the runtime environment.

Embedding component version information into your application.

The dwvstamp.vbx control makes it possible to embed into the executable a complete list of every DLL, VBX or other software component that is needed by your program. This embedded component information includes the required version information for each component. You can also specify the conditions under which a warning will be triggered.

Dwvstamp.vbx is able to automatically scan a project for a list of the custom controls used by the program and a list of all DLLs referenced by the Declare statements in the project.

Detecting component incompatibilities at runtime.

Since an executable stamped by VersionStamper "knows" exactly what components it requires at runtime, it is an easy matter for it to check if all of those components are available and up to date. This comparison process is also built into the VersionStamper custom control.

VersionStamper provides a great deal of flexibility in terms of how you handle the scanning and reporting process. Beginning programmers may simply choose to add the standard Vervrfy.frm form or vervrfy2.frm form and associated modules to their application to provide a default verification check at load time or under user control. The OLE version even allows you to scan for files not specified in your file list during run-time. The run-time distributable control is royalty free. **These controls are fully compatible with Visual Basic 4.0 and other true OLE Control containers!** More advanced programmers may choose to modify the code to create their own custom report. You might also provide the user with a step-by-step procedure on how to fix certain problems, or perhaps a request that they call your customer support line.

It is possible for the software components required by an application to be so old that the program will not run at all. For these cases VersionStamper includes two sample "Rescue" program which are able to compare the component requirements of an executable with the runtime environment without actually loading that executable. These rescue programs include complete source code and can be fully customized to suit your own needs.

Additional Tools and Information

VersionStamper includes a program called VerInfo.exe which is able to report on the version information of any executable that contains a version resource. It is also able to report on the embedded component information added by the VersionStamper custom control.

This program also includes full source code. Which brings us to one of the final features of this package, a feature that we feel is one of the most important.

One of our goals at Desaware is to not just provide "canned solutions" for programmers but to also help educate programmers to take advantage of all of the technology that is available to Visual Basic programmers. Following this philosophy, you will find a fair amount of technical material in this manual and a generous amount of Visual Basic source code as well. We will also cover some of the reasons why certain things work the way they do and how they influenced the design of VersionStamper.

Some additional features of VersionStamper are:

- **VerResQ.exe** - A Visual Basic-based program that analyzes any Visual Basic-based executable stamped by **VersionStamper**. It instantly detects any incompatibilities that exist between the requested files and those actually present on disk. Includes source code so that it can be customized for distribution with your application.
- **VerSplash.mak** - This sample project demonstrates using a standalone executable to perform file verification for your main application. It displays a splash screen during file verification. If no conflicts were found, it Shells your application, otherwise a form is displayed notifying the user of the conflicts. This method will allow you to identify any incompatibilities that exist - even if the executable cannot be loaded. Designed to be easily modified so that you can create your own splash screen shell program to distribute with your application.
- **VsRTDemo.mak** - This sample project demonstrates a new feature of **VersionStamper** (OLE control only) - how to scan files dynamically during run-time.
- **Technical Notes** include a complete discussion of the Windows-based system of version stamping and the embedding techniques used by **VersionStamper**. It also includes detailed suggestions and examples for improving the Visual Basic setup toolkit. Version 4.0 extends includes an extensive discussion of platform dependent issues including Windows 95 and Windows NT.

But fear not - this product was designed to be used by absolute beginners as well. And for those who just need a quick solution to the distribution problems discussed earlier, feel free to skip forward to the Quick Start section which will walk you through the process of embedding component information and adding a runtime conflict report (and embedding a version resource for VB3.0) in a few easy steps.

VersionStamper costs only \$129 plus shipping and handling.

The Common Dialog Toolkit (SpyNotes #2)

The Common Dialog Toolkit is the second of ongoing series of application paks for use with SpyWorks. These application paks combine text in windows help file format along with plenty of sample code. Most of these paks will be on a single subject, for example: multimedia, or Database Access, and will cost about the same as a good book or newsletter might.

The Common Dialog Toolkit discusses advanced programming topics with an emphasis on using and modifying the Windows Common Dialog box library. It provides far more capability than the limited cmdialog.vbx custom control provided with the professional edition of Visual Basic. Many of the techniques described can apply towards other tasks and third party DLL's as well - so you should find the package worthwhile even if you never use the common dialogs themselves.

And as always, you'll find more than one technique demonstrated that is generally thought to be "impossible".

The following is a brief summary of the techniques that are demonstrated in this package:

- How to call the common dialog API functions directly.
- Finding and manipulating controls within a common dialog.
- Using the CBK.VBX control to implement a common dialog hook.
- Hiding command dialog controls.
- Positioning a common dialog before it is shown.
- Making common dialogs Modal or Modeless.
- Communicating with common dialogs and use of registered messages.
- Hooking the Visual Basic GetMessage loop.
- Embedding Visual Basic controls into common dialogs.
- Creating new controls on common dialogs.
- and much more....

This Program is a VBX only product for those programmers developing in Visual Basic 3.0.

Only \$35 plus shipping and handling.

[Run the Common Dialog Toolkit Demo](#)

The Desaware API Class Library

Now you can combine the power of the Windows API with the ease of use of Visual Basic. The Desaware API Class Library encapsulates hundreds of Windows API functions into Visual Basic classes that are both easy and safe to use. Add the classes to your application, or use them via a standalone OLE server - it's up to you. Our class library is an implementation of the new Foundation Object Standard sponsored by Desaware, the Crescent Division of Progress Software, Viewpoint Technologies and other leading vendors and includes full Visual Basic source code. Included with SpyWorks 4.0. From the authors of the Visual Basic Programmer's Guide to the Win32 API - API programming will never be the same!

Visual Basic programmer's have long been aware that you can substantially increase the power of your Visual Basic applications by taking advantage of the hundreds of functions that are built into the Windows API. Desaware has a long history of helping programmers take advantage of API functions, first through the Visual Basic Programmer's Guide to the Windows API, and now through the forthcoming Visual Basic Programmer's Guide to the Win32 API.

API functions are powerful, but they can be difficult to use. One way to help programmers learn and use API functions is to encapsulate them into a function, class or object library. Desaware's new API class library takes a rather unique approach in this regard. You see, there is no one best way to access API functions. Sometimes it is best to use a standalone API object library. Sometimes it is best to incorporate a class library into your application. Sometimes it is best to add inline code into your own program. By including complete source code, Desaware's class library supports all of these approaches. Cut and paste code into your program. Add the classes into your application. Or compile the classes into your own API DLL server - the choice is yours.

Here is a preview of some of the classes included:

Classes that Represent Windows Objects and Architecture

The following classes are the "core" classes that reflect key Windows concepts or architecture.

dwSystem

This class is used to obtain information about the system and to retrieve and set system settings. It encapsulates key functions such as GetSystemMetrics and SystemParametersInfo. It also allows you to set and retrieve various system colors.

dwWindow

This class encapsulates the functions that work with windows on the screen. Generally speaking any function that takes a window handle as its first parameter will fit into this class.

dwHDC

This class encapsulates the functions that work with device contexts. Generally speaking any function that takes a device context as its first parameter will fit into this class.

Classes that Represent Windows Data Structures and Objects

The following classes correspond to commonly used Windows API data structures and are often used as parameters to methods of the core API classes.

dwRect

This object contains a RECT data structure that describes a rectangle.

dwPoint

This object contains a POINTAPI data structure that describes a point.

dwRegion

This object corresponds to region objects.

dwSize

This object contains a SIZE data structure that describes a size.

Classes that Represent GDI Objects

The following classes correspond to GDI graphic objects. They are often used as parameters to methods of the dwHDC class.

dwBrush

Corresponds to a GDI brush object.

dwPen

Corresponds to a GDI pen object.

dwMetaFile

Corresponds to a GDI metafile object.

Secondary Classes that encapsulate additional functionality.

The following classes are created and exposed by the core classes to encapsulate additional API functionality.

dwCPInfo

Used to retrieve information about code pages.

dwDevCaps

Used to obtain information about the capabilities of a device.

dwLogBrush

Used to obtain information about a logical brush.

dwMetrics

Used in conjunction with the dwSystem object to obtain information about the system.

dwOSVerInfo

Used in conjunction with the dwSystem object to obtain system version information.

dwSysColor

Used in conjunction with the dwSystem object to retrieve and set system colors.

Classes for Advanced Windows operations

In addition to the above classes that represent the core Windows API, a number of classes are currently under development to work directly with the SpyWorks low level OLE controls and to expose additional advanced Windows functionality.

The Desaware API Class Library is included in [SpyWorks 4.0 Professional](#) and [the Visual Basic Programmer's Guide to the Win32 API](#).

SpyNotes #1

SpyNotes are a series of application paks that will deal with a particular subject and include both code and documentation in Windows Help file format. SpyNotes #1 is included free with SpyWorks-VB version 2.0. Refer to the On-line help for further information on this package.

The Custom Control Factory

For 16 bit VBX and for 16 and 32 bit OLE Containers and Visual Basic

The Custom Control Factory by Desaware provides a powerful tool for creating your own custom button controls for Visual Basic. CCF controls are created interactively while working in Visual Basic design mode without programming. CCF controls may be distributed with a royalty free runtime library. The Custom Control Factory has the unique ability to hold virtually unlimited numbers of bitmaps or icons. Now supports Visual Basic 4.0 and other OLE Control Clients. CCF controls can be used to create the following:

Version 4.0 features include:

- **Multiline captions** with flexible alignment: Aside from the normal left, center and right alignment, the entire text block can be placed anywhere in the control window.
- **Automatic 3D style** borders with user defined colors, borders bevel widths and so on. Offsets can be specified for both the text and image in order to add the illusion of movement when a button is pressed.
- **256 & 24 bit color support.** Specify a palette directly or use one of the control images to set the palette.
- **Image compression** reduces the size of executable files and (optionally) memory use. Even works with 24 bit bitmaps (with reduction to 32k colors).
- **Custom cycle/drawing capabilities.** This ranges from optional programmer control of the frame sequence to true "owner draw" capability.
- **Synchronization** events during animation.
- **Metafile support** - including flexible positioning and sizing.
- **Ability to load cursors** for improved compatibility with CCF-Cursors.
- **Frame alignment dialog box** makes it easy to align frames and match their sizes. This reduces the necessity for precision when cutting bitmaps out of other drawing programs.
- **Improved performance and efficiency.** Each frame in a CCF control requires a single global handle. No Windows resources are used. This makes the Custom Control Factory the most efficient way to store arbitrary sized bitmaps, icons and metafiles in your Visual Basic program.
- The **MLIST2** control is a powerful **LISTBOX** control that handles single select, multiple select, multiple column modes. User definable tabstops are supported along with the ability to embed an image in each entry in the list box. Each list entry can have a user defined foreground and background color as well. This control comes with complete 'C' or C++ language source code. Includes VBX, and 16 & 32 bit OLE Controls.

Over 50 sample controls are provided that illustrate the capabilities of the package.

16 & 32 bit OCX plus 16 bit VBX controls included. Compatible with Windows 3.1x, Windows NT & Windows 95. **All this for only \$48 (plus S&H).**

Run the Custom Control Factory Demo (note: you may need to register the demo controls using the Installation program in order for this demo to run).

CCF-Cursors

CCF-Cursors is a VBX product that supports development in Visual Basic 3.0. The cursor's primary role in a Windows program is to indicate the position of the mouse on the screen. However, in many applications the cursor plays a key role in indicating the state or operating mode of a program. For example: The hourglass cursor indicates that the user should wait. The I beam cursor is often used to indicate a position in a text string. In paint programs, cursors often indicate the tool in use. A pencil, paint can and aerosol spray cursor can indicate the draw, fill and airbrush operations. Visual Basic 3.0 comes with only 12 built in cursors (or "mousepointers" as they are called), and could not easily be extended - until now. CCF-Cursors has been designed to provide this capability and much more.

CCF-Cursors Features:

- The ability to create cursors from scratch, or to convert any icon into a cursor.
- The ability to set the cursor for a form or control including VB 2.0/3.0 graphical controls.
- The ability to set the default cursor for all controls on a form.
- The ability to detect mouse events (MouseDown, MouseUp and MouseMove) for ANY control (including those that do not support mouse events). Also detects DbClick in most controls.
- Detection of menu selection events and characters entered when a menu is active.
- Support for automatic cursor animation.
- The ability to set and retrieve the cursor location, both in screen coordinates and control coordinates and to restrict the cursor to any control or part of a control or form.
- Full compatibility with Desaware's [Custom Control Factory](#) makes it easy to save cursors in your Visual Basic form or .exe file.
- A set of windows resource and coordinate transformation functions to simplify cursor operations.
- Icon to cursor conversion program icon2cur.exe and other demonstration programs with Visual Basic source.
- Application oriented documentation with detailed examples including cursor animation, cursor selection based on various criteria, etc.
- Over 50 Sample cursors including directional arrows and the rotating hourglass.

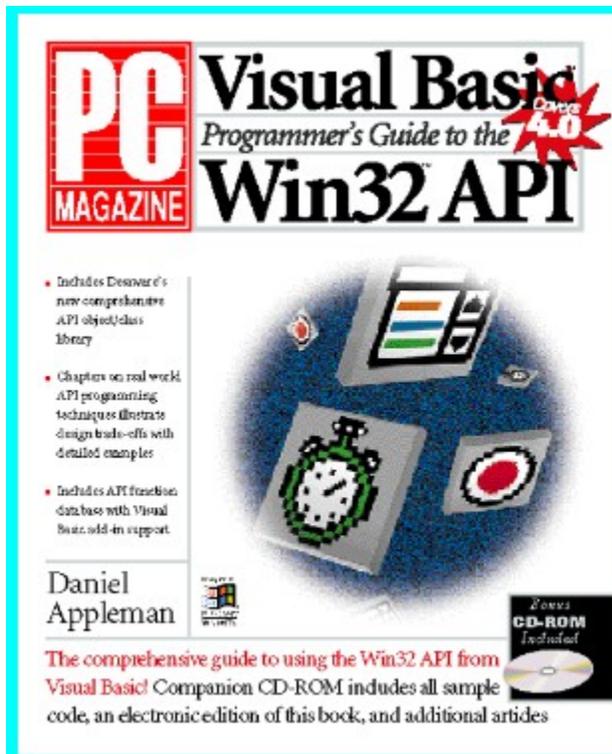
CCF-Cursors is only \$35 plus shipping and handling.

[Run the CCF-Cursors Demo Program](#)

Visual Basic Programmer's Guide to the Win32 API

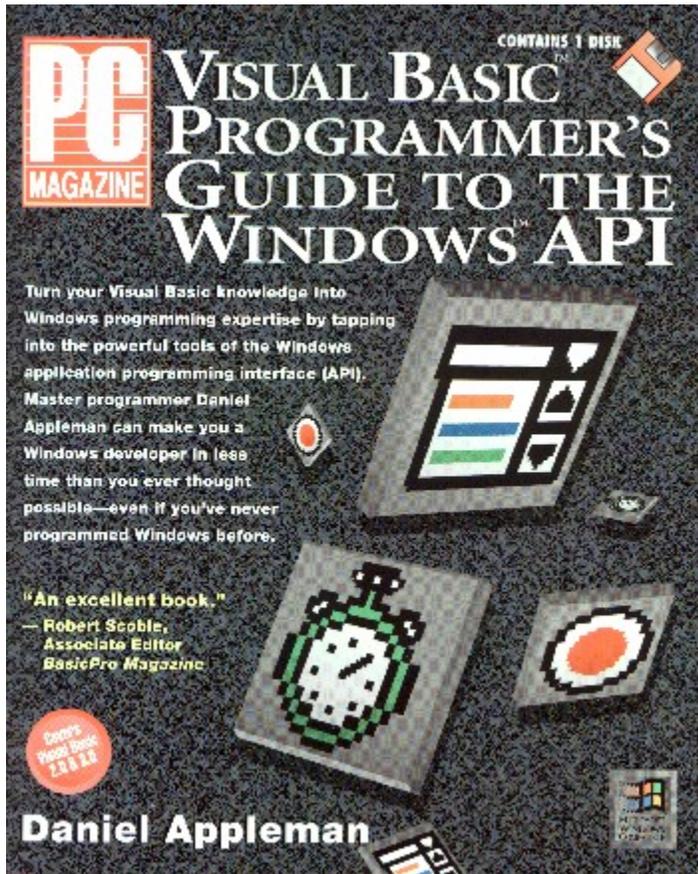
Author - Daniel Appleman

The original Visual Basic Programmer's Guide to the Windows API has helped tens of thousands of Visual Basic programmers incorporate advanced Windows API programming into their Visual Basic application. The new Win32 32-bit API for Windows NT and Windows 95 is even more powerful, not to mention considerably larger. Daniel Appleman's new book on the 32 bit API for Visual Basic programmers goes beyond just covering the new API functions. It includes more extensive explanations, more sample programs, and more subjects. Also extensive information on porting from 16 bit applications and writing code that will run on both 16 and 32 systems. Plus: Over 1400 pages and a full text searchable electronic edition included on the CD-ROM! The book includes a portion of the [Desaware API Class Library](#). Build on your knowledge of Visual Basic to become a Windows expert by learning to take advantage of the hundreds of functions contained in the Windows API. No knowledge of 'C' or prior Windows knowledge is required. Written by the president of Desaware, it covers virtually every aspect of Windows and includes extensive sample code. Published by Ziff-Davis Press. ISBN: 1-56276-287-7. List is \$49.95, but we have it for only \$39.96 (20% off).



Visual Basic Programmer's Guide to the 16 Bit Windows API

Build on your knowledge of Visual Basic to become a Windows expert by learning to take advantage of the hundreds of functions contained in the Windows API. No knowledge of 'C' or prior Windows knowledge is required. Written by the president of Desaware, it covers virtually every aspect of Windows and includes extensive sample code. Over 1000 pages plus disk. Published by Ziff-Davis Press. ISBN: 1-56276-073-4. List is \$34.95, but we have it for only \$27.96 (20% off).

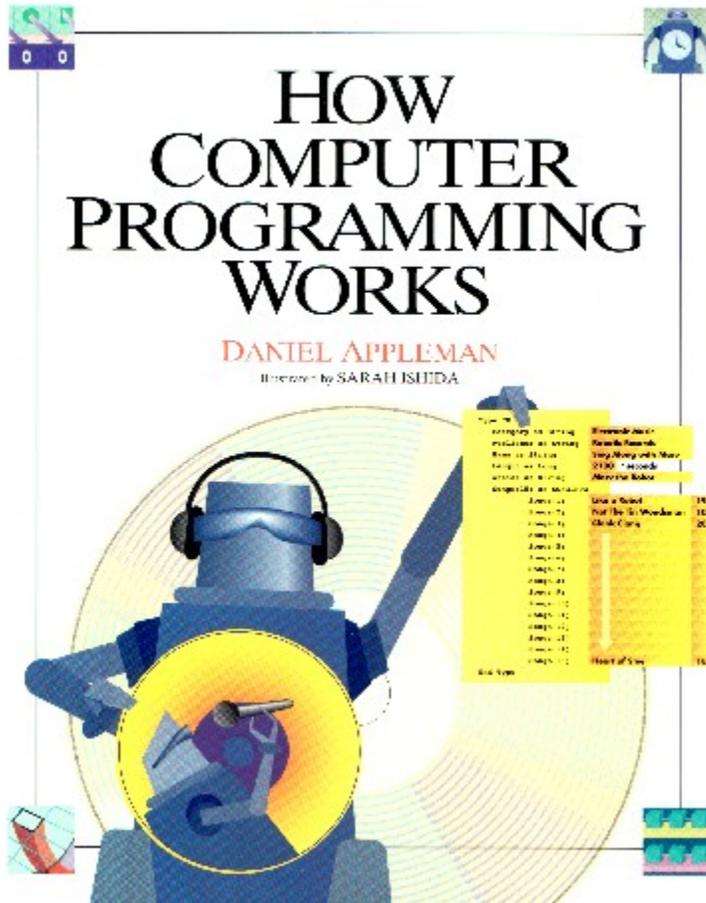


How Computer Programming Works

This book from Ziff-Davis Press is part of their best selling "How It Works" series. Written by Daniel Appleman, president of Desaware, this fully illustrated book introduces the fundamentals of programming and computer science in a way that is easy to understand for non-programmers and beginning programmers alike.

Ideal for helping friends and family to understand what it is that you actually do during all those hours that you sit in front of your computer!

Available from Desaware for 20% off list - only \$19.96



Technical Notes

Desaware's products are designed to be used by professionals. This means that we do our best to make them efficient in terms of resource and memory use. Some of the most important features of these products are often "behind the scenes". The purpose of this paper is to introduce you to some of these hidden features.

SBC.VBX - Efficient Subclassing:

Subclassing a window by its very nature implies that the subclassing code will receive and process every message received by the window being subclassed. The performance impact of subclassing itself is very small - however we were concerned about several issues when developing this control. First, neither we, nor Microsoft guarantees that it is safe to fire a VB event during every Windows message. We know for a fact that there are many operations that are not allowed during certain types of message processing. Second, executing Visual Basic code for each message has higher overhead than processing it in C. In order to handle both situations, All of Desaware's subclassers only trigger VB events for those messages that you specify. This significantly reduces the chance of accidental errors, plus it reduces the amount of VB code required for message processing.

The SBC.VBX and dwsbc???.ocx controls are also able to safely subclass windows in other VB or non-VB applications, and the VBX edition is able to subclass VB3 graphical controls (that do not have a window handle). Each control can subclass any number of controls, providing an efficient mechanism for subclassing multiple windows.

Subclassing is a simple idea in concept, but can be very tricky in practice - especially in an environment such as Visual Basic where a form or control may be subclassed several times by different 3rd party tools. SpyWorks has been designed with this in mind, and uses a number of advanced techniques to cooperate with and protect itself from other tools and applications. These are detailed in the August 93 issue of Windows Tech Journal in an article titled "Rules of the Road".

The VersionStamper controls - Automation or Full control + efficiency.

Visual Basic promotes the use of software components - VBX's, DLL's and so on. But while Windows provides good technical support for use of components, it is pretty clear that its designers never considered the real world problems that occur on systems with multiple versions of shared components. We ourselves have spent plenty of time on the phone chasing down bugs that turned out to be old versions of controls that somehow "reappeared" on our customer's systems.

[VersionStamper](#) is our way of providing a tool to solve these problems when they occur. We had three major design criteria. First, we wanted it to be easy to use for those who wanted a quick and simple solution to these distribution problems. If you accept the control's defaults, all you need to do is select embedded files, type in your version numbers, and add a module and form to your application that contains our default report generator (assuming you want that capability).

But we also wanted to provide flexibility for serious programmers. As such, all conflict resolution is handled through Visual Basic events, allowing you to take complete control over the way any problems are handled. The package includes plenty of source code (all of the Visual Basic utilities include source code).

Finally, we wanted the control to be efficient. As such, we placed all code used at design time into a separate design time DLL that is not distributed with your application.

CBK.VBX and dwcbk???.ocx - Different protocols, and a unique guarantee

Callbacks involve passing a function address to a DLL or Windows API function which it will call in order to trigger a VB event. Most callback functions use what is known as the PASCAL calling convention (or stdcall under Win32), however a few use the 'C' calling convention. Our callback controls are designed to handle either type.

There are some callbacks under Windows that take place at a very low level (even at the interrupt level). The documentation for these callbacks warns that only the PostMessage API function may be safely called by the callback function. The low level multimedia functions are an example of functions that use this type of callback. The latest versions of our callback controls are able to handle these

callbacks by posting a message to itself which will later trigger the Visual Basic callback event. You can specify a default return value to for this type of callback (though in practice, few of these callbacks expect a return value).

There can be any number of callback types - depending on the parameters that are passed with the callback. In theory, it is possible to create a generic callback that simply points to an area on the stack, however we felt this would be extremely difficult for most people to use. Instead, we provide a VB event for each callback type with this unique guarantee: if you require a callback type that is not already implemented in our controls, we will add it for you at no charge. The new callback type will be incorporated into all future versions of the control, so you need not worry about incompatibility as long as your customer is using the version of the control that you distribute or a later one (and of course, all of our controls are properly version stamped). We've done this about 20 times so far, each time we've delivered the update within a few days.

Our Technical Vision - a note from the president:

It is my belief that Visual Basic represents the dominant paradigm for programming now and for the foreseeable future. Visual Basic itself is an impressive implementation of that paradigm, and I expect that it will continue to be one of the dominant platforms for Visual programming.

One reason for this is that it is possible to use Visual Basic to write Windows applications without compromising on the power of traditional C and SDK based techniques. I've seen a great many VB programmers get frustrated by their inability to do something in VB and blame the environment itself. My primary goal with Desaware (aside from keeping a roof over my head), is to help VB programmers break through these walls both through education, and by providing innovative development tools.

I think we've made a good first step in this direction. My book, "PC Magazine's Visual Basic Programmer's Guide to the Windows API" has been very well received as a "Windows SDK" for the Visual Basic programmer. SpyWorks provides the low level hooks and debugging tools required to do the heretofore "impossible" in VB. VersionStamper is the first product to seriously address the problems of distributing applications made from a large number of components. The Visual Basic Programmer's Guide to the Win32 API and SpyWorks 4.0 extend this philosophy into the 32 bit world.

In the future Desaware will continue with this approach. You won't be seeing large libraries of controls or high end solutions - there are many vendors providing excellent tools of that type. Instead watch for development tools that enable you to develop your own solutions, for the debugging tools needed to learn enough to create those solutions, and for additional information in the form of application notes such as our [Common Dialog Toolkit](#), or newsletters that will build on the knowledge base of the Visual Basic community at large (and of course, Desaware's customers in particular).

Thank you for your support in the past, and I look forward to working with you in the future.

Daniel Appleman

Desaware Order form

Desaware Inc. 1100 E. Hamilton Avenue, Suite 4, Campbell, CA 95008
 (408)377-4770, Fax: (408)371-3530, E-mail 74431.3534@compuserve.com

The following order form can be printed and used to order directly from Desaware. A list of [International Representatives and Distributors](#) follows.

Software Products	Price	Quantity	Total
SpyWorks 4.0 Professional	\$249	_____	_____
SpyWorks 4.0 Standard	\$129	_____	_____
SpyWorks 2.1	\$129	_____	_____
VersionStamper 4.0	\$129	_____	_____
StorageTools 1.0	\$129	_____	_____
Developer's Suite - <i>SpyWorks Pro, VersionStamper, StorageTools</i> & <i>Custom Control Factory</i> (A \$555 value)	\$429	_____	_____
Custom Control Factory 4.0	\$48	_____	_____
CCF Cursors 2.0	\$35	_____	_____
Common Dialog Toolkit 2.1	\$35	_____	_____
Other Products			
VB Programmer's Guide to API (16 bit)	\$27.96	_____	_____
VB Programmer's Guide to the Win32 API	\$39.96	_____	_____
How Computer Programming Works	\$19.96	_____	_____
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Shipping/Handling * (please specify method) -----		_____	_____
TOTAL CHARGES (Product +Tax+Shipping)			_____

* \$5.00 for US & Canada software orders, \$8.00 for book orders (USPS or ground service). \$15 for 2nd day within US; \$20 for overnight. \$15 for international software orders (under 2 pounds). International book orders and courier service are charged the actual shipping cost. No handling charge if you provide a courier account number. Large orders will be charged additional shipping to reflect the weight of the shipments. Visa/MC/Amex. CA residents add 7.75% sales tax.

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International Representatives and Distributors

Desaware's products are available locally in many countries. In some cases local technical support is available and in the case of Japan and Germany, localized versions of some of our products are available.

COUNTRY	Organization
ARGENTINA	Soteica Av. Alvarez Thomas 796 3° CS.R.L. (1427) Buenos Aires Phone: 1 551 4981 Fax: 1-551-0751
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Fax: (364) 654-200

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Persistence of Data - A Technical White Paper

When should your VB programs use Databases, the Registry, .INI files, or Disk files to save information? And what is OLE Structured Storage? Find out in this new article by the author of the Visual Basic Programmer's Guide to the Win32 API.

by Daniel Appleman

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The following technology white paper is based on a talk that I presented at the Silicon Valley Visual Basic User's Group in January 1996. It is being distributed in an effort to educate Visual Basic programmers regarding available techniques for implementing data storage in their applications. The paper focuses on matching an appropriate data storage technology to the needs of individual applications, and discusses the advantages and disadvantages of each approach. The end of this article does discuss a Desaware product (the company for which I work), however you will find that the bulk of the article is an objective and technical discussion on storage techniques that should prove valuable to every Visual Basic programmer. By reading this article you will gain:

- An understanding of many of the tradeoffs involved in data storage technologies including initialization files, the system registry, disk files, database systems and structured storage systems.
- An excellent understanding of OLE structured storage as it relates to application design - including where its use is and is not appropriate. Also, you will see how OLE structured storage fits into Microsoft's OLE strategy.

Introduction

OLE structured storage is one of the most exciting technologies to come along in quite a while. It will dramatically change the way you work with files. It is.....

Wait. Isn't this the way most articles begin when describing a cool technology? They focus on the features and capabilities of the tool or technique being described. But is this really the information that most programmers need?

You see, most programmers (myself included) tend to fall in love with technology. We hear about a cool new tool or technique, and it becomes, for a while, the greatest thing that we've ever heard of. When I was studying computer science I remember being introduced to a new language every week or two, and each one instantly became the "best" language in my repertoire - the language that I could surely use to perform any task more efficiently and quickly than any other. And it would remain the "best" language until the next one came along.

This is something that I think is common among many programmers and engineers. We become passionate about technology. We tend to love our work. Our preferences of languages, tools and machines are almost religious in their intensity (in fact, I dare say that there are programmers who are considerably more passionate about their programming tools than their religion).

So before discussing this "cool new tool" called OLE structured storage, I think it is important that we pause for a moment and place it in perspective.

You see, as programmers our real job is not to fall in love with technology. It is to solve problems using software. And as such, it is our professional responsibility to choose the tools that will best help us solve the problem at hand - not the one that we happen to be excited about at the moment, or the one that the industry is busy hyping.

That said, here is the truth about OLE structured storage: It is a powerful technology that is highly suited to solving particular problems, and totally unsuitable for others. So, how does one determine which problems are right for this technology? Let us start with considering the entire class of problem at hand: that of persistence of data.

Persistence of Data

Imagine a program such as a word processor that was unable to save information from one session to the next. With such a program, you would have to type in a document from scratch every time you needed a printout - roughly akin to the way offices used typewriters just a few decades ago. Much of the value of computers comes from the ability of applications to store information - to persist their data. There are many technologies available for persisting data, and not all of them are appropriate for every situation.

There are three major reasons for persisting data in an application and one or all may be appropriate for any given program. They are as follows:

- 1. Application configuration information:** Many applications save state information from one session to the next. It may remember user settings such as whether a backup should be generated for each file, or the positions of windows so that the application will restore itself to the same state that it was in when it was last closed. The application might save general configuration information as well as user specific configuration settings (for applications that support multiple users).
- 2. Documents:** Many applications work on documents which are opened at the beginning of a session and saved or closed when the session is over. Typical documents are word processing documents, spreadsheets, pictures and so forth. Documents can often contain many types of objects. The key thing to remember about documents is that they generally correspond to a single disk file. This makes a document easy to manage as an individual unit. For example: it can be copied to a diskette, or sent via Email.
- 3. Records:** Applications that need to keep track of multiple records which are similar to each other will typically use some sort of database storage mechanism. Databases support searching and filtering and are designed to be easily shared by multiple applications simultaneously.

Each of these reasons for storing data influences the choice of technology that can best solve the particular storage problem. But the choice of technology is not always obvious. Let's take a look at the major storage technologies in use under Windows and how appropriate each is for the problems listed above.

Private Initialization Files

Initialization files are an older technology that goes back to Window 2.0 (version 1.0 did not support private initialization files, only win.ini). While some of the newer Windows documentation suggests that one should always use the registry instead of initialization files, this is not necessarily the case. Initialization files maintain a number of advantages over the registry for some applications. They can be edited by hand using any text editor such as Notepad. They can be easily copied or saved using simple file commands. They are very easy to work with using a few simple API functions or Visual Basic commands.

Are initialization files appropriate for saving application configuration information? Yes - absolutely. A program's state can often be stored as a relatively small number of short string entries or numeric entries - exactly the kind of information that initialization files handle best. It would take more effort to handle user specific configuration information - each user would have to have their own section in the file, but it is still a viable solution.

Are initialization files appropriate for saving documents? Probably not. Their performance is not adequate for most documents. Each entry is limited in size, as is the entire file (depending on the operating system). They can only handle text data, limiting their flexibility for general use.

Are initialization files appropriate for saving record information? Certainly not, except perhaps for the most limited applications.

The System Registry

The system registry or registration database provides hierarchical storage in a central location on each

system. The registry is quite limited under Windows 3.x, supporting only limited data types and only one value at each node in the hierarchy. Under Windows 95 and Windows NT, however, each key in the registry may have any number of named values associated with it, and those values can be one of a wide selection of available data types including raw binary data. Each value is generally under 2k bytes in length.

Is the registry appropriate for saving application configuration information? Absolutely. It provides a far more sophisticated structure for saving configuration information and you can easily save user specific information by simply giving each user their own node in the registry hierarchy. The registry is, however, harder for an end user to edit (which is either an advantage or disadvantage, depending on your application). Editing the registry always opens the risk that the user might accidentally make a change that could interfere with the correct operation of the system - since the registry, unlike private initialization files, also contains configuration information for the system itself. The registry is harder to access programmatically than private initialization files, requiring the use of more sophisticated API commands (though a simple set of Visual Basic commands are also available for basic registry operations).

Is the registry appropriate for saving documents? Certainly not. There is no clean mechanism for managing individual parts of the registry - how would you copy part of the registry to a disk file or send it through Email? The registry is, by its very nature, not document oriented. It is also strongly recommended that each value in the registry be kept relatively small.

Is the registry appropriate for saving record information? Not a chance - all the reasons discussed for documents apply here as well.

Independent Documents

One of the most common methods used by applications to persist data is to store the required information in document files on disk. There are a number of standard formats for disk files, for example: .BMP files (windows bitmap format) is a standard file format for bitmap images. RTF (rich text format) is a standard formatted text document format. In many cases, applications define their own private file formats - in fact, many standard formats originated in that manner. Whether a private or public file format is appropriate for a given application is one of the design choices that must be made by the developer.

With document files, the contents of the file are the responsibility of the application, as are all of the file operations. File operations are implemented using either API commands or a wide variety of Visual Basic commands that allow you to work with lines, records or binary data.

Are document files appropriate for saving application configuration information? Yes - after all, a private initialization file is, essentially, a document on disk. But document files are rarely used in this way. If the configuration information is simple, it is easier to use an initialization file. If the configuration information is complex or requires the persistence of data that cannot be easily represented as text, it is often easier to use the system registry.

Document files are easy to manage on disk. They can be copied, moved, sent via Email, and managed using standard file management software.

The task of reading and writing document files can range from very simple to extremely complex, depending on the type of document. A simple text document can be created by simply printing lines of text into the file, each one separated by a carriage-return line-feed combination. If, however, you wish to insert a line into the middle of the file, or remove a line from the file, you will generally need to write the entire file from scratch - there is no easy way to shift information in a disk file.

What if you wish to save many different types of information in the document? For example: a word processing file that contains both text and pictures? In that case you need to define a more complex file format that keeps track of where individual objects are located within the disk file. You might need to actually define an internal directory within the disk file that lists the various parts of the file and where they are located. In fact, if you think about it, you might reach a level of complexity in file organization that is used by database systems (which routinely track large numbers of arbitrarily sized objects within a disk file).

Which brings us to the subject of records. Is a document file appropriate for storing multiple records of data that are similar to each other? The answer here is yes and no. Let's say your application uses a

user defined type (data structure) internally to store data, and needs to persist an array of these structures. In this case, a document file can be an extremely efficient way to store this information. Visual Basic includes record I/O file operations that are fast and have low overhead.

The document approach towards storing records does, however, have a number of potential disadvantages. Insertion and deletion of individual records can be complex. If there is a chance that the structure format might change, your application will need to keep track of document versions and implement a scheme for updating documents from one version to the next. Use of variable length records requires a more complex storage scheme that includes some mechanism for finding the start and end location of each record. Also, any searching or filtering schemes need to be implemented by the application.

Records

In many cases you may need to persist groups of records, where the records are similar to each other in structure. These often take the form of tables of records, where each record contains the same fields. You may need to work with different types of records in the same file (multiple tables). In many cases, you will want the information to be accessible to multiple users or applications at once. Clearly, this is the type of information that is often stored using a database system. This might include use of a specialized database command set or the database controls and commands built into Visual Basic.

You may be thinking that this is a somewhat convoluted way of talking about databases. Why go to all of the trouble to differentiate between “saving records” and building a database? Because it is important to distinguish between the goal and the solution. The goal is to persist a certain type of data: records that are similar to each other. One solution is a database - but it is not the only solution.

You have already seen that it is possible to store records in a document file. However, if a database is clearly designed for record storage, why would you ever want to store records in a document file? You might want to do so if you do not need the database’s searching and filtering capability, if you have little or no need to share the file and if the records are simple and of fixed length. In that case not only might the document approach be easier to program - it will probably be faster and will allow you to avoid the overhead of including a database engine with your application.

The case for application configuration information is easier to see. A database would almost always be extreme overkill for this type of data persistence. Even storage of per user application information is more easily accomplished using any of the other techniques.

What about documents? Is it appropriate to use a database to store document information - a word processing document, for example? It certainly can be done. You can imagine a complex database structure that includes one table for the lines of the document (perhaps with formatting information), and other tables that contain different types of objects, perhaps in blob format to hold images, video, sound, and so forth. These tables can be linked through the relational capabilities of the database.

This approach would work - but it can become quite complex - easily as complex as implementing the document using a proprietary format and performing your own disk operations. The database approach also can have a significant impact on performance and involves significant overhead.

The Missing Technology

All programmers have to deal with the problem of persisting data, and there is a tendency to jump straight to a solution without considering the problem in the context of the requirements of a particular software project. It is true, as you have seen, that application configuration information is usually best handled using either a private initialization file or the system registry. It is true that record storage is usually best handled by a database. It is true that simple documents are usually best handled by reading and writing a disk file directly. But you have also seen that each of the four technologies that we’ve discussed can be applied for any of these persistence tasks, and the obvious choice is not always the best.

It is also clear from the previous discussion that there is one type of persistence problem for which none of the technologies is ideal. What is the best way to store complex documents that contain different types of information? Implementing a complex file format is a great deal of work. And databases are designed for records that are similar to each other - using them to store arbitrary types of information of arbitrary length is possible in many cases, but can be even more work.

Until recently, there has been no obvious solution to this problem available to Visual Basic programmers.

Before looking at OLE structured storage in the context of this problem, let's pause for a moment and consider the characteristics of the ideal complex document storage system - a system able to manage a complex document file. Assume for the moment, that the term "object" refers to any block of data that you care to define.

- The file must be able to hold a very large number of objects, of types defined by the application. Each of the objects must be of any arbitrary size, efficiently handled whether it is a few bytes or megabytes in size.
- It must be possible to insert and remove objects, or change their size or contents without needing to rewrite the entire file.
- It must be possible to write data into the space allocated for an object, without risk of interfering with other objects stored in the file.
- The storage system must maintain an internal table of information about the objects in the file, making it easy to find and reference any object. It would be even nicer if it were possible to organize these objects in some hierarchical manner of objects and sub-objects.

The complexity of implementing such a system on your own is substantial - and one of the reasons that it is so tempting to look for alternatives to creating a private file format. At the same time, this description might sound familiar - in fact, a storage system that meets these criteria is present on every Windows and DOS based system.

It is the file system.

Think for a moment of files as objects. A file system can handle many thousands of objects. Each file can range from zero bytes to gigabytes in size. You can certainly add and remove files without fear of one file interfering with the next. And writing into one file cannot corrupt any other. Files are named, and can be organized in a hierarchy of directories.

In fact, you will find some applications that solve the problem of complex document storage by using the file system - dividing their documents into multiple disk files. An example that I worked with recently is Corel Ventura Publisher, in which one publication can consist of multiple chapters each of which contains links to documents of different types. A single publication can thus be made up of hundreds of files, which are typically organized in one or more directories.

The disadvantages of this approach are clear when you try to copy a document to a floppy disk, to another directory, or to send it via Email. Copying the publication requires a special utility that can search out all of the linked files and copy them to the correct destination. If even one file is missing, the entire publication can fail to load at worst, have missing information at best.

Which brings us to OLE Structured Storage.

OLE Structured Storage

It sometimes seems that part of the challenge of being a Windows developer (whether you use Visual Basic or another language) is coping with the multitude of new terms and acronyms that are generated with great frequency from Redmond. OLE Structured Storage is one of these.

Fortunately, this is where the somewhat long introductory material that you have read up to now serves its purpose. Because it makes it possible to understand exactly what OLE Structured Storage is and why it exists and even how it might fit into your own development plans.

Think again, for a moment, about a file system - both its advantages and disadvantages, and how it might be used to address the problem of creating complex documents. Consider then, that a file system exists on a hard disk drive - a large area that is able to store information. What would happen if, instead, you could place an entire file system within a single disk file? Suddenly you would have all of the advantages of a file system, with none of the disadvantages. Since the entire file system is within a single disk file, you can copy, move and Email all of the objects for that file system by simply copying, moving or Emailing the file that contains the file system.

OLE Structure Storage is a technology that places an entire file system within a single disk file. Nothing more and nothing less. And understanding that this is what OLE structured storage is, you know nearly as much about it as any of the experts.

Terminology

In a file system you have directories and files. Each directory has a top level root directory. Each directory can contain multiple subdirectories and any number of files.

In OLE Structured Storage, the term *Storage* is used in place of directory, and the term *Stream* is used in place of file. When working with OLE Structured Storage Files, you start with a top level storage (*root storage*). This storage can contain additional sub storages and streams. Streams can be created, opened and closed just like files. You can write into streams without worrying that one might interfere with another. OLE Structured Storage takes care of allocating space for streams and storages, and managing space allocation within the disk file.

OLE Structured Storage also defines a name for a disk file that is managed by this technology. These files are called *Compound Documents*.

Why is Structured Storage a part of OLE?

Structured Storage accurately describes what this compound document technology does, but why is this part of OLE? - the "Object Linking and Embedding" standard from Microsoft?

Part of this is the fact that OLE is in fact a collection of technologies - a sort of grab bag under which many of the new developments for Windows falls. But part of it has to do with one of the major goals of OLE - the ability for users to deal with documents instead of applications.

Consider what happens when you embed an Excel spreadsheet into a Word document. When you click on the spreadsheet part of the document, the Excel user interface appears within Word - a technology called "in-place editing". The document is a word document, yet clearly, Word is able to somehow store and manipulate the Excel spreadsheet object that is somehow embedded into the Word file. Or can it?

In fact, Word has no idea what data is contained in the Excel spreadsheet or how to work with it. What actually happens is that the Word file is a compound document. One of the storages in the document is a place where objects foreign to Word are stored including, in this case, the Excel spreadsheet. Each object is stored in its own stream. When you save the word document, Word does not know how to store the spreadsheet object, but it does not need to - all it has to do is pass a handle to the stream to Excel. Excel then saves the spreadsheet data into the stream.

When you reload the document, Word looks at the objects in its object pool. Each of the streams starts with a GUID - a universal identifier. Word looks at that identifier and calls the OLE libraries asking it to create an object based on that stream information. OLE looks through the system registry, sees that it is an Excel spreadsheet object, then loads those parts of Excel that are necessary to display the object and allow the user to edit it.

As you can see, OLE Structured storage fills the critical need of allowing an application to store objects even though it does not know their internal format - it can simply pass a stream handle to a server that knows how to work with that object. You can use this same technique in Visual Basic in conjunction with the OLE container control to store foreign objects inside your own compound document files.

A quick look with a compound document browser shows that OLE Structured Storage is used by many Microsoft Applications including most of the Microsoft Office applications.

Should you use a Compound Document or a Database?

I've been asked this question any number of times. In fact, a large part of the purpose of this article is to dispel this question. Note that I say dispel - not answer. The question can't be answered because it is intimately tied to the design of each individual application.

If your application is storing multiple groups of records, where all of the records in a group are similar to each other, and requires sophisticated search and filtering capabilities and support for the definition of relationships between records in different groups (tables), then you probably need a database.

If you wish to create a private document format that contains arbitrary types of data of different sizes, and perhaps objects from other applications, Structured Storage might be a better choice.

In either case, the problem is first to determine the needs of your particular application. Once the requirements are defined, the choice of technology will, in most cases, be clear.

Private vs. Public Information

While the contents of any particular stream in a compound document is defined entirely by the application or object that it contains, the management of streams and storages within the document is the responsibility of OLE itself. This means that it is possible for any application to browse through the structure and contents of the document - just as any application can open and read a disk file.

One of the nice results of this characteristic of compound document files is that you can mix private and public data within a file. You can, for example, place a plain text description in a stream with a given name that any application can read.

Microsoft has actually defined a standard properties format stream called the "SummaryInformation" field. This stream contains standard summary information such as the document Title, Author, Comments and so forth. This means that any application can read this summary information. You can use it in your own documents, or use it to obtain information about other documents that use this feature.

Self Persisting Classes

You've seen how OLE Structured Storage allows each application to be responsible for its own objects within a single document. You can use the same technique within your own application by creating self persisting classes.

Say you create an application that contains a number of different classes and you wish to persist collections of objects from each class. One technique involves creating high level routines for saving and loading all of the objects. The disadvantage of this approach is that any changes to a class require that you modify the high level routines. This includes adding new classes, or changing the formats that a class uses to save its data. This kind of centralized approach is necessary in most cases where you are creating a private file format that you are managing yourself.

OLE structured storage makes possible a better approach in which each class knows how to transfer its data to and from a stream. In this case, all the high level routine has to do is call a "Save" or "Load" method for each instance of each class. If a class needs to change its data format, it can do so at will (assuming it maintains the ability to load the older format). The high level persistence routines do not need to be modified in any way.

Use of self-persisting classes can improve the long term reliability of an application by making it less likely that the persistence operation of one class might interfere with those of others used by the application - even when the code or data formats for individual classes are modified.

Other capabilities of OLE Structured Storage

Compound document files support sharing - individual storages can be opened for exclusive or shared access, in much the same way as disk files support sharing.

OLE Structured Storage also supports transactioning. You can open a storage in transacted mode. After modifying the contents of the storage you then have the choice of committing those changes or reverting to the original contents. This can be ideal for implementing features such as incremental Undo operations.

OLE Structured Storage and Visual Basic

There is just one catch that exists when it comes to using OLE Structured Storage technology from Visual Basic. That is that Visual Basic does not support this technology. OLE Structured Storage is not implemented using API calls but rather OLE interfaces, a system not supported in VB.

Fortunately, you can access all of the capabilities of OLE structured storage from Visual Basic using a third party package called "StorageTools" from Desaware. This package includes 16 and 32 bit OLE controls that support both structured storage and easy access to the system registry.

The next page includes a more detailed description of StorageTools and its capabilities. For further information contact:

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StorageToolsTM Version 1.0

The ultimate data storage and file manipulation toolkit! Change the way you work with files and data forever!

You may have heard about OLE 2.0 with its ability to control applications and embed objects from one application into another. But there's another feature built into OLE 2.0 that until now was not accessible to Visual Basic programmers. It's called "Structured Storage" and StorageTools is your key to this powerful technology.

Structured Storage allows you to create files that organize information easily. Blocks of data can be placed in hierarchical form, just as files are placed in directories. It's like having an entire file system in each file. You can also create and work with compound documents - a new standard for document storage.

OLE 2.0 takes care of allocating and freeing space within a file, so just as you need not concern yourself with the physical placement of files on disk, you can disregard the actual location of data in the file. Plus: with its support for transactioning you can easily implement undo operations and incremental saves in your application.

StorageTools allows you to take advantage of the same file storage system used by Microsoft's own applications. Includes sample programs (with source) that let you examine the structure of any OLE 2.0 based file so you can see exactly how they do it!

StorageTools Storage Control:

The Storage control uses Visual Basic OLE Objects to represent storages and streams, creating a familiar interface for manipulating those elements using familiar "Get" and "Put" style commands. Within the Structured Storage standard are a number of functions that let you upgrade your file handling procedures easily: you can detect whether files are in Structured Storage format or not, and you can read any normal file as if it was a Structured Storage file. The Storage control also adds a number of features specifically for Visual Basic programmers. It lets you read and write information in any of the styles Visual Basic uses, such as "Sequential", "Binary" or "Random", including arrays.

StorageTools is the key to unlocking the following Structured Storage capabilities:

- Utilize a powerful new method for organizing information within a file or compound document.
- Buffered file modifications allow you to easily undo modifications to a file using Transactioning.
- The ability to create a compound document in a memory buffer instead of a disk file
- Full support for standard SummaryInformation fields lets you expose general document information while still maintaining a proprietary internal data format.
- Ability to look inside any compound document file including those generated by Microsoft's Office applications such as Word and Excel.
- Includes a compound document file browser with complete Visual Basic source code.
- You can organize information in memory exactly like you organize information on disk. Only one function call is required to copy information between a Storage in memory and a Storage on disk.
- Reduce disk access time by only saving the parts of the document that have changed.
- All disk space allocation and organization are done for you.
- **And more....**

StorageTools Registry Control:

The Registry Control makes it easy to access the Registry and the Registration Database. It provides all the power of Windows API calls and more. Keys within the Registry are accessed like directories. Values are converted to data types compatible with Visual Basic. Powerful search capabilities are included, allowing you not to only search among keys and value names, but within the value data itself. The documentation includes descriptions of areas in the Registry that might be useful and how to access them.

Using StorageTools - the Registry becomes the key to transforming your Visual Basic program into a truly professional application. Here are just some of the thing you can do:

- Register the filename extension to your documents, so your program is automatically launched when a user activates one.
- Create user-specific and machine-specific configuration settings, dramatically improving your user interface.
- Expose DDE links to your program.
- Interface with Windows 95: set icons, register an uninstaller, update reference counts for DLL's you use, and much more.
- Expose your program's version information.
- Read and modify system settings.
- **And more....**

StorageTools includes 16 & 32 bit OLE controls, documentation and sample code. *only* \$129.

Desaware prides itself on products that address real-world programming issues. Desaware develops advanced tools that educate and expand the limits of software development. Desaware is the developer of SpyWorks, VersionStamper, StorageTools, The Custom Control Factory, CCF Cursors and The Common Dialog Toolkit. With the transition to 32 bit OLE controls, and new operating systems, these products reflect our commitment to remaining at the forefront of this new technology.

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Final Comments

This article runs about 5000 words (not counting the product information). Normally, I would sell an article of this type to one of the major magazines. This article is an experiment to see if electronic media has become widespread enough to justify writing feature articles for direct distribution. My hope is that enough people will be interested enough in the article to read the product information that follows, and that the sales that result will offset the loss resulting from not selling the article through traditional channels.

I would appreciate any feedback you may have regarding this approach.

Daniel Appleman

Installation

Depending on the operating system that you are using, you may need to explicitly register the demonstration OLE controls in order to run the included demo programs or use the demonstration controls. The installation utility included here will register the demo controls on the CD-ROM - no files will be copied to your system.

Click here to register the demonstration OLE controls: 

The demo file directory contains recent versions of some of the support files required by these controls including mfc40.dll. They will load from the CD-ROM if they are not already present on your system. If you have trouble running any of the demos, make sure that the versions of these files on your system are current.

Demo Controls

This CD includes demonstration versions of the 32 bit OLE controls for SpyWorks, VersionStamper and StorageTools. These controls are used by the demonstration programs, but can also be added to your VB applications to check them out within the Visual Basic environment (they will not run executables).

The SpyWorks, Verstamp and StgTools subdirectories each contain a readme file that briefly describes the operation of these demo controls.

The controls must be registered before they are used. This can be done through the Visual Basic "Custom Controls" menu or using the [Installation](#) program provided. You may wish to copy these controls to your hard drive and reregister them to improve performance.

Only 32 bit demonstration controls are provided here. 16 bit OLE controls and VBX controls are available for products as described in the product descriptions.

The Desaware Visual Basic Bulletin

I hate junk mail.

No, that's not really fair. Sometimes something comes in that I actually find worthwhile. But the vast majority of the offers and flyers and so forth that I receive get trashed with barely a glance.

So when I started Desaware I faced a dilemma. I couldn't really afford to come up with large glossy advertising catalogs - especially knowing that most of them would probably just get thrown out. And from an environmental perspective, if I was going to mail out information, I wanted it to have value to the recipient. I wanted what I sent out to be the type of material that I myself would not mind receiving.

So I decided to do a newsletter. One that would have interesting technical information, some of which focused on our products, and some of which was just of general interest. And it would also include some percentage of product information, so that I wouldn't have to send anything else out.

To what degree I succeeded is for you to judge. The first four editions of the newsletter follow, pretty much as they originally appeared.

About the [Newsletter Bonus Disks](#)

About [Desaware](#)

The Desaware Visual Basic Bulletin

Volume 1 Issue 1

Welcome to our Newsletter

Welcome to the first edition of what we hope will be an ongoing newsletter. Why a newsletter, you ask? Because if we are going to impose upon you by sending a mailing, the least we can do is make it something worthwhile. It is true that you will find some product information in here (after all, we can't afford to send these out if they don't generate some sales), but you will also find tips and techniques that are useful to VB programmers in general, and of course, our customers in particular.

— Dan Appleman

Inside...

[Transferring information between forms and applications](#)

[Using the SendMessage API Function](#)

[Using long variables to transfer data during callbacks and messaging](#)

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Transferring information between forms and applications using Windows messages.

Windows has long recognized the need for applications to exchange data with each other. Initially data could only be exchanged manually using the clipboard. Later, Microsoft implemented Dynamic Data Exchange (DDE) which allowed applications to send data to each other automatically. DDE is supported in Visual Basic, however it is relatively inefficient. Performance can be poor, and due to its asynchronous nature, timeout errors can occur.

An ideal solution to interform/ intertask communications is the use of Windows messages to transfer the data. It is easy for VB applications to send messages (See Using SendMessage on page 2), but a VB application requires the SBC.VBX control from Desaware's SpyWorks-VB package to be able to intercept incoming messages. Messages have the advantage of being both fast and synchronous (your code does not return from a SendMessage call until the other form or application has processed the message). A message triggers an event in the destination form that can include data or a pointer to the data, so you can avoid the need to use global variables.

The following steps are involved in using messaging to communicate between forms or applications.

Obtain a message number to use.

Obtain a destination window handle. For forms in your own application, you can simply use the Hwnd property for the form. For forms in other applications, use one of the techniques described later in this article to obtain a window handle..

The destination form uses **SBC.VBX** to subclass the form. This involves setting the ctlParam property to the name of the form to subclass, and setting the Messages or RegMessage property to identify the message to detect.

Prepare the data or obtain a handle or pointer to the data. (See: Using long variables to transfer data during callbacks and messaging, page 3).

Use the SendMessage API function to transfer the data.

On receipt of the message (SBC WndMessage event), the destination copies the data into the appropriate local variables.

Obtaining Message Numbers

Every Windows message is represented by a number. Standard Windows messages have constant values assigned, for example: the WM_PAINT message is always &H0F. If you need a message number to use within an application or between cooperating applications, you can also use a constant message number. The numbers above &H400 (WM_USER) are available for your use. You need not worry about other programs sending those messages to your form. For Visual Basic, you should avoid using message numbers between &H1000 and &H2FFF, as the lower part of these ranges are currently used internally by Visual Basic.

If you wish to obtain a message number that is unique in the system, you can use registered messages. Registered messages are obtained using the function

RegisterWindowMessage(lpstring\$), where lpstring\$ is the name of the message. Any application that calls **RegisterWindowMessage** with the same name will receive the same message number. This is ideal for cases where you wish to publish message numbers to use with other applications and be assured that they are unique.

Obtaining a Window Handle in Another Application

You must obtain a handle to a window in another application in order to send it a message. At first glance, the **FindWindow (classname\$, windowname\$)** API seems a suitable choice. Unfortunately, there are many cases where it is not reliable. Finding a window by class runs into problems any time more than one window of a class exists. For example: if more than one instance of NotePad is running, **FindWindow** will return the handle of the first one found, which may not be the one you want. The same problem applies to doing a **FindWindow** based on the window name (which is the same as the window caption), plus you have the added problem of handling those applications who modify their caption based on the open document. For example: the default windowname for Notepad is actually "Notepad - (Untitled)".

The real solution for this problem is to use the **EnumWindows** API function to enumerate all of the top level windows in the system, checking first if it belongs to the module handle that you are searching for (as returned by the Shell command or WinExec API) and also if it matches the class that you are looking for (for cases where an application has more than one top level window). The **EnumWindows** API function takes as one of its parameters a pointer to a function. Since Visual Basic does not provide you with an address of a VB function, you can use the **CBK.VBX** callback control (part of SpyWorks-VB) to obtain a function address to pass to **EnumWindows**. Each time that function is called, it will trigger a callback event in the **CBK** custom control.

Using the SendMessage API

The SendMessage API function is used to send Windows messages to other applications. Unfortunately, there is frequently confusion on how to handle the lParam parameter which is defined to be "As Any". The declarations that we provide in the *Visual Basic Programmer's Guide to the Windows API* are as follows:

```
Declare Function SendMessageBynum& Lib "User" Alias "SendMessage" (ByVal  
hWnd%, ByVal wParam%, ByVal lParam%)
```

```
Declare Function SendMessage& Lib "User" (ByVal hWnd%, ByVal wParam%, ByVal  
lParam As Any)
```

```
Declare Function SendMessageByString& Lib "User" Alias "SendMessage" (ByVal  
hWnd%, ByVal wParam%, ByVal lParam$)
```

We recommend that you use the aliased versions where possible to prevent errors, but here is a brief summary of how to send values, strings, structure addresses and nulls.

When the message expects a string:

```
dl& = SendMessageByString(hWnd, MSG, wParam, lParam$) or
```

```
dl& = SendMessage(hWnd, MSG, wParam, ByVal lParam$)
```

When a message expects a NULL value (can substitute a long variable as well)

```
dl& = SendMessageBynum(hWnd, MSG, wParam, 0) or
```

```
dl& = SendMessage(hWnd, MSG, wParam, ByVal 0&) (must be long type!)
```

When a message expects a pointer to a structure or numeric variable

```
dl& = SendMessage(hWnd, MSG, wParam, lParam) (lParam is any variable or  
structure)
```

You can see how the aliased versions significantly reduce the chance of error, since the declaration takes care of both adding the ByVal and forcing the parameter to be passed as the correct type.

Using long variables to transfer data during callbacks and messaging

The **IParam** parameter to a window message will frequently point to a data structure. Many callback functions also use pointers. In some cases you simply need to examine values in the structure. In others you may need to change values in the structure.

The trick to doing this is to dimension an object of the referenced structure type in the event code itself. You can then use the **dwCopyData** function to copy the data to and from the structure.

For example: you can define a structure to transfer two integers and a string:

```
Type YourStruct
    A As Integer
    B As Integer
    S As String * 40
End Type
```

Sending the data via a message is easy. The source form or application uses `SendMessage` as follows:

```
Dim YS As YourStruct
SendMessage(desthwnd, msg, wp, YS)
```

This causes a pointer to structure `YS` to be passed as the `IParam` parameter. You can receive and process it as follows:

```
Sub WndMessage(wnd As Integer, msg As Integer, wp As Integer, lp As Long,
retval As Long, nodef As Integer)
    Dim YS2 As YourStruct
    ' Get a copy of the structure
    dwCopyData ByVal lp, YS2, Len(YS2)
    ' Now you can access the data using
    ' the fields in YS2
    x% = YS2.A
    YS2.S = "New string data"
    ' To set data into YS, copy the data
    ' back as follows
    dwCopyData YS, ByVal lp, Len(YS2)
End Sub
```

Be very careful using the `dwCopyData` function. You will always need to specify the **ByVal** keyword for `lp`. Be sure that the size of the structure is correct. It is also a good idea to check if `lp` is zero before attempting the copy.

The Newest Component: OLE custom controls

Microsoft has recently announced a new component model called OLE custom controls (though we expect everyone will soon be calling them by their extension - OCX controls). With all the press you may wonder, what is hype and what is real? Well, here's our opinion....

It has been apparent to us for some time that the VBX control model is limited and would not be easy to port to the 32 bit programming model. Thus in the long term there is no doubt that the VBX model will become obsolete. But then again, so will DOS, right? Yet how many people still use DOS applications?

As this paper goes to press, the next version of Visual Basic remains little more than rumor - it is clearly some time in the future. 32 bit application development is also clearly only in its earliest stages, though we expect it to accelerate with the appearance of Windows 4.0 sometime late this year (or so they say).

The VBX programming model is extensively supported by C++ compilers, application development platforms and Visual Basic. Microsoft has publicly said that VBXs will be supported under the 16 bit edition of the next edition of Visual Basic. We expect VBX to be the dominant component model for the rest of this year without any doubt, and probably well into 1995.

That said, we at Desaware are turning our attention *now* to the new OLE custom control format and do plan to support all of our products under this control model in both the 16 and 32 bit environments as quickly as possible. After all, our entire focus as a vendor is to provide the highest quality and most sophisticated developer's tools. So stay tuned!

Safely distribute your Visual Basic applications...

An end-user or customer calls. ***Your program is behaving strangely, or no longer loads.*** Did another program install an older DLL or VBX on their system? Or maybe a later, but incompatible version? Is it a conflict due to an incompatible DLL already loaded in memory? Has the PATH environment setting changed? Is a required file missing? If only your program could tell you what's gone wrong... Now it can - with VersionStamper-VB

Detect VBX and DLL Incompatibilities Instantly

VersionStamper-VB allows you to embed into your Visual Basic executable information about all of the dynamic link libraries and custom controls used by that application, along with their required versions, file dates, and choice of warning conditions. The dwvstamp.vbx custom control uses this information to check the versions of the actual modules that are available on the target system. Incompatibilities are detected instantly.

VersionStamper-VB is designed with your needs in mind. You can perform version verification automatically on load, or at any time under program control. A customizable and redistributable "rescue" program can be used to detect and log problems when an application won't load at all. VersionStamper-VB is designed primarily for DLL's and VBX's, but will work with any type of file, even those without version information.

Simply set a few control properties in the dwvstamp.vbx custom control and VersionStamper-VB automatically adds a standard Windows version stamp into your Visual Basic based executable when you compile..

Add true Versioning to your Visual Basic EXEs

A COMPLETE solution

VersionStamper-VB is easy to use even if you are an absolute beginner - but we didn't forget the experts. Look what else you get:

dwvstamp.vbx - This version stamping custom control has properties for each of the standard version information fields, and extensive dialog box support for embedding version information for DLLs, VBXs and other files which you select.. It also has the ability to scan Visual Basic-based projects to automatically create a list of the DLLs and VBXs required by the application. The runtime distributable control is royalty free, and is small and efficient.

VerInfo.exe - A Visual Basic-based program that allows you to view the version information for any executable, DLL or VBX that contains versioning information. Source code is included. It also produces a complete list of the components required by the application based on information embedded by the dwvstamp.vbx control.

VerResQ.exe - A Visual Basic-based program that analyzes any Visual Basic-based executable stamped by VersionStamper-VB. It instantly detects any incompatibilities that may exist between the requested files and those actually present on disk. Source code is included so that it may be customized for distribution with your application.

VrsqTest.mak - A sample rescue program that shows how to scan a version stamped executable and determine any incompatibilities that exist - even if the application cannot be loaded. It is designed to be easily modified so that you can create your own rescue program to distribute with your application.

Technical Notes include a discussion of the Windows-based system of version stamping, using the versioning API, suggestions for improving the Visual Basic setup toolkit and more.

Whether you are developing for corporate use in house, or for distribution worldwide, VersionStamper-VB will pay for itself the first time a customer calls with a compatibility problem. You'll have a solution in minutes - with VersionStamper-VB.

NOTES:

VersionStamper-VB posed an interesting problem for us. How do you create a package that is at once so easy to use that even an absolute beginner can use it, yet powerful enough for the most advanced VB developer? We ended up placing 99.9% of the functionality into a single custom control and several

prepackaged forms and modules. Use the defaults and you have a complete solution using just a few lines of code. Or modify our VB code and override the VBX event defaults to create your own customized solution. Our manual is designed the same way: use the quick-start for a canned solution, or read the text (>100 pages) to learn everything you would want to know about versioning and component distribution.

- Dan

Distributing Applications Created with Visual Basic

Quite a bit of attention has been paid lately to the problem of source code control and group project management. Fortunately, a number of source code control projects have begun to appear. It is only recently that developers have turned their attention to the problem of safely distributing applications that make use of components such as Visual Basic custom controls (VBXs) and Dynamic link libraries. The presence of an obsolete component on a system can cause an application to fail, and even cause a General Protection Fault.

Developers have attempted a number of solutions. Some try to place their VBXs and DLLs in their own application directory. This approach can fail in two ways. First, once another application loads a different version of the control, that version will be used - Windows will not attempt to load the correct version. Next, it is not possible to guarantee that the current directory will be the same as the one containing the components, and Windows always searches the current directory first.

Some developers attempt to make sure that they have the correct control by installing their versions of a component into the system directory regardless of the presence of an existing control that may have a later version. This could almost be considered criminal, as it is very likely to break other applications on the end user's system.

Windows searches for components in the following order:

Any component with the same module name that is already in memory.

The current directory.

The Windows directory.

The System directory.

The project directory (contains the executable that is loading the component).

Directories specified by the PATH environment variable.

There is no way to completely assure that an incompatible control does not exist somewhere on a target system, or to prevent it from being loaded.

Worse yet, there is no way to determine the version of a Visual Basic executable, as VB does not support standard Windows version resources. This means that a user could take an older version of your application, and overwrite a later version without warning.

Given these facts, two things are clearly needed. First, a way to embed a version resource into a VB executable. Second, a way to mark an executable with a list of the components that it requires so that it would be possible to determine if the correct components are in fact present on a target system.

Desaware's new VersionStamper-VB addresses both issues.

Make your VB Applications Tile like non-VB Applications

One of the biggest complaints about programs created with Visual Basic is that they cannot be tiled by the Windows Task Manager. Instead, Task Manager leaves the VB program where it was, and leaves a large hole where it was supposed to go. Desaware's SpyWorks-VB allows you to let your VB application tile with the rest.

First, you need to subclass the hidden main window that belongs to every VB application (class name ThunderRTMain - Use the **EnumTaskWindows** API with the **CBK** callback control to get this handle). This is because task manager tries to tile this window - not your form. But you can intercept the task manager's attempt to size this window and move the form yourself.

Use the **SBC.VBX** control to intercept the WM_WINDOWPOSchanging message and use the following code:

```
Sub SubClass1_WndMessage (Wnd As Integer, msg As Integer, wp As Integer, lp
As Long, retval As Long, nodef As Integer)
    Dim lpwinpos As Long, flags As Integer
    Dim isicon As Integer, ismax As Integer
    Select Case msg
        Case WM_WINDOWPOSchanging:
            ' Make sure our application is not in iconic or
            ' maximized state before tiling or cascading.
            isicon = IsIconic(Me.hWnd)
            ismax = IsZoomed(Me.hWnd)
            If ismax Or isicon Then Exit Sub
            'get structure information
            lpwinpos = dwGetAddressForObject(winpos)
            dwCopyDataBynum lp, lpwinpos, Len(winpos)
            'The hWndInsertAfter field of the WINDOWPOS structure is
            normally the handle of this apps main form, but is NULL when a tile or
            cascade message is sent. The SWP_NOCOPYBITS bit of the flags field is
            turned on during a tile or cascade message, and off for others.
            If (winpos.hwndInsertAfter = 0) And (winpos.flags And
            SWP_NOCOPYBITS) Then
                flags = winpos.flags And &HFEFC
                ' Position and size the main form.
                SetWindowPos Me.hWnd, 0, winpos.x, winpos.y,
            winpos.cx, winpos.cy, flags
            End If
        End Select
    End Sub
```

You also need to place code in the form's Resize event to hide the ThunderRTMain window when the form is minimized or maximized. Use the ShowWindow API to do this.

A sample program demonstrating VB tiling can be found on the Newsletter Bonus Disk described on page 7.

Trapping and blocking the Control-Escape Sequence

When the user hits the Ctrl+Esc key, Windows sends a WM_SYSCOMMAND message to the active application. The information in the message tells the active application to bring up the Task List. You cannot use the Keyboard Hook to throw the Ctrl-Esc key message away because the WM_SYSCOMMAND message is sent before the key message.

The solution is to use the **SBHOOK.VBX** control to place a task or systemwide hook that detects the WM_SYSCOMMAND message (Set the HookType property to GetMessage).

In the WndMessage event, the lp parameter contains the cursor coordinate if the user selects the "Switch To..." command from the System menu. When the user hits the Ctrl+Esc key, lp is set to 0. By blocking the WM_SYSCOMMAND message only when lp = 0, you can allow the user to bring up the Task List via the System menu.

In the WndMessage event place the following code:

```
If msg = WM_SYSCOMMAND Then
    If wp = SC_TASKLIST Then
        If lp = 0 Then
            nodef = True
            msg = 0
        End If
    End If
End If
```

Setting nodef to True prevents further hooks from being called, but in many cases you must also set the msg value to zero to truly block the control-escape key.

Parsing Lines Read from Win.ini

What do you do when you have a list of words in a string that are separated by a delimiter such as a comma or null character, and you wish to find out if a word is in the list? You might use the Instr\$ function, except that it also detects partial words such as “now” in “snow”. You can use the Instr\$ function however, if you include the delimiters in the search string. So in this case you would search for “,now,”. The only problem with this approach is that it will fail to check the first and last word in the list because they only have one delimiter. The solution? Add an extra delimiter to the start and end of the list as follows:

```
Instr(“,” & list$ & “,” , “,now,”)
```

accurately detects the word “now” in the word list. This technique is especially useful when you use an initialization file that has a list of words separated by commas, or API functions that return a list of entries delimited by null characters.

NOTES:

When VB3 came out, I snagged a bunch of free copies of VB2 from a local user's group and handed them out to some local teens. One of them, Eyal Soha (16), learned enough to write the swiniedt program which became part of SpyWorks-VB, and came up with this clever tip in the process. — Dan

Handling Null Terminated Strings

Many Windows API functions can return a string to your application by loading a null terminated string into a buffer. The end of this string is marked by a null character, however Visual Basic will still use the entire length of the buffer in string operations. Consider this example:

Declare the **GetClassName** function that retrieves the Windows class name for a window:

```
Declare Function GetClassName% Lib "User" (ByVal hWnd%, ByVal lpClassName$,  
ByVal nMaxCount%)
```

Then use this code to get a forms class:

```
classname$ = String$(32, "A")  
di% = GetClassName(yourform.hWnd, classname$, 31)
```

The string buffer is filled with the letter A to illustrate clearly what is taking place.

Print classname\$ in the immediate window:

You will see:

ThunderForm AAAAAAAAAAAAAAAAAAAAAA

Visual Basic allows embedded nulls, so even though the API correctly set the buffer to a null terminated string, the length of the string from VB's point of view is still 32, and the characters after the null terminator remain unchanged.

Fortunately, it is easy to extract a VB string that contains only that part of the buffer before the null termination:

```
Function NullTermToVBString$ (usestr$)  
Dim position%  
    position% = InStr(usestr, Chr$(0))  
    If position% <= 1 Then ' Avoid errors  
        NullTermToVBString$ = ""  
        Exit Function  
    End If  
    NullTermToVBString$ = Left$(usestr$, position% - 1)  
End Function
```

SpyWorks-VB - Winner of the Visual Basic Programmer's Journal 1994 Reader's Choice Award!

SpyWorks-VB allows you to do virtually anything in Visual Basic that is possible with other languages. It supports powerful Windows programming techniques that are not built into Visual Basic. Subclassing allows you to intercept any Windows message going to a form or control. Callbacks allow you to provide function pointers to Windows and other DLL's which trigger VB events when called. Hooks give you system or task access to keyboard and mouse events.

You CAN do it in Visual Basic

We can barely begin to describe all of the possibilities provided by SpyWorks-VB, but here are a few: Create VB add-ins to other applications or VB itself using cross-task subclassing. Printer configuration. MouseEnter/MouseExit for status bars. Tiny Captions and Rollup Windows. Scrolling Forms/Controls. True LostFocus & GotFocus detection. Create owner draw controls. Trap tab and alt-tab keys. Use Windows enumeration functions. Detect WIN.INI changes. Use private and owner draw clipboard formats. Change the behavior of standard controls. Indirect property access. Obtain an event history for a program. Detect Windows API parameter errors.

SpyWorks-VB 2.0 Custom Controls:

SBC.VBX - our subclassing custom control provides you complete access to the underlying windows message stream for the forms, controls and even graphical controls in your application. It even detects internal Visual Basic messages.

CBK.VBX - our generic callback custom control handles Windows API function or third party DLL functions that require a function address as a parameter. It even handles multimedia callbacks.

The **SBCEasy.VBX** custom control adds true Mouse enter and exit events, Menu selection events, "tiny" captions and "rollup" windows, virtual forms, and more.

The **SBCHOOK.VBX** custom control provides extensive support for Windows hooks allowing you to detect underlying Windows messages on a form, application or system level.

SBCKBD.VBX, the keyboard hook custom control, lets you detect all keystrokes for an application or the entire system. Even detects hard to get tab, enter and arrow keys.

The **DWSPYDLL.DLL** dynamic link library provides utility functions, access to Visual Basic CDK functions, and the ability to read and write property values for controls in other applications, and even the VB design environment.

SpyWorks-VB Debugging Tools

SpyParam.exe uses the Windows 3.1 built in parameter error detection capability to detect and trap API function parameter errors - errors that are hard to find because they are simply ignored by Windows.

SpyMem.exe is a memory, resource, module and task browser. Its snapshot mode allows you to compare current heap & resource states with a previous reference - ideal for detecting resource leaks and memory that is not being freed.

SpyMsg.exe is a classic "spy" program with the ability to record any or all messages going to one or more Windows in your system. It also has the unique ability to detect Visual Basic events.

SpyWin.exe is a window browser that lets you examine information about all of the windows in your system. Visual Basic awareness allows it to report VB specific information such as form and control names, and to detect graphical controls..

SpyMenu.exe is a menu browser that can analyze the structure of the menu and command identifiers for any window on your system.

SpyVBX.exe is a form, control and custom control analysis program.

SpyWorks-VB comes with extensive on-line help, lots of VB source examples, SpyNotes #1 (advanced application notes), and more....

Next time someone tells you that you can't do something in Visual Basic the joke will be on them. Now you CAN do it - with SpyWorks-VB.

(update - SpyWorks- just won the 1995 VBPJ Reader's Choice award as well)

NOTES:

I had the original vision for SpyWorks-VB within minutes of seeing the original VB 1.0 beta. The efficiency of VB was obvious, and once I saw that it was possible to access DLL's and create custom controls I knew that I would not have to compromise on power - I could still use the capabilities of Windows. It took over a year for this vision to evolve into a way to share this power with everyone - without requiring that they program in C or become Windows experts.

I'd like to take this opportunity to thank you all for your support and encouragement. You are the people who made SpyWorks the amazing success that it has become..

— Dan

SpyNotes #2 The Common Dialog Toolkit

The Common Dialog Toolkit, an applications pack for use with **SpyWorks-VB**, lets programmers access and modify the Windows Common Dialog Box library using API functions.

The common dialog box library included with Windows makes it possible for programmers to significantly customize the behavior and appearance of common dialogs. However, the common dialog custom control (VBX) that comes with Visual Basic Professional does not provide this capability. The Common Dialog Toolkit shows Visual Basic programmers how to directly access the Common Dialog libraries using the tools in SpyWorks-VB to take advantage of all of the capabilities of the Windows Common Dialogs.

Desaware has launched the **SpyNotes** series of application notes to help programmers learn the advanced techniques made possible by SpyWorks-VB. The Common Dialog Toolkit is the second application note in this series. As such, in addition to a description of how to access Common Dialogs, the package includes in depth technical information and complete documented source code to do the following (and more):

How to access all of the standard Common Dialog boxes from VB.

Using callbacks to trap the messages received by Common Dialogs.

How to embed Visual Basic controls into a common dialog box.

How to use *modeless* dialog boxes and give *modal* dialogs *modeless behavior*.

How to add controls to a common dialog box.

How to set the size and position of a common dialog box.

How to register and use user-defined messages and registered messages.

How to create 3D common dialogs.

How to Hook into the main Visual Basic GetMessage loop.

How to access and modify the behavior of controls in a dialog box.

With its advanced technical information, the Common Dialog Toolkit will prove valuable even if you never use the Common Dialogs themselves!

Classics from Desaware - CCF-Cursors and The Custom Control Factory

Visual Basic comes with only 12 built in cursors (or "mousepointers" as they are called), and could not easily be extended. **CCF-Cursors** provides a complete package for design and use of custom cursors and includes other enhancements to VB's mouse and cursor control.

Create Cursors from scratch, or convert any Icon into a cursor.

Set the cursor for a form or control.

Animated cursors - automatic animation with specified intervals.

Support for Visual Basic 3.0 graphical controls.

Detect mouse events for ANY control.

Detect menu selection events.

Coordinate transformation, resource and other functions.

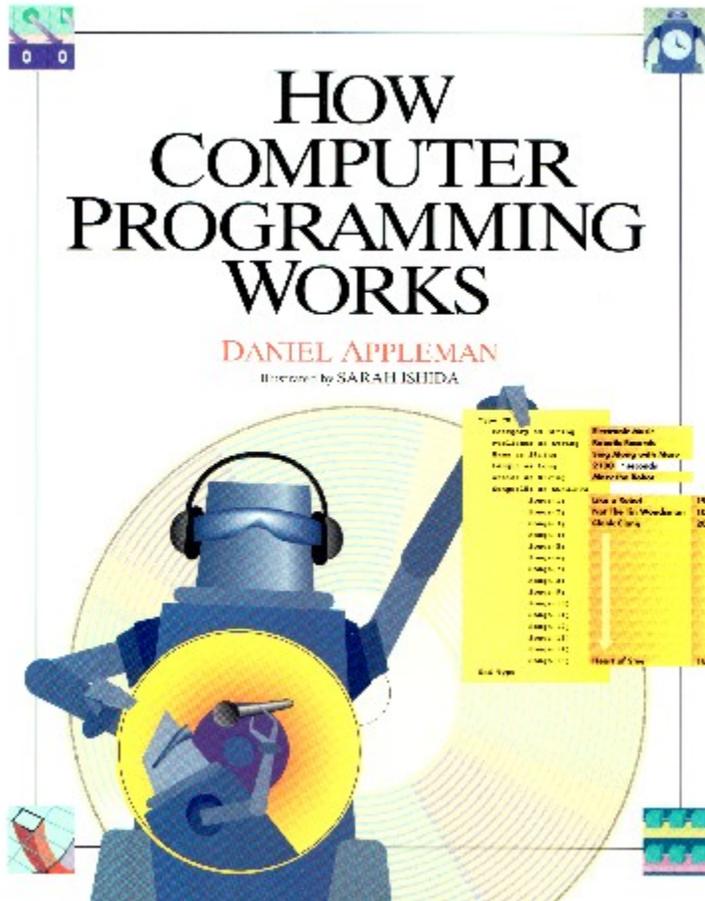
Over 50 sample cursors, including an animated hourglass.

The Custom Control Factory lets you create customized button controls interactively while working in VB design mode. With their unique ability to hold virtually unlimited numbers of bitmaps, icons, cursors or metafiles, CCF controls can be used to create **Animated Buttons**, **Multistate Buttons**, **Toolbars**, and other enhanced user interface objects.

Features include: Multiline Captions, flexible text/image alignment, image scaling and automatic control sizing, programmable animation speed, runtime configurable, automatic 3D borders with flexible widths and colors, 256 color support, Image compression, Custom drawing/cycles. Now includes our new **MLIST2.VBX** control, a powerful list box that also holds bitmaps and supports unique colors for each item in the list box. (Includes C source code for MLIST2).

How Computer Programming Works

A new book by Daniel Appleman
from Ziff-Davis Press.
ISBN: 1-56276-195-1



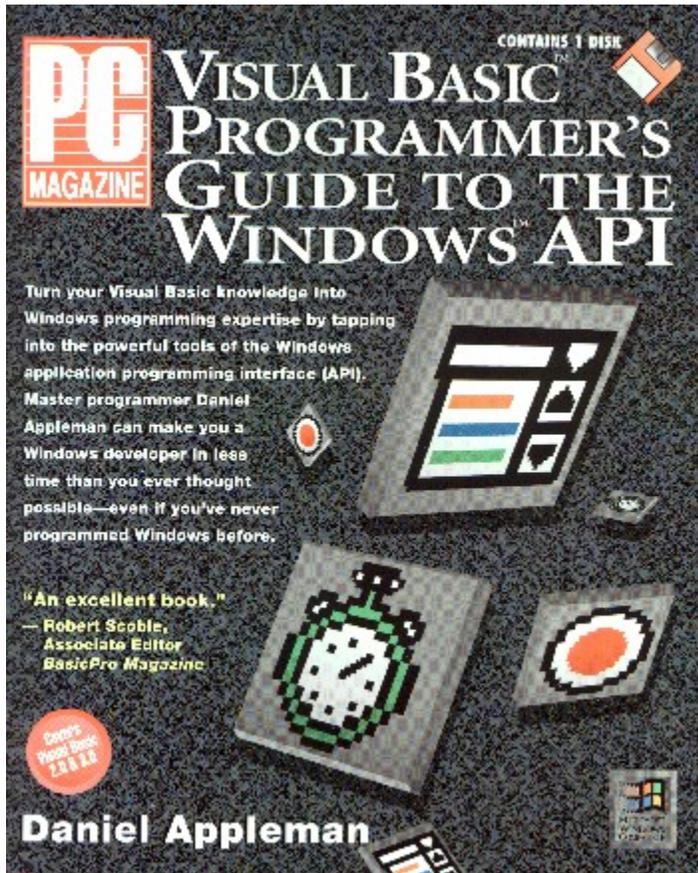
Have you ever tried to explain to someone what it is that you actually do as a programmer? Are you a self taught programmer who sometimes wonders if maybe you missed some important information along the way - or do you know someone in that situation? Have you ever met someone, a friend, parent or child that you wanted to introduce to programming in an easy to read manner?

Well... I've been in all of these situations - and I have wanted to do something about it for a long time. Now, thanks to the good folks at Ziff-Davis Press, I've been able to take what I think it is a good step in the right direction.

"How Computer Programming Works" is part of Ziff's award winning How It Works series. It's fully illustrated (color, of course) and focuses on the fundamentals and concepts of programming and computer science. Plus, I've arranged again to offer a 20% discount on the book when purchased through Desaware.

— Dan

Visual Basic Programmer's Guide to the Windows API



Build on your knowledge of Visual Basic to become a Windows expert by learning to take advantage of the hundreds of functions contained in the Windows API. No knowledge of 'C' or prior Windows experience is required. It covers virtually every aspect of Windows and includes extensive sample code. Even Windows experts will benefit from the information on API/VB compatibility. Over 1000 pages plus disk. Published by Ziff-Davis Press. ISBN: 1-56276-073-4. 20% discount on this book when purchased through Desaware.

The Desaware Visual Basic Bulletin

Volume 2 Issue 1

We came up with the idea of this newsletter as a mechanism to provide some advanced ideas and techniques to our customers, along with some product information. One of the reasons that the subscription is free is because we didn't want to be bound to a particular schedule - and not being bound to schedules seems to be going around nowadays. You see, we honestly expected this issue to come out in conjunction with either a new version of Visual Basic or some other container that supports OLE controls. So now we've given up waiting, and here we go full speed ahead into another issue of the bulletin, full of some of the coolest things we've learned how to do since the last one, plus news and a special offer or two.

—Dan Appleman

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Stop VBX/DLL Conflicts using Easy "Splash Screen" Implementation.

In our last issue of the Desaware Visual Basic Bulletin, we discussed in detail the troubles that can occur when an application tries to load an obsolete or incorrect version of a custom control or DLL - a problem that is happening with increased frequency as more applications take advantage of software components. We also showed how VersionStamper-VB gives you the ability to scan your target computers for all the required files and correct versions of those files.

VersionStamper-VB provides a number of approaches that you can take when it comes to performing this scan. One approach is to perform the scan as part of your main application's initialization routines. The problem with this approach is that it can be time consuming - after all, each verification does require a certain amount of disk access and a verification of a file that uses many components can take a while. Another approach is to perform the scan only on user request - by invoking a menu option in the main application or by executing a standalone "emergency rescue" program that is able to scan your executable. This approach is fine for detecting problems, but does little in the way of preventing them.

You can combine the best of these two approaches - using a standalone program to perform a scan before your main application is run. The standalone program approach has one very important advantage over performing the verification from within the main application. When you run a Visual Basic executable, it loads all of the required custom controls before executing a single line of Visual Basic code. This means that before the file verification even begins, you may already be running code from an incompatible file. There may be cases where an incompatible file (or files) will crash your application before the file verification can be performed. The standalone program only needs to load the dwvstamp.vbx control in order to perform the verification for your main application. It can read the file list from your main application and verify the compatibility of those files without actually loading them.

Solving the delay problem

Running a standalone verification program before loading your application is a powerful preventive measure and more reliable than building the verification into your main application, but this still does not address the issue of the delay caused by the verification process. Fortunately, we can turn this delay into a strength by using the standalone verification program as a "splash screen" for your main application. You can create a form that displays your product name, serial number, copyright notices, registered user's name, etc. This form remains visible while the verification is in progress. If the verification passes, this form will shell your main application and unload itself. If it fails, you can display your normal warning and error messages.

Start by designing a form to display during the verification. Add a VersionStamper and Timer control to that form. and set the Timer Interval to 100. Then add the appropriate verification template files to the project (refer to pages 22-24 of your VersionStamper-VB manual). The code to start the verification should be placed in the Timer Event (this allows your form to be displayed before file verification process begins). On success, Shell your main application and unload the form.

Other considerations

Some customers may eventually figure out that the verification program is just shelling your main application. They may think that they can bypass the "splash screen" and run your main application directly instead (they will probably run it and find no warnings or errors). One trick you can use is to Shell your main application with some parameters (undocumented of course). For example, you can Shell your main application with the "/verified" string. During the Sub Main or Form_Load of your main application, you can call the Command\$ function to retrieve the command line argument. If it does not match, you can display a warning message to the user telling them that file verification was not performed. Another thing to remember when using this method is to install your "file verification" program and your main application in the same directory. Since VersionStamper searches for required files in a specific pattern (the same pattern used to load DLLs and custom controls), these two

programs must be in the same directory in order for the search to be identical for both.

Customer Comment on VersionStamper

As nice as awards are, hearing compliments from our customers is even nicer. And it's a real treat when the compliment comes from a customer who is another Visual Basic add-on vendor! (it turns out that our products are peculiarly suited for extending the Visual Basic environment itself, so it's not surprising that other add-on vendors use them). I received the following Email message from Brad McLane, one of the lead developers at Pinnacle Publishing, who kindly granted me permission to print his comments:

"BTW, you should know that Version Stamper has paid for itself many times over in reduced tech support cost and customer good will. Most tech support problems with ToolThings were directly attributed to DLL or VBX version incompatibilities on the installed system. Version Stamper sniffed out the problems in no time. Happy (and very impressed) users abound!"

ToolThings (for those who don't know) is a set of 10 productivity tools that can help you with your VB programming. You can reach Pinnacle at (800) 231-1293. By the way, they also publish the Visual Basic Developer newsletter for which I am currently writing a regular column.

—Dan

Hidden Treasures of SpyWorks

When people think about SpyWorks, they most often turn to its powerful subclassing and callback capabilities which are used to extend the power of Visual Basic. But there are a number of less well known tools inside the package that can prove surprisingly useful.

INI File Function Library

Did you know that every message name and value used by sbc.vbx and sbchhook.vbx, and every group of messages used by these controls and spymem.exe is entirely user configurable? They are all defined in the file spyworks.ini which contains an initial set of default values. This makes it trivial to add custom messages to SpyWorks which are handled in exactly the same way as standard messages. It also makes it possible to define your own group of messages to be detected when spying on messages, making spymsg.exe one of the most flexible tools of its type available.

In order to make it easy to define your own messages and message groups, SpyWorks includes the program swiniedt.exe, which allows you to edit spyworks.ini. As a bonus, this program includes full source code. The file swiapi.bas provides an intermediate level function interface to the ini file, and demonstrates how to manipulate the contents of any private initialization file. It also shows how to use the Alias command to create type safe declarations to access INI files. Though designed for this particular application, the code is easily transferable to other applications or could be used as the basis for a generic INI file library.

The file swimisc.bas contains additional useful functions, including "ParseAny-String" which can be used to extract substrings from a list of strings (The initialization file functions can return a list of values in a special string format in which each value is separated by a NULL character, and the entire list is terminated by two consecutive null characters).

SpyParam - Find hidden API bugs;

One of biggest improvements from Windows 3.0 to 3.1 was the reduction in the number of "Unrecoverable Application Errors". One of the ways this was accomplished was by the addition of parameter validation to most Windows API calls. Invalid parameters that would once cause a system crash are now simply ignored.

While this does help make programs more stable, it can lead to hidden bugs that are difficult to find - since simply ignoring invalid parameters does not solve the source of the problem. SpyParam taps into the internal parameter validation of Windows and reports on parameter errors that occur. Like other SpyWorks components, this tool is designed specifically for VB programmers. It can even trigger a Visual Basic runtime error on the exact line where you call an API function with invalid parameters. SpyParam also allows you to filter out parameter errors that are caused by components such as VBX's and DLL's so that you can focus in on your own code.

Here's an example of SpyParam in use. The SelectObject API function is used to select a different drawing object such as a brush for a specific device context. After you are finished using a brush, you should restore the previous brush. Most people do not check the return value from SelectObject when restoring the previous object. SpyParam can detect cases where SelectObject fails due to an invalid device context handle or an invalid GDI object

```
Declare Function GetStockObject% Lib "GDI" (ByVal nIndex%)
Declare Function SelectObject% Lib "GDI" (ByVal hDC%, ByVal hObject%)
res% = SelectObject(hDC, GetStockObject (WHITE_PEN)) `res now
contains the previous pen
:
lres& = MoveTo(hDC, X%, Y%) `Do some drawing
:
res% = LineTo(hDC, EndX%, EndY%) `previous pen is now lost (this is a
bug due to reuse of a temporary variable)
:
res% = SelectObject(hDC, res%) `selects garbage into the device
context
```

In this case, the White Pen was selected into the device context and something was drawn. But, the variable used to hold the previous pen was reassigned. This error could cause drawing problems later that would be very hard to trace to this code. SpyParam would detect this problem instantly.

SpyParam Helps While Subclassing

Windows programmers often do not bother to check the return value from the PostMessage function, which indicates (among other things) whether the window handle used is valid. Windows can be created and destroyed by various actions in the system, and are even sometimes destroyed and recreated immediately. Take the case where you are sending a series of commands to a window, then posting a final command. If one of the previous commands destroys the window, then every subsequent command using that window handle will fail.

SpyParam can be used to trap "invalid" parameters passed to Windows API functions such as an invalid window handle passed to PostMessage.

```
Declare Function PostMessage% Lib "user" (ByVal hWnd%, ByVal wParam%, ByVal
lParam%, lParam As Any)
```

```
Declare Function PostMessageBynum& Lib "User" Alias "PostMessage" (ByVal
hWnd%, ByVal wParam%, ByVal lParam%, ByVal lParam&)
```

```
hWnd = windowarray(index)
`if the window gets destroyed or is invalid, this will generate an error
that SpyParam can trap
lres& = PostMessageBynum(hWnd, WM_COMMAND, wp, lp)
```

Create Status Bar Help

Two application features that have recently become popular are status bars and tooltips. Status bars consist of an area towards the bottom of your application screen that displays a brief description of the control under the current mouse location. Tooltips are the increasingly obiquous yellow messages that popup over a control when the mouse lingers in one spot for more than a few seconds.

While SpyWorks-VB does not directly implement either of these features, it does provide controls that allow you to add these features to your application with very little effort, and with less overhead than a standalone control would use to accomplish the same task.

You'll need two controls to implement status bars and tooltips. For status bars you will need a picture box aligned at the bottom of your main form (or any form for which you want to implement status bar help. This control will typically contain a label control which will hold the status bar text - though you can draw the text directly on the control if you wish.

For tooltips you will need a small form which will also probably contain a label for the tooltip text. This form should be loaded during initialization, unloaded when your application is closing, and shown and hidden as necessary. The form's `BorderStyle` should be set to 1, background color set to `&H0080FFFF` (same as label), and the `Caption`, `ControlBox`, `MaxButton`, and `MinButton` properties set to `False`. The label's `AutoSize` property may be set to `True`.

At run-time, you will need to know when the cursor moves into a control (so you can display the appropriate status bar text), when the cursor moves out of a control (so you can clear the status bar text), and when the cursor has remained inside a control for a specified length of time (so you can display the tooltip). You will also need a way to determine which controls have status text or tooltip text attached. Ideally, the implementation should be modular, and not require you to attach code to events for each control.

It's easy using SBCEasy

One of the most powerful, but often overlooked features of SpyWorks-VB is the SBCEasy control, particularly a feature that we call "MouseTransit". The underlying Windows system does provide support for the MouseMove event that can detect when the mouse is moved over a control (though not all VBX controls expose this to the VB programmer). But Windows does not provide any direct mechanism to determine when the mouse enters or exits a particular control or window. SBCEasy solves this problem - taking it a step further by supporting Visual Basic graphical controls as well. By setting SBCEasy's MouseTransit and MouseTransitNC properties, you can receive notification whenever the mouse enters or exits any control in your application. This approach centralizes mouse detection to a single control per form or application (as you choose). SBCEasy's TransitHctl property identifies the control for which the event has been triggered. SpyWorks-VB's indirect property access capability makes it possible to use this value to read the properties for the control. You could, for example, place tooltips and status bar help text in the control's Tag property and use the dwGetPropertyvalue function to retrieve the Tag property for the control. A timer control can be used in conjunction with SBCEasy to implement tooltips.

Updating the status bar

Update the status bar text during SBCEasy's MouseEnter event. Parse the Tag property string to retrieve the status bar help and update the status bar label caption. If this control does not have status bar help text, then the status bar would be cleared.

```
Sub SbcEasy1_MouseEnter(...)
    Dim statusstring$
    Dim iresptr%
    statusstring$ = dwGetPropertyValue(SbcEasy1.TransitHctl, "Tag",
iresptr%)
    If (iresptr% = 0) Then
        `return the first substring
        statusstring$ = ParseString(statusstring$, 0)
        statusbar.Caption = statusstring$
    End If
```

Showing and hiding the tooltip

Enable the timer control in SBCEasy's MouseEnter event. The timer's interval should be set to the length of time the mouse is required to remain inside the control before the tooltip is shown. During the timer event, disable the timer, parse the Tag property string of the control to retrieve the tooltip text and show the tooltip form. Use the GetCursorPos api function to get the cursor coordinates so that you can position the tooltip directly below the cursor. Set the form's ZOrder property to make it topmost and use the ShowWindow api function to show the form without giving it focus.

```
Sub Timer1_Timer()  
    Dim tagstring$, tipstring$  
    Dim tippoint As POINTAPI  
    Dim toffset%, loffset%, iresptr%  
    Timer1.Enabled = False  
    tagstring$ = dwGetPropertyvalue(SbcEasy1.TransitHctl, "Tag", iresptr%)  
    If (iresptr% = 0) Then  
        `return the second substring  
        tipstring$ = ParseString(tagstring$, 1)  
    End If  
    If tipstring$ "" Then  
        ` calculate position of the form based on cursor position  
        GetCursorPos tippoint  
        toffset% = 18: loffset% = -2  
        ToolTipForm.Top = (tippoint.y + toffset%) *  
Screen.TwipsPerPixelY  
        ToolTipForm.Left = (tippoint.x + loffset%) *  
Screen.TwipsPerPixelX  
        ToolTipForm.ToolTipLab.Caption = tipstring$  
        ToolTipForm.Width = ToolTipForm.ToolTipLab.Width + (4 *  
Screen.TwipsPerPixelX)  
        ToolTipForm.Height = ToolTipForm.ToolTipLab.Height + (2 *  
Screen.TwipsPerPixelY)  
        ToolTipForm.ZOrder `place on top of zorder  
        `do not activate the tooltip form after displaying it  
        res% = ShowWindow(ToolTipForm.hWnd, SW_SHOWNOACTIVATE)
```

During SBCEasy's MouseExit event, hide the tooltip form and disable the timer.

Variations on a theme

What if you are using the tag property for some other purpose? One of the advantages of centralizing the code into a single event or function is that you can easily maintain a table or list of status or tooltip text. You could, for example, use a database - SBCEasy provides the name of the form and control which you can use for a table lookup. You could place the text in a standalone text file and read it in as needed. You can even hardcode the text if you wish. These programmatic approaches provide one overwhelming advantage over the tag property approach - they make it much easier to internationalize your application, as you can use the Windows API to determine the underlying language and select your status and tooltip text accordingly.

Other considerations

SBCEasy tracks the mouse regardless of whether your application is active or not. This means that if you have another application running which is partially covering your application and the mouse moves into your application, SBCEasy will generate a MouseEnter event. You will probably want to display the

tooltip only when your application is active. You can call the `GetActiveWindow` api function during the `MouseEnter` event to determine whether you should display status bar help or tooltips. `GetActiveWindow` returns the window handle of the active Form or MDIForm unless the `SetActiveWindow` api function was used to explicitly activate a different window.

SBCEasy's `TransitHctl` property guarantees that a control handle will be valid only during the `MouseEnter` and `MouseExit` events. Control handles do not change, but controls may be deleted at any time. As long as you know that a control will not be deleted after a `MouseEnter` or `MouseExit` event, it is safe to use SBCEasy's `TransitHctl` control outside of these events.

I believe in standards. The fact that Windows applications now share a common look and feel is, I think, a good thing overall - it really does make things easier for the end user. But standards are not a religion and should not be followed blindly. This point is most often proven by Microsoft - that strongly promotes the user interface standard, yet does not hesitate to change it any time they feel like it (for example, when releasing a new version of Office, Windows, or anything else).

Who said that status bars can have only text? Who said that tooltips must be yellow? Perhaps you would occasionally want a red tooltip to indicate a potentially dangerous operation? One of the nice things about the SpyWorks approach to implementing status bars and tooltips is that while they are only slightly more complex than a standalone control would be, they are typically more efficient and infinitely more flexible. Why, you could even bring up a full dialog for some controls instead of a tooltip if you felt it necessary.

Awards

Awards are nice. Let's face it - it's nice to receive acknowledgment from the press that your products are cool or useful (almost as nice as hearing that from customers!). As a reader, you may wonder - who are these people who give out the awards? After all, any magazine or newsletter can invent an award - who is to say whether it means anything?

That is why where an award comes from is as important to me as the award itself, and that is why I was so pleased that VersionStamper-VB won the Windows Tech Journal "Star-Tech" award for 1994. What does this mean? It means that the editors of Windows Tech Journal felt that VersionStamper-VB was one of the six best Windows development tools of the year - period. The best from among ALL windows development tools - not just those for Visual Basic. J.D. Hildebrand, the editor of Windows Tech Journal, is known to be somewhat outspoken, and always honest - so this award means a lot to me. If you'd like to judge his editorial skills yourself, you might want to check out their new VB-Tech journal - a rather snazzy new publication that includes a focus on third party products and component based software. You can call them at (800) 234-0386 (BTW: this mention was unsolicited).

-Dan

Avoiding Problems With Intercepted Messages in SpyWorks-VB

You may notice that occasional General Protection Faults (or other run-time errors) happen when you try to perform complex actions during Subclass or Hook events. The reason this happens is that the SBC.VBX, SBCHOOK.VBX and SBCKBD.VBX all stop the message handling portion of Windows while an event takes place. If the code within the event takes too long, the messages start backing up, and eventually cause an error. Because the amount of time before an error takes place depends on the number of messages being sent (and therefore on the number and nature of other programs being run at the same time), these kind of errors can be frustratingly rare

Usually, this problem can be solved by receiving "posted" messages, which do not require that the message handler stop during the VBX event. This can be accomplished by setting the Type property to "Posted" in SBC.VBX, or by setting the Notify property to "1 - Posted" in SBCHOOK.VBX and SBCKBD.VBX. There are problems with this method. First, message parameters can no longer be changed. Second, messages can no longer be deleted before being used. Finally, the message is delayed, and may come too late.

A way around this dilemma is to use the PostEvent property and DelayedEvent event in the SBC.VBX control. As an example, we can imagine a user trying to perform a time-consuming editing function whenever the user presses the "backslash" key. The function will not work in the time constraints required by the KbdHook event, but if a posted method is used, the backslash key cannot be prevented from being sent to the text editor. The solution is to split the code in two parts: the quick code that needs to execute immediately (checking that the key received is the correct one and discarding the key) is put in the KbdHook event. Then an identifying long integer is placed in the SBC control's PostEvent property.

```
Sub HookKbd1_KbdHook (keycode As Integer, keystate As Long, shiftstate As Integer, discard As Integer)
    discard = True ` get rid of the backslash
    If keystate And &H80000000 Then GoTo Bye: `ignore KeyUp Event
    HookKbd1.Enabled = False ` accept only one message per keypress
    Select Case keycode
        Case 220 ` backslash
            SubClass1.PostEvent = 1 ` Send a posted message
    End Select
Bye:
End Sub
```

Now the time consuming code (highlighting the last character entered and copying it into the Clipboard) can be put safely into the SBC's DelayedEvent event.

```
Sub SubClass1_DelayedEvent (lvalue As Long)
    If (lvalue = 1) Then
        SendKeys "+{left 1}" `select the last character typed
        SendKeys "^c" `copy selected text to clipboard
        HookKbd1.Enabled = True ` turn the SBCKBD back on
    End If
End Sub
```

Working with Caps-Lock During Keyboard Hooks

When using SpyWorks-VB's keyboard hook to detect hot keys that use the Shift key, you may need to consider the physical state of the Shift key, for example: when detecting cases where the user must hit the Shift key along with another key. Because the state of the CAPS LOCK key can cause keys to be shifted, special detection may be needed to see if the shift key itself is pressed.

For Example, if you want to have a "SHIFT-F10" key as a hot key, you have to detect both the Shift F10 and F10 keys with the keyboard hook. The trick is to call the GetKeyState API function to determine the state of the Caps Lock key during the KbdHook_Event. You can then do an exclusive or with SBCKBD's shiftstate parameter to determine whether the Shift key was actually hit.

This example shows how to detect for the physical state of the Shift key.

```
capslockstate% = GetKeyState(VK_CAPITAL)
If (capslockstate% Xor shiftstate)
Then ... the shift key was physically pressed.
```

Keeping your Form TopMost

You can call the `SetWindowPos` API function to make your Form the topmost form (will always be “on top” of other windows and forms - unless others have also been set to topmost). But under certain situations, Windows and Forms can lose their topmost status (e.g. when minimizing a Visual Basic Form). A `WM_WINDOWPOSCHANGING` message is sent to the window that is losing their topmost status. You can use the SBC control to intercept that message and call the `SetWindowPos` API function to set the topmost status for that window again. `SetWindowPos TopForm.hWnd,`

Dear Marian.....

(Believe it or not, this column is not just a gimmick. The person responsible for producing the Newsletter is, in fact, named Marian, and she really does write this column based on questions that are frequently asked of us. Ed...).

We at Desaware are not afraid of hard questions - even those designed to make us squirm. Here are some of the toughest ones, along with the sometimes painful answers.

Will there be a 32 bit edition of SpyWorks?

Yes. It's hard to do because the operating systems (NT and Windows 95) are completely different, but we are making good progress. There will also be 32 bit OLE control based editions of VersionStamper-VB and the Custom Control Factory, and a 32 bit edition of the Common Dialog Toolkit.

When will the new programs be available?

The new programs depend on 32 bit OLE control technology, which means you need a 32 bit OLE control container to use them. Until we know when those containers will become available, we can't forecast a release date for our controls.

Will there be an updated edition of Dan's book?

You may have found it suddenly difficult to obtain a copy of the Visual Basic Programmer's Guide to the Windows API. No, it didn't go out of print, but there was a problem. You see, most technical books sell a large number of copies when they first come out, then gradually taper off, and the publisher plans accordingly. Things didn't quite work out that way with the VB Programmer's Guide. While it did taper off after the first several months, sales then began to increase and either held steady or grew through 5 printings. In September, it seems that sales jumped again and the entire fifth printing sold out in less than two months (it was supposed to last for at least four). That, combined with a paper shortage meant that the book was out of stock through much of October and November. On behalf of Ziff-Davis Press, we apologize for this miscalculation - it is now available and will remain in print for the foreseeable future.

Dan is currently working on a new book, the Visual Basic Programmer's Guide to the Win32 API. This book is an update to the current book, but is not a replacement. The intent is for the original book to continue to be the 16 bit API reference book, while the new book takes over on the 32 bit development side. Expect it sometime after Windows 95 is released. *(Well, technically it did show up sometime after Windows 95 was released - though perhaps a bit later than I had hoped. Ed.:)*

Congratulations

Please join us in congratulating Franky Wong for being formally named as Vice President of Desaware. Franky has long been performing the duties commiserate with the position as everyone is well aware. Thanks for the helping hand and a job extremely well done.

The Desaware Visual Basic Bulletin

Volume 2 Issue 2

Introduction

Welcome to the third issue of our newsletter. I think this is our most exciting issue yet, largely due to the enormous changes going on now in our industry. Windows 95, Windows NT, Visual Basic 4.0, Office 95, Delphi - how can one keep up?

I've always felt that one of the ways that Desaware distinguishes itself as a vendor is that we are not just in the business of selling components and tools - we are really in the business of teaching programmers what they need to know to do their jobs - to create the best applications possible. Part of that teaching is to provide tools that are not your typical "canned" components, but rather tools that extend the capabilities of the programming environment itself.

For the past year and a half, I've spent most of my time studying (as have the other developers at Desaware), focusing on two areas - 32 bit Windows, and OLE controls. In this issue of our newsletter, you'll see some of the results, with more to follow over the next few months.

One of the things that we are trying follows my philosophy of attempting to provide information along with product. The SpyWorks professional subscription edition addresses a problem we ran into with the original SpyWorks - there is great demand for more information on how to use the product, yet there is no good, economical way to provide it. By offering a software subscription, we can provide to those customers who need it, not only articles and application notes, but new product features that are influenced in a large part by the demands of our subscribers.

This newsletter issue may have a different feel than the past two (if not a different look - I did say we were trying new things!). Instead of a lot of shorter how-to articles, there is a greater emphasis on some of the underlying technology with which we have been dealing over the past year. In the next issue, the focus will return to emphasizing practical tips and techniques. The issue is four pages larger as well, to allow us to include new product information in the newsletter itself.

This is an exciting time for us as I'm sure it is for you as well. For those of you who are already Desaware customers, thank you for your support through the Visual Basic 1.0 through 3.0 generations. I think you'll find us a good source of support in the transition to Visual Basic 4.0, 32 bit and other development platforms. For those of you who are not yet Desaware customers, I invite you to get to know us through our newsletter, online sources or just give us a call. Our approach, style, marketing and types of products may not be typical, but in customer service, product quality and level of technology, I believe (with all due modestly) that we are among the best in the business.

Daniel Appleman

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Structured Storage

Practically every program needs to read and write information to disk. In some cases, the solution is to use a database system. But there are many cases where a database is not appropriate. Sometimes the data that needs to be stored does not fit into the structure of a database - for example: if you were creating a word processor you would certainly not use a database to create document files. In other situations, you might not want the overhead of a database engine in terms of memory, performance, the need to redistribute large database components or require that your end user have the same database system. For all of these cases, a private file format is a more logical approach.

This means that practically every programmer has the problem of figuring out how to organize information within a file. This can be a complex task because of the nature of sequential files. Consider the case where you have to add a single character near the start of the file. This task requires a significant amount of time because even after changing a single character, you have to rewrite the entire file - a substantial performance hit, especially as files get larger.

And of course, the file format would, most likely, be completely incompatible with those of other programs. To retrieve even partial information from a file requires intimate knowledge of the entire file format. For example, to find out how many pages are in your word processing document, you must load the program that created it. As your file size increases, performance will degrade as you find it necessary to rearrange blocks of data within the file.

In order to overcome these problems, Microsoft has devised a new standardized technique for structuring blocks of data within the confines of a single file. This standard is called Structured Storage, and is implemented as part of the Object Linking and Embedding (OLE) subsystem. It allows you to organize blocks of data within a file just as you would organize files on a drive - in a hierarchical structure. The elements analogous to directories are called "Storages" and those analogous to files are called "Streams". A program familiar with the Structured Storage format can browse the contents of any Structured Storage file without having the slightest clue as to which program created the file or what the file contains. And by including a stream containing a standardized data structure, a file can expose useful information to any program that recognizes the standard. A file that follows these standards is also called a "Compound Document". Microsoft Word 6.0 follows this example. It saves its documents in Structured Storage files, and includes a common information stream. When the properties of a Word 6.0 document are viewed in Windows 95, it shows such information as title, author and page count. Again, Windows 95 does not need to know the format of a Word document to do this, and this capability is available to any application.

Because the information in a Structured Storage file is stored in separate blocks of data, it is no longer necessary to write or read an entire file to adjust for minor changes. By saving each page in its own Stream, for example, you need only write the page that was modified. An element within the file can be added, deleted, moved or copied while all other elements remain untouched. This makes it possible to easily perform incremental saves of information in files instead of having to rewrite the entire file each time a change is made. All disk memory allocation is done for you, dramatically simplifying your job as a programmer.

You can even create a Structured Storage within a block of memory. This lets you store information in memory just as you would store it on disk. The Structured Storage system handles all memory allocation for you. In Windows 3.1, you can share this block of memory between programs, creating a powerful method for sharing large amounts of complex data.

Because the Structured Storage uses a different standard than normal DOS file access, any number of storages and streams can be kept open at the cost of only one file handle per Structured Storage file.

Structured Storage implements one other incredibly powerful technology called “transactioning”. If you open a part of the file in transactioned mode, you can make as many changes to it as you wish. At any time you can decide to “commit” those changes and make them permanent, or “revert” them - i.e. cancel them - regardless of how many changes you have made. This makes it possible to easily add “undo” functionality to your applications that work with files.

Desaware’s StorageTools exposes all of the capabilities of OLE structured storage to Visual Basic programmers, bridging the gap between VB’s traditional (and limited) sequential and binary file access, and the use of a full database system.

File Verification under Win32

There are several important changes in Win32 that affect the order applications use to load components. First of all, 32-Bit applications are not required to use a file already loaded in memory by another application. 32-Bit applications may load the file from the same or different path because shared files are no longer shared across all applications in the system. Instead, the shared file is loaded into your application's process space, making it actually part of your application. Second, the registry (or registration database) is used more extensively. The registry replaces the INI files, it is central depository containing all sorts of information. Most OLE controls are expected to register itself into the registry. After being registered, the path and other information for the file would be available to any program that queries for that component. Thus, applications that use a certain component would know where to load the file from.

So, what distribution problems do these changes solve, and what new problems do they introduce?

The ability for 32-bit applications to map a component into its own process space eliminates one of the most frustrating problems dealing with shared components. You don't have to worry anymore about other programs already running with older versions of a component trashing your application. Your application will still check first to see whether the component is already loaded in memory, but only within its own process space, not globally. If the component is not loaded, it will go through the normal search to find the required component and map that component into your own application's process space. One thing to be aware of is that it is now possible to load more than one version of the same dynamic link library (DLL) into your application, a dangerous thing to do if you are not careful.

In Windows 3.1x, components are often stored all over the place. They can be found in the Windows directory, Systems directory, private directories, and directories in the user's path. If different versions of the same component exist, the file that will be loaded may depend on the current directory, or the path environment. Under Win32, files can still be stored in many different directories, but Microsoft introduced the registry to provide a central location for programs to query for the path of a particular file. New components should register itself in the registry so applications that use it can query for the directory to load the file from. Unfortunately, you have no control over what's registered in the registry after you register a component. Other applications can unregister the required component and register the wrong component in its place. Once a component is registered, it must exist in the registered directory with no exceptions. When an application queries the registry for the path of the component, it assumes that it exists in the specified path. If the application does not find it in the specified location, it will not attempt to search for that component anywhere else. In Visual Basic version 4.0, you get an "Error Loading File" message box and it doesn't tell you which file caused the error. The registry also proves to be a very intimidating place to browse manually. Using the Registry Editor to browse the registry for an unfamiliar component may take some time and patience.

Additional file types

So far, what we've discussed focus mainly on DLLs, VBXs and OCXs. There are many cases where applications are also distributed with certain types of databases, licensing files, other executables, and other application critical files. These files must all be in "sync" in order for the application to run properly. VersionStamper is not limited to just checking for DLLs, VBXs, and OCXs. You can embed any type of file into VersionStamper's custom control to check for.

Conditional Verification and Multiple File Lists

VersionStamper allows you to run a verification while your application is loading or at any other time. It can even verify your application before it is loaded, allowing you to catch potential conflicts and maybe even correcting them before your application starts. Each VersionStamper control can embed two list of files. This is ideal when writing applications that will run under both 16 and 32-bit Windows. You can create a list of files based on the files required for the 16-bit version, and a list of files based on the files required for the 32-bit version. You can create additional file lists by adding more VersionStamper controls to your project. There are other situations where the files used by an application may depend on different circumstances. For example, some features of an application may be disabled for a particular user if that user does not have the required hardware or license. Rather than embedding all

the different combinations of file lists into your application, you may want to dynamically create a file list during run-time based on information about the user. VersionStamper allows you to specify the files to verify at run-time.

Conclusion

Using components under Win32 has improved a bit, but many conflict problems can still occur. VersionStamper cannot solve file conflicts, but it does notify you to when they occur and can save you a lot of customer support calls.

The Registry & Why You Would Want To Use It

One of the key features of Microsoft Windows is its ability to be customized to meet the needs of each user. Not only can a user specify color schemes or pictures on the desktop, but programs can (if the programmer so specifies), remember their last location and which documents were most recently used. Since the first version of Windows, Microsoft has recommended that applications store this type of configuration information. To facilitate this task, Microsoft created a common place for this information to be stored: a text file called WIN.INI. Despite a tendency for the file to become hopelessly cluttered, it was sufficient for the first versions of Windows simply because there were so few Windows applications. When Windows 3.0 became popular, the limitations of this single configuration file became apparent. Windows 3.1 introduced the idea of private initialization files - INI files that were private to a single application, or related group of applications. This caused new problems. First, the WINDOWS directory became cluttered with .INI files. Second, if for some reason users wanted to change a configuration item, they would have to wade through pages of unorganized values. Finally, it became difficult for programs to learn about or to modify other programs. With the introduction of Dynamic Data Exchange (DDE) and Object Linking & Embedding (OLE) - both of which are essentially technologies for communication between programs - it became clear that a new standard for configuration storage would have to be designed.

The result was the Registration Database. You can explore it yourself with the REGEDIT.EXE program that should reside in your WINDOWS directory. It was designed to overcome some of the problems that resulted from the explosion of .INI files. It was a single database that was supported by Windows and was accessible to all programs. Information that should be commonly available (such as describing DDE links, or describing types of files based on extensions) could now be kept in a central repository. Information could be stored in hierarchical form, allowing complex relationships between values to be stored, as opposed to the flat organization of .INI files. The database itself was in binary form, allowing quicker access. However, it was still limited to 64K in size, and it was not meant as a complete replacement for .INI files.

With the creation of Windows NT, a new, massive, powerful, centralized configuration system was developed. It is called the Registry. While based upon the Registration Database, the Registry does far more. It completely replaces the WIN.INI and SYSTEM.INI files, and is the recommended location for storing other program's configuration information. Values placed in the Registry it can be in a variety of formats, unlike the Registration Database or .INI files, which can only store strings. Any single value can hold up to a megabyte of information, and the Registry itself can hold more information than you'd ever care to put into it. It is implemented as a number of separate binary files called "hives". These hives are formatted and specially buffered to allow speedy access.

Windows 95 also uses a Registry very similar to Windows NT's, although the operating system does not depend on it nearly as much. Although the WIN.INI file exists, and is used, it can be deleted without harming Windows 95's ability to operate.

While it might take some work to convert your program from using initialization files to using the Registry, you will gain a number of advantages. The Registry is often faster and more robust than accessing a large text file, and registry entries are less likely to be deleted by accident than a text file. The Registry lets you easily store separate configuration information for each user. It is the key for integrating your program with the Windows 95 shell.

While the Registry can be accessed using API calls, Desaware's new StorageTools contains a new OLE control that uses a file-system metaphor to access the Registry - an approach that is both familiar to Visual Basic programmers, and far easier to use. But regardless of how you choose to work with the new system Registry - your applications can't afford to ignore it. It forms the foundation for both system and application configurations under both Windows NT and Windows 95.

Upgrades Upgrades Upgrades

SpyWorks 2.0 to 2.1 VersionStamper 1.0 to 4.0, Custom Control Factory 2.0 to 4.0

First the free stuff. If you purchased SpyWorks, VersionStamper or Custom Control Factory after August 1, 1995, you are eligible for a free upgrade to version 2.1 or 4.0 respectively. To take advantage of this offer you must send us a copy of your original sales receipt (via mail or fax) with your order. Please be aware that there is a shipping/handling charge of \$7.50 per order (U.S. and Canada orders) or \$15.00 (international orders) . This offer is valid until January 31, 1996 and available only from Desaware.

For those customers who registered for our free Custom Control Factory upgrade earlier this year, your free copy of the software will be sent automatically. Please contact us, if you have not received you software by December 1, 1995.

Now for those customers who are not eligible for the free upgrade, we have modestly priced the cost of upgrading to SpyWorks 2.1 at \$45, VersionStamper 4.0 at \$79 and for Custom Control Factory \$24, plus shipping/handling and applicable sales tax.

SpyWorks 2.1 to 4.0 Professional or Standard Edition

Upgrading to SpyWorks 4.0 is a two step process of first upgrading to SpyWorks 2.1 and then to 4.0 Professional or Standard as warranted. The upgrade process has been structured in this way to insure that our customers have the most current software.

Our suggestion is to take advantage of the SpyWorks Professional edition which includes the one year subscription service for upgrades. We have priced the upgrade accordingly (and affordably at \$165). Take a few moments and review the SpyWorks series article on page 12, we think that you will agree that the subscription service will keep you up to date with a minimum of effort on your part with the latest features and controls.

Is Visual Basic 4.0 Any Good?

(I had the privilege of being one of the two featured speakers for the Visual Basic 4.0 launch at the Microsoft Developer's Days Santa Clara Venue. The following comments formed the basis for my session introduction.)

How does one judge a computer language? You may have already seen articles in the weekly magazines that preview Visual Basic 4.0 and proceed to judge it. Is it better or worse than expectations? How does it match up with the forthcoming 32 bit Delphi? With C++? With other development environments? You will undoubtedly see more of these articles in the months to come.

By what criteria do these magazines make their judgements? Performance is certainly one criteria. Features lists - those ubiquitous lists of features with checkboxes are also frequently used. Still, I wonder if the way the media judges this type of products is not overlooking something.

Allow me to share with you an insight that I gained several years ago when upgrading from Word for Windows 1.0 to 2.0. I liked version 1.0. It was easy to use and straightforward. As an author, I am more interested in content than features, so I rarely used some of the more esoteric features - the "bells and whistles" of the program. When I did need to do something special in the way of operation or formatting, I would look up the information in the manual, figure out how to do it and move on.

The upgrade to 2.0 went smoothly - it was several months before I noticed something interesting. In all of the time since the upgrade I had not needed to use the manual once. Never. Occasionally I would use the online help for a specific task, but even that was highly unusual. At the same time I had started working with Microsoft PowerPoint. Not only did I never crack the manual for that product - I never used the online help either. You see, while everyone was judging these products or upgrades on the features that they provided, they typically failed to see the most important change: these programs were truly intuitive. The real thing - not a marketing buzzword. Someone at Microsoft has figured out how to write software that meets the real needs of users and that is truly intuitive - and hardly anyone has noticed it. This is the real reason that Microsoft Office has become such a success. It's not just marketing - it's great software.

So before we look at the bulleted feature list for Visual Basic 4.0, allow me to apply this insight to what you are about to see. It is my considered opinion that the Visual Basic 4.0 team has created the language that most VB programmers really need. It may not yet be everything they want. It may not match other tools feature for feature. But many of the new features are truly significant, and many of the missing ones are irrelevant.

Here's an example: more than one programmer has complained to me that Visual Basic 4.0 does not allow creation of multithreaded applications. In most cases I look at the skill level and experience of the individual and tell them that they should be grateful. Those who hear about multithreaded programming and understand it in principle know that it is a great way to allow an application to perform several tasks at once. Those of us who have done multithreaded programming know that it is often a nightmare of biblical proportions - tough to design properly and nearly impossible to debug. Should Microsoft have included multithreading in a tool for programmers, many of whom are only now starting to understand and write event driven software? You must be kidding. Maybe someday Microsoft will figure out how to make Visual Basic multithread in a way that is easy to understand and debug. Until then - lets be glad they left it out.

But wait, you ask. Who is Microsoft to play big brother and protect us from our own mistakes? Have them put the feature in and let the programmer beware! Ah, you see - you also have fallen in to the trap of looking solely at features. You've forgotten what Visual Basic really is. Here's a reminder: *Visual*

Basic is first and foremost a Windows programming language that is safe, efficient and powerful.

Let's take these one at a time. It is a programming language. Not a database tool, though it does that extremely well. Not a glue for OLE components and other OLE enabled applications, though it does that well also. It is a programming language. You will see that many of the most important new features, from line continuation characters to classes directly address features that a serious programmer wants in a language.

Safe - With all of the changes and improvements, Visual Basic 4.0 has not lost sight of this all important philosophy - Visual Basic does not just let you recover nicely from General Protection Faults and exceptions. It does not let them happen in the first place. Errors in your code do not cause system faults - they cause VB errors, and VB tells you where and why it occurred and how to fix it. If you have ever done Windows development using C++, you realize what a miracle this is.

Efficient - Easy to use - how do you measure this? The truth is, I can still write a program in Visual Basic in substantially less time than any other language or environment - period. You can argue features all day - when I need quality software written quickly, Visual Basic is the obvious choice. And since I rarely need quality software written slowly... well, you get my drift.

As for powerful - well, that really is the subject of the rest of this presentation.

Before that - As you look at the new features for Visual Basic and evaluate the product in the context of your own needs, I encourage you to keep this thought in perspective. In Visual Basic 4.0, Microsoft has not lost sight of their vision of what Visual Basic is - a windows programming language that is safe, efficient and powerful. In this context, and for this, as a developer, I am grateful.

Under The Hood: Inside a Subclasser

Subclassing is only a small part of the overall SpyWorks package, but it is perhaps the best known. Part of the reason for this is that subclassing is, itself, a very widely used and well known technology. In fact, there is every possibility that you will run into demo or shareware subclassing controls on book disks or online. This naturally raises the question: "is there anything unique about the SpyWorks subclassers, or is subclassing such a simple and routine task that they are basically all the same?" Before you stake your project on any subclassing control, there are some questions that you should ask and features that you should investigate. The stakes are high - subclassing is by its very nature adds a level of risk to your software, making it much easier for your program to crash itself or even the system, not to mention impair performance significantly. You want your control to be designed to limit and control the amount of risk that you take and have a minimal impact on your application and on the system.

Message Filtering

I once got into a long discussion with someone who wrote a simple subclassing control that triggered a Visual Basic event for each incoming message, in which he suggested that this was not a problem and had no significant impact on performance. It is true that there was no measurable impact as long as there was no code in the subclassing event, but as you can imagine, as soon as code was added the situation changed. The last thing you want is to execute Visual Basic code for every incoming message, most of which you do not need.

A good subclassing control should provide a filter that triggers VB events only for those messages that you specify. The SpyWorks subclassers place this filter at the very lowest level where the hook occurs, minimizing the amount of code that runs for messages that are not in the filter list. In fact, due our unique architecture which uses a separate subclassing engine, messages that are not in the filter list do not even make it to the OLE Control or VBX - they are blocked in the low level DLL.

Multiple Windows

There are cases where you may wish to subclass multiple windows. Every control on a form uses memory and resources both from the system and from the container. It is only reasonable for a subclassing control to be able to subclass multiple windows. Of course, in some cases you may wish to use a hook to intercept messages on a form, task or systemwide basis - a capability that is not supported by subclassers, but which is part of the SpyWorks hook controls.

Posted Detection

When you subclass a message, your code is executed as part of the message processing. This means that your application, and receipt of all further messages by the application, is suspended until you have finished processing the message event. This means that in general you should keep code within message events to a minimum. But what about cases where you don't really need to process the message - all you need is a notification that the message was received? In this case the ideal situation would be for the subclasser to simply record the message as received and then let it complete processing, while posting the notification so that it is received later by your control. You can then handle the message during the course of regular message processing.

Another important issue is that there are some operations that are not allowed during the handling of certain messages. For example: attempting to change the focus during a focus change message can be fatal to your application. Deferred message processing allows you to completely ignore these concerns, since by the time the message is received you have already exited the critical message processing code.

The SpyWorks subclassers all allow a “posted” detection mode which defers triggering of the message information until normal message processing is taking place. SpyWorks also has a built in self-posting mode which allows the control to post a message to itself for later operation. This allows you to execute a small amount of critical code during the initial interception of the message, then post a notification so that further code can be executed later.

Default Processing Control

If you did not subclass a window, the default window function for the window would execute. Your subclasser should be able to intercept the message either before or after the default window function executes. If you intercept the message before the default function, you should have the option to prevent the default function from executing. If you intercept it afterwards, you should have access to the result returned from the default window function.

Cross Task Capability

What if the window that you want to subclass belongs in another task? Under 16 bit windows, this was not terribly difficult to accomplish (though there are some subtleties to it that can cause designers who take the obvious subclassing implementation approach to fail under certain conditions). But under 32 bit Windows (NT and Windows 95), cross task subclassing is much more complex. The `dwsbc32.ocx` 32 bit subclasser handles cross task subclassing without any difficulties, and provides you with additional information for each message and support functions that let you easily interpret the contents of out of task messages.

Paranoid Design

Subclassing may be simple in concept, but things can get complicated quickly in a real program, especially in Visual Basic where a window may be subclassed by several different controls or add-ins at one time.

What does this mean? It means that a subclasser must carefully keep track of when it is safe to remove itself from a subclassing chain. It must not only be careful to cooperate with other subclassers (so that they continue to function correctly), but must be paranoid itself - check its own state on each message to make sure that another, less sophisticated, subclasser has not made the function addresses that the initial subclasser utilized invalid. And it needs to do so in a way that takes little or no effort on the part of the Visual Basic programmer.

In addition to protecting you from the side effects of other subclassing that may be in effect, Desaware's subclassers have a unique architecture that protects you from itself and allows you to subclass as many windows as often as you would like without any concern for these kinds of interactions. SpyWorks is the only package that divides the subclassing operation into two components: a high level OLE control or VBX and a low level subclassing engine (`dwspy32.dll` or `dwspydll.dll`). All subclassing is done through the subclassing engine which internally monitors which applications and controls are performing a subclass operation. Under SpyWorks, you can subclass a window hundreds of times, using different configurations and messages, and do so from several different applications at once, and be assured that no matter what you have done - the subclassing engine has actually subclassed the window just once. So from the point of view of the system and other controls, the subclassing engine always appears as a single subclassing instance. It is the responsibility of the SpyWorks subclassing engine to arbitrate between the SpyWorks controls and trigger their events. This architecture minimizes the chance of dangerous interactions that can destabilize your system. This architecture is also used by the SpyWorks controls that perform windows hooks.

Developer's Motivation

Wait a minute: how can the developer's motivation have anything to do with the implementation of a subclasser? Besides: the developers are doing this just to make money, right?

It is true that motivation may not have the most direct impact on code implementation, and it is also true that the developers who work at Desaware have mortgage, rent and car payments.

But consider this: The SpyWorks subclassers (and other components) were not created as part of a hobby just to see if it can be done, then posted as Shareware to see if anyone was interested. They were not thrown together in order to demonstrate a few principles in a book and thrown on a book disk to help people feel that it was a better value.

The SpyWorks controls were created first and foremost for use in Desaware's own commercial grade Visual Basic applications. They were created because we refused to accept any limitations on the part of Visual Basic. They were created for ourselves - and we would no more compromise on the quality of our components than you would.

Support

Which brings us to a final, but all important factor for any serious developer. Once you start using a subclasser, things can get complex quickly. It takes a great deal of information to take full advantage of this and other low level techniques. It takes sample code. And sometimes it takes a person that you can call or send Email to to get you over the rough spots. We're very proud of the quality of our technical support, and continue to strive to make it better. We've been know to turn around bug fixes when necessary in a matter of days and sometimes hours (no waiting for the next version - we know that your project depends on our components, and we take that responsibility extremely seriously). Advanced components and developer's tools such as SpyWorks is our full time business. We think that when you look under the hood at a subclasser or any other software component, the company that develops and services that component makes a huge difference.

Dear Marian.....

When will Dan's 32 bit Programmer's Guide be available....

I am sure that as soon as possible will not suffice in this instance. Okay, Dan's book should be released by the end of 1995 or early first quarter of 1996. I know that everyone would like a specific date (next week would be greatly appreciated) but honestly, the man has got to sleep sometime. We have kept Dan fairly busy lately in the office with such things as code and manuals, not to mention trade shows and speaking engagements. In the mean time, we promise to have an excerpt from the book in the next newsletter. Give us a call in December to reserve your copy!

How many newsletters have been published and when is the next one due?

Quite honestly, I need to sleep sometime too! This is newsletter number three. Feel free to contact us if you are missing one of the earlier editions. At this time, (programmers know that nothing is ever set in stone) the newsletter will be published three times a year with the next edition scheduled for (oh my heavens!!) January 1996.

When will new versions of the software be available:

As of this publication SpyWorks 2.1 which is the VBX based upgrade for SpyWorks 2.0 is currently available. Spyworks 2.1 contains the latest VBXs. The OCX (32 bit) version, which is SpyWorks 4.0 Professional Edition, will be available the first week of October in addition to VersionStamper 4.0 and our newest product StorageTools. We will also be offering a software suite which includes SpyWorks 4.0 Professional, VersionStamper, StorageTools, and Custom Control Factory.

What is the difference between SpyWorks Standard and SpyWorks Professional?

SpyWorks 4.0 Standard is the OLE control version of the software, whereas SpyWorks 4.0 Professional contains the VBX and the OCX version. In addition, 4.0 Professional edition is a subscription, so not only are you purchasing the current OCX controls, but you are also going to receive three updates during the course of the year (to be sent approximately every three to four months). We understand that as software developers it is imperative that you have the most current controls and information for use in developing your applications. Upgrading to SpyWorks 4.0 Professional edition will allow you to do just that for just \$165.00.

The SpyWorks Series

Those of you who have worked with SpyWorks since it first appeared may remember how the product evolved to meet the needs of customers and address issues that arose as we (and our customers) tried to perform new tasks with the product.

One of the first things that we realized when undertaking this new edition is that in a very real sense we are back at square one. The operating systems we are working with are new. The containers (Visual Basic and others) are new. The tasks that need to be accomplished are relatively unknown.

In an ideal world, we would be able to take a year or so to develop the product after the platforms were stable (that's how long it took to do the original product), but obviously that is unacceptable - Too many people depend upon and require SpyWorks today for their own products.

This tradeoff - the demand to meet customer needs along with the lack of information of what this product ultimately needs to be, lead to a somewhat different approach with this version.

Initially, the 32 bit OCX product will be part of a professional/subscription package - those who sign up will receive updates every 3 or 4 months that add new features and address those issues and bugs that arise under both Visual Basic and other OLE control containers. It will also provide a way to offer application notes and other advanced information as we learn them. Subscribers will be assured of always having the latest of everything - VBX, 16 bit OCX, 32 bit OCX, application notes, newsletters and so forth. At \$249, we think this will provide an excellent value for the professional Visual Basic programmer.

Once we have a core set of controls that we are happy with, we will start shipping a standard OLE control edition that corresponds roughly to the current SpyWorks package with all of the core controls but without some of the utilities. This \$129 package is targetted for more casual users who need to perform specific tasks but are not interested in taking advantage of new features, new platforms or learning more advanced techniques as information becomes available.

We haven't forgetton those people still using Visual Basic 3.0 or who are focusing on 16 bit Visual Basic programming. SpyWorks-VB 2.1 is an upgrade of the classic VBX based product. The primary focus of this edition is full compatibility with Visual Basic 4.0 and Windows 95. It provides a number of new features as well. This package will continue to sell for \$129, and is available to current SpyWorks users for only \$45 (or, upgrade to the full professional edition for \$165 and receive not only the upgraded SpyWorks 2.1, but the full OLE control product and annual subscription!).

Three different editions of a product is a bit more complex than we would like, but it seemed the best way to meet the needs of our many customers who range from individual college students to Fortune 500 corporate sites.

Finally, for thow who are really looking for a deal, check out our new Professional Developer's Suite which includes the professional edition of SpyWorks, StorageWorks-VB, VersionStamper and Custom Control Factory. All this available directly from Desaware for only \$429, a savings of over \$100 as compared to purchasing the products separately.

Current Affairs

We've moved...

Just in case you haven't noticed we've moved. Our new address is:

**Desaware Inc.
1100 East Hamilton Avenue, Suite 4
Campbell, CA 95008**

We will continue to receive mail at our old address through the end of the year, but we would appreciate it if you would take a moment to change your records now.

Our phone and fax number remain unchanged.

Come cruise with us!

Check out our new home page on the web. It includes the latest product information and demos. Our address is:

[HTTP://www.vbxtras.com/~desaware](http://www.vbxtras.com/~desaware)

You are also welcome to visit our forum section on Compuserve, "Go Desaware"

Welcome to Karyn Duncan

We would like to welcome our newest staff person, Karyn Duncan. Karyn will be answering phones and processing orders (among several other things of course!). Feel free to say hello and welcome her to the company next time you call!

A tearful good-bye to Matt Solnit, one of our summer interns, who is off to U.C. San Diego to study something that can't possibly be as important as working for us.

Special Opportunity:

Now you can own one of the original cards from the card house in the VersionStamper ad featured in the Visual Basic Programmer's Journal & the Visual Basic Technical Journal. These collector items are available for you at a modest price of 5\$ per card. Yes, this card comes with a Desaware label on it and proceeds will be donated to the Crippled Children's Society of Santa Clara County. Own a piece of history, and help us get rid of all these cards.....{Please!}

Ordering Info

If you are a registered owner of any Desaware products, you will continue to receive these newsletters when published. All others will receive future issues only if we hear from you - just mail or fax this form back requesting a free subscription.

The Desaware Visual Basic Bulletin

Volume 3 Issue 1

Introduction

Welcome to the fourth issue of our newsletter. The first thing you'll notice is that the wait for this issue was much shorter than last time. We are trying to come out with 3 or 4 issues a year. One thing that we are considering is whether or not to switch to online distribution - via Email or a World Wide Web site. What do you think? (send comments to 74431,3534 on Compuserve or 74431.3534@compuserve.com) or drop us a postcard.

Among the technical articles you'll find in this issue include an intriguing way to use OLE structured storage to create self-persistent classes (classes that save and restore themselves - a great way to design a reliable document format). Also a way to place your logo (or any other picture) in the client area of an MDI form.

And on the product front, this is the first announcement of the new Desaware API Class Library - the easiest way to use the Win32 API (and the best way to learn it, since we provide all the source code!). And yes, at long last, the Visual Basic Programmer's Guide to the Win32 API is at the printers. It's been a lot of work, but at long last all of our 32 bit OLE control products are shipping and available - and we're even offering a developer's suite that can save you quite a bit on what I think are some of the coolest tools in the business. So dive in and enjoy!

Daniel Appleman

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Product Information:

(Note: These are the original product descriptions as they appeared in the newsletter. For more detailed information, refer to the [Desaware online catalog](#))

[SpyWorks 4.0 for 16 and 32 bit OLE Containers](#)

[StorageTools Version 1.0](#)

[VersionStamper version 4.0](#)

[The Visual Basic Programmer's Guide to the Win32 API](#)

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Creating Custom MDI Form Backgrounds

Many programmers take advantage of the Multiple Document Interface (MDI) standard as the basis for their application. As nice as MDI forms are, if you use them you are stuck with the bland, plain solid background color offered by Visual Basic. The other day I received a message from a programmer who said that if only we offered a control that would let him put a custom logo or picture on the MDI form background, he would be the first to buy it.

I had to disappoint him, because as you will soon see - SpyWorks has supported this capability for ages, and now supports it under 32 bit VB4 as well.

After several false starts (which are described in chapter 17 in the Visual Basic Programmer's Guide to the Win32 API), I came up with the following code that works very nicely.

Add a picture control to an MDI form at the top or bottom if you don't have one already - you'll need it to hold the dwsbc32.ocx control. Don't worry if you don't want the picture control to appear in your application - you can simply turn the Visible property for the control to False to hide it. Load a bitmap into the picture control (or a second child picture control). Drop a dwsbc32.ocx control on the first picture control and use the Messages property to intercept the WM_ERASEBKGD message. We're going to completely take over the background drawing for the MDI form. Set the Type property to Pre-Default. The declarations you'll need are shown in Listing 1. In this example they are declared as private declarations for use in the MDI form code. You can also declare them as public and place them in a module.

In the form load event for the MDI form you'll need the following code:

```
SubClass1.HwndParam = GetWindow(hwnd, GW_CHILD)
Form1.Show
```

What's going on here? Every MDI form actually consists of two windows. The background area of the form is a separate window from the MDI form - it is a window with the class MDIClient. The hwnd property for the form returns the form window handle, but we need to subclass the MDIClient window - thus we use the GetWindow function to retrieve the handle to the child window.

The real work is done by the SubClass1_WndMessage event. The device context for drawing is provided as the wp parameter for the function. Normally, this device context has a clipping region set so that only those areas that need to be drawn are accessible by the device context. In this case, we must clear the clipping region because we need to override the normal scrolling operation provided by the form. (Try commenting out the SelectClipRgn function and see what happens when you scroll the MDI form.)

We create a temporary compatible device context and select into it the handle of the bitmap that we want to display. The FillRect function draws the main background area (outside of the bitmap area). The BitBlt function copies the bitmap into the desired location on the form.

Note how the bitmap and compatible device context are cleaned up after they are used. The retval event parameter is set to True to notify Windows that the background has been erased. The nodef event parameter is set to True to prevent the default WM_ERASEBKGD message processing from taking place.

Figure 1 shows the results. The sample code can be found on the CD-ROM that accompanies the VB Programmer's Guide to the Win32 API.

Listing 1

```
Option Explicit
GetWindow() Constants
Private Const GW_CHILD = 5
Private Declare Function GetWindow Lib "user32" (ByVal hwnd As Long, ByVal
wCmd As Long) As Long
Private Declare Function CreateCompatibleDC Lib "gdi32" (ByVal hdc As Long)
As Long
Private Declare Function GetDC Lib "user32" (ByVal hwnd As Long) As Long
Private Declare Function ReleaseDC Lib "user32" (ByVal hwnd As Long, ByVal
hdc As Long) As Long
Private Declare Function DeleteDC Lib "gdi32" (ByVal hdc As Long) As Long
Private Declare Function SelectObject Lib "gdi32" (ByVal hdc As Long, ByVal
hObject As Long) As Long
Private Declare Function BitBlt Lib "gdi32" (ByVal hDestDC As Long, ByVal
x As Long, _
ByVal y As Long, ByVal nWidth As Long, ByVal nHeight As Long, ByVal hSrcDC
As Long, _
ByVal xSrc As Long, ByVal ySrc As Long, ByVal dwRop As Long) As Long
Private Declare Function GetObjectAPI Lib "gdi32" Alias "GetObjectA" (ByVal
hObject As Long, ByVal nCount As Long, lpObject As Any) As Long
Private Declare Function GetClientRect Lib "user32" (ByVal hwnd As Long,
lpRect As RECT) As Long
Private Declare Function DeleteObject Lib "gdi32" (ByVal hObject As Long)
As Long
Private Declare Function FillRect Lib "user32" (ByVal hdc As Long, lpRect
As RECT, ByVal hBrush As Long) As Long
Private Declare Function SelectClipRgn Lib "gdi32" (ByVal hdc As Long,
ByVal hRgn As Long) As Long
Private Declare Function ExcludeClipRect Lib "gdi32" (ByVal hdc As Long,
ByVal X1 As Long, ByVal Y1 As Long, ByVal X2 As Long, ByVal Y2 As Long) As
Long
Const COLOR_BACKGROUND = 1

Private Const

Private Type RECT
    Left As Long
    Top As Long
    Right As Long
    Bottom As Long
End Type
` Bitmap Header Definition
Private Type BITMAP
    bmType As Long
    bmWidth As Long
    bmHeight As Long
    bmWidthBytes As Long
```

```
        bmPlanes As Integer
        bmBitsPixel As Integer
        bmBits As Long
End Type
```

Listing 2

```
Private Sub SubClass1_WndMessage(hwnd As Long, msg As Long, wp As Long, lp
As Long, retval As Long, nodef As Integer)
    Dim tdc&
    Dim usedc&
    Dim oldbm&
    Dim bm As BITMAP
    Dim rc As RECT
    Dim offsx&, offsy&

    ` Get a DC to draw into
    usedc = wp
    ` Create a compatible DC to use
    tdc = CreateCompatibleDC(usedc)

    ` Gets the bitmap handle of the background bitmap
    oldbm = SelectObject(tdc, Picture1.Picture)
    Call GetObjectAPI(Picture1.Picture, Len(bm), bm)
    Call GetClientRect(hwnd, rc)
    ` Decide where to place the MDI client logo
    offsx = 20
    offsy = 20
        ` Set the clipping region to the entire window -
    ` necessary because the hDC provided has a clipping
    ` region set.
    Call SelectClipRgn(usedc, 0)

    ` We exclude the bitmap area - this reduces flicker (try removing it)
    Call ExcludeClipRect(usedc, offsx, offsy, offsx + bm.bmWidth, offsy +
bm.bmHeight)
    Call FillRect(usedc, rc, COLOR_BACKGROUND)

    ` And restore the clip region before painting the bitmap
    Call SelectClipRgn(usedc, 0)

    Call BitBlt(usedc, offsx, offsy, bm.bmWidth, bm.bmHeight, tdc, 0, 0,
SRCCOPY)

    Call SelectObject(tdc, oldbm)
    Call DeleteDC(tdc)
    nodef = True
    retval = True
End Sub
```

SpyMem

Have you ever wondered how much memory and how many resources are being used by your application? Have you ever wanted to find resource leaks - in which your program (or others) allocate resources but fail to free them? Have you ever wondered what DLLs or VBXs your application has loaded? SpyMem has the unique capability of being able to take a snapshot of your current system state, be it global memory, resources or loaded modules. This snapshot is taken by displaying the list that you are interested in and clicking on the "Set Reference" button in the SpyMem main window.

You can then perform any operations, and later compare the system state with the saved reference. The comparison displays a list of items that are not present in the reference list. This feature can be applied in several ways. by taking a snapshot before you run your program and comparing the module list afterwards you can obtain a list of new modules that were loaded by your applications, make it possible to detect DLLs and VBXs that were newly loaded by your application. You can take a snapshot of system resources before running your program, then run the program, close it, and perform a comparison. This will give you a list of resources that were created during the load and exit process that were not freed. These may be caused by a resource leak. SpyMem's ability to obtain detailed information about resource heap objects can be very helpful in identifying the exact resource that is not being released (for example: not only will SpyMem identify an object as a bitmap, it lets you view the bitmap. A pen is not just identified by type, but by color as well).

SpyMem has been improved for the current version of 2.1 and 4.0 Professional. It includes the ability to display detailed statistics about the GDI resource heap such as the percentage of the allocated heap used, number of objects, number of objects of each type, etc. Filtering will make it possible to list memory blocks for a single application, allowing you to focus on the task at hand. A new footprint analysis tool will automatically take a snapshot of global memory and the GDI and User heaps, launch a specified application, and display a summary of the memory and resources used in loading the application, allowing you to determine the demand of an application on the system.

Current Affairs

Things They Are A Changin'

We would like to announce that as of January 1, 1996, we have changed our name to:

**Desaware, Incorporated
1100 East Hamilton Avenue, Suite 4
Campbell, CA 95008**

Our phone and fax numbers remain unchanged.

When you update your records, don't forget the address change which we announced in our last newsletter. Thanks.

Come cruise with us!

Check out our new home page on the web. It includes the latest product information and demos. Our address is:

[HTTP://www.vbxtras.com/~desaware](http://www.vbxtras.com/~desaware)

You are also welcome to visit our forum section on Compuserve, "Go Desaware"

On the road again

We will be exhibiting at the following venues in the near future. Stop by and say howdy!

San Francisco February 12-14

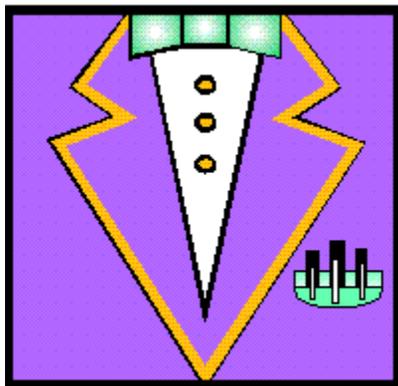
StorageTools Garners a Star Tech and a Techie Award

We would like to thank the editors of Windows Tech Journal for awarding StorageTools the Star Tech Award for 1995. This award was given to just *four* products in recognition of outstanding innovation, significance and usefulness as a software development tool for Windows programmers. The citation appears on page 27 of the December 1995 issue of Windows Tech Journal.



We are also proud to announce that StorageTools was one of *six* products awarded a Techie Award as one of the very best new products of the year for Visual Basic programmers. This from the editors of VB Tech Journal. The article appears in the December issue of VB Tech Journal on page 16.

Thanks again for both honors.



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VB TECH
JOURNAL
TECHIE
AWARD
PRODUCT
EXCELLENCE

The Visual Basic Programmer's Guide to the Win32 API

The original "Visual Basic Programmer's Guide to the Windows API" has, thanks to your support, gradually become one of the standard references for Visual Basic programmers. It is also the unofficial "real" manual for Desaware's SpyWorks. The tie in between the two is not surprising, and it goes beyond the fact that I am both the founder of Desaware and author of the book. Both the book and SpyWorks have one primary goal: to empower Visual Basic programmers by giving them the information and tools to tap into the full power of Windows from their Visual Basic applications.

As this newsletter goes to press, the book is in the final stages of production and on its way to the printer. I realize that many people wish it were available earlier, with the arrival of Visual Basic 4.0 - but allow me to point out an often unspoken but obvious fact. *Any VB4 book that is available within a few days or weeks of Visual Basic 4.0 cannot possibly be based on the final released version of VB4!* It takes time to write a book, and typically takes at least a couple of months after the author has done his job for the book to get into print and become widely available. Even a multi-author work, which can be written quickly, cannot be available with the product and be 100% accurate. Visual Basic 4.0 underwent significant changes close to the release date. I decided, for better or worse, that the VB Programmer's Guide to the Win32 API would be based on the final VB4, Windows NT 3.51 and Windows 95 products - even though that meant that it wouldn't appear until several months after VB4 shipped.

That said, allow me to add that I am very excited by the results, and I think that you will be as well. The amount of explanatory text has increased substantially (I like to think that I've learned a thing or two about writing in the past few years). The number of examples has increased dramatically. There is a great deal of information on porting applications from 16 bit and writing applications that will run on both 16 and 32 bit platforms. There are sections that explore the internal workings of Visual Basic with regards to API calls. It is an almost complete rewrite of the 16 bit book, yet the overall structure remains the same. I don't have the final page count yet, but it's big - very big. Even though the emphasis was on making the core book better - there are a number of cool new features that I think you'll be very pleased with. Here's a short list:

CD-Rom with a full text searchable edition of the book: Let's face it - it can be hard to find something in a large book even if you know where things are. A text search can make an enormous difference.

The Desaware API Class Library. Yep, Desaware has come up with an API Class Library (or object library, if you will), that encapsulates large parts of the core API. SpyWorks Professional customers will gain the full benefit of this library (as they will receive the latest edition 3 times/year along with new advanced classes for subclassing and other functionality). But a large portion of the core API classes (dwSystem, dwWindow, dwHDC, dwDevice context etc.) are included with the book. Not only that - but they are included with full VB source code - so even if you prefer not to use a full class library, they serve as a source of examples of how to implement hundreds of functions.

The Desaware API Toolkit. A number of goodies here including: An API text viewer that works as a VB add-in, supports 32 and 16 bit conditional compilation, and includes full source code. An API database that fixes a number of errors from the win32api.txt file (well, hundreds of errors, actually - but who's counting?).

Other cool things. Some articles I've written in the past. Some demo controls. Some video clips intended to help explain tough concepts. And whatever else I thought you might enjoy.

And for those of you who were at VBbits Florida and were surprised by the \$59.95 price on the flyer -

good news, I was succesful in convincing the publisher to lower the price to \$49.99. Add to that the 20% discount that you can get by ordering the book directly from Desaware, and I think you'll find it one of the best values around.

So stay tuned and watch for it (or even pre-order) - it should be available very soon. And in the meanwhile for those of you who don't yet have the original Visual Basic Programmer's Guide to the Windows API and are wondering if you should get it - it's your call. If you don't need to do 16 bit API programming, wait for the new one. But the Win32 book does not cover Win16 at all - other than in the context of porting software or writing software that is compatible with both platforms - so if you are still doing 16 bit programming, that is the book you'll need even after the Win32 book is available. The 16 bit version of the book is currently available from Desaware at \$27.96 plus shipping & handling.

Subclassing and Process Spaces under Win32

(Portions of the following article are excerpted from the Visual Basic Programmer's Guide to the Win32 API..)

You've probably heard that Windows 95 and Windows NT are considerably more stable than Windows 3.x. But what does this really mean? To a large degree it means that it is much more difficult for one application to crash another application or the entire system. Under Windows NT it is nearly impossible. Windows 95 is not quite as stable, but it is still better than 16 bit Windows.

How is this stability accomplished? One of the most important mechanisms has to do with the way Windows organizes memory. This is something that most Visual Basic programmers rarely need to think about, but it is both interesting, and important to know when you start working with 32 bit subclassing and hooks.

Imagine, for a moment, that you have a system with 16 megabytes of memory. The physical addresses of memory will range from address 0 through &H1000000. For now we'll ignore the issue of virtual memory, in which the hard disk is used to simulate additional memory. Purists will also note that this discussion will ignore the implications of the segmentation architecture used under Windows 3.x - an issue which would complicate the subject considerably and distract from the principles that are the focus of this article.

In this example assume that three programs are running, the Program Manager, File Manager and a user application. Under Windows 3.x, they might be organized in memory as shown in Figure 1. A couple of system dynamic link libraries are shown as well. Each of these modules needs to access memory in the normal course of running, and uses pointers internally to reference locations in memory. If the program is working correctly and has no bugs, it will never try to access memory outside of the memory space that is allocated to it (except under certain special conditions, as you will see). However, if something goes wrong or the program has a bug that gives one of these pointers an invalid value, it is possible for the program to write into the memory belonging to another application or even the operating system. This means that one application has the potential to corrupt memory on a systemwide basis.

Figure 1: Allocation under Windows 3.x

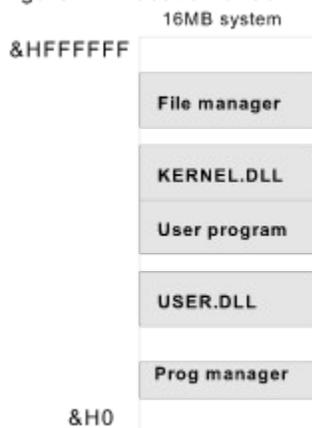


Figure 1 - Memory organization under Windows 3.x

This memory organization does have one advantage when it comes to performing subclassing. Since each application can easily access memory belonging to other applications, it is relatively easy for an application to hook into another application's internal data and substitute its own function address for the

window function of any window belonging to that application. It would not be accurate to say that this type of cross-task subclassing is simple - there are many other issues involved in doing it safely, but it certainly is easy compared to what comes next.

As you have seen, under Windows 3.x each application shares the same view of system memory and can access all available memory. Windows NT uses a much more advanced memory scheme in which every memory access by an application undergoes a translation step that converts it into a physical memory address. This fact has far reaching implications. For one thing, since each application's memory access has to be translated anyway, there is no reason why more than one application should not use the same addresses. This is, in fact, what Windows NT does - each application is given an address space of 4 gigabytes - that's $&0$ through $&FFFFFFF$. This does not mean that you need 4 gigabytes of memory or even disk space to use Windows NT. It does mean that each application can allocate blocks of memory anywhere in that address range and have the operating system assign those blocks to real memory. Figure 2 illustrates how two applications might view memory and how it might be translated into physical memory.

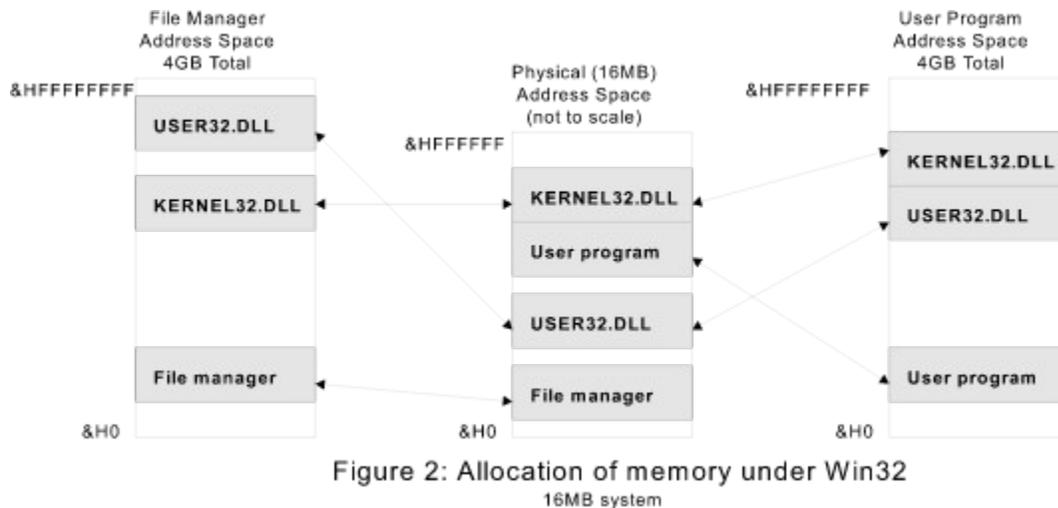


Figure 2: Allocation of memory under Win32
16MB system

Figure 2 - Memory Organization under Win32

The first thing you might notice is that there is no relationship between the location of data or code in the address space of the application and its location in physical memory. In fact, a dynamic link library that is shared by two applications might appear at completely different addresses as viewed by each application. Also note that the memory for one application does not even exist in the address space of the other application. This means that it is completely impossible for one application to accidentally write into physical memory assigned to another - and difficult to do intentionally (and only possible when explicitly requested through the operating system). It also means that an address that is valid in one application, is almost certainly not valid in another.

What about Subclassing?

Despite these obstacles, the SpyWorks 4.0 subclassing control `dwsbc32.ocx`, has no trouble subclassing windows that belong to other applications. Well, to be fair - it does have trouble, but that trouble is almost completely hidden from the Visual Basic programmer.

The secret to how this is accomplished lies in the `dwspy32.dll` module - the 32 bit subclassing engine. You see, it really is impossible for one application to directly subclass another. But it is possible for a dynamic link library to be loaded by more than one application at once. As a first step toward any cross task operation, `dwspy32.dll` maps itself into the other application's address space. This means that the other application becomes able to execute code in `dwspy32`, just as each application is able to execute operating system code. `dwspy32.dll` is able to keep track of which applications are mapped and has

the ability to communicate from one address space to another. When you try to subclass another application's window using `dwsbc32.ocx`, the control tells `dwspy32.dll` which window it wants to subclass. `dwspy32.dll` checks to see if the window is already subclassed - if so, it just notes that your application wants to intercept messages for that window as well. If it is not already subclassed, `dwspy32.dll` maps itself into the other application's address space and subclasses it in that address space. Any time a message comes in, `dwspy32.dll` notifies your application and triggers the appropriate event.

A similar mechanism comes into play for windows hooks and keyboard hooks - any time you try to work with information outside of your own application or on a systemwide basis, `dwspy32.dll` takes over.

Dealing with Pointers

There is still one catch - once you subclass a window belonging to another process, some of the information you retrieve will consist of memory addresses in the other application's address space. For example: the `WM_GETTEXT` message returns a pointer to a string containing a window caption. Due to the memory translation scheme, this pointer is useless in your application - it only has meaning in the other program's address space. For this reason `dwspy32.dll` provides a set of cross task memory functions that are designed to make it easy to safely read and write memory belonging to other applications. Safely in this context is relative - if you are careful, you should be fine, but this ability to access another program's memory space has the potential of bringing back the problems that are inherent in Windows 3.x - the ability of one program to crash another or the entire system. The SpyWorks tools always strive to let you keep your level of invasiveness to a minimum.

What about Windows 95?

Why the focus so far on Windows NT? Because NT provides the highest level of security available. Under Windows 95, the separation between applications is not quite as extreme. For example: the upper two gigabytes of memory are actually shared among all applications. This area in memory contains dynamic link libraries and operating system modules that are mapped into the same addresses for all applications. Application modules, which are placed in the lower two gigabyte space, are still protected from each other. This means that while Windows 95 is a dramatic improvement over Windows 3.x, it is nowhere near as secure as Windows NT.

Conclusion

The subject of process spaces can be complex and this is a somewhat simplified version of what is going on behind the scenes. It did not, for example, discuss how 16 bit application memory is managed, or what happens when an application tries to write into a dynamic link library that is mapped into several applications (which is possible under Windows NT, but is, believe it or not, safe due to a built in copy on write mode). Chapter 14 in the VB Programmer's Guide to the Win32 API goes into substantially more detail, as it takes the next step and explains how to use the many new API functions that are designed to work with virtual memory spaces.

Extending the Capabilities of the Windows Common Dialogs

How many times have you opened the File Save dialog box only to have to switch to the File Manager in order to create a new directory in which to save the file? Or how many times had you opened the File Open dialog box and could not remember the name of the file that you worked on last Friday. Or had to switch to the File Manager in order to look at the last modification date of the file you want to open? If you have encountered these annoying limitations in other programs chances are that your customers have also encountered them in yours.

Common Dialogs are Good

Common dialogs are a strong step in the right direction. They standardize the "look and feel" of certain operations and provide some useful functionality - all implemented in a stable and thoroughly tested DLL. Though you may not realize it based on the common dialog support provided by Visual Basic, common dialogs were designed to be extended or customized with relative ease. You can frequently add quite a bit of functionality without jeopardizing the reliability of the control or violating the user interface commonality that makes them so valuable. There's one catch - in order to modify the common dialogs, you must refer to API functions inside the common dialog library, COMMDLG.DLL - you can't just use the cmdialog.vbx control that comes with Visual Basic. Cmdialog.vbx is just a wrapper for the commdlg API functions, and it does not expose the hooks that are necessary to modify the dialogs.

You Can't Can do that in Visual Basic - with SpyWorks

SpyWorks comes to the rescue once more with its CBK.VBX control and SpyNotes #2 - The Common Dialog Toolkit. The CBK (callback) control allows you to provide a callback function address when calling the COMMDLG.DLL library functions directly. *The Common Dialog Toolkit* shows you how to modify each of the common dialogs. When a dialog box and all its controls are loaded, a WM_INITDIALOG message is sent to the dialog box (which the callback function receives). At this time, you may make any additional initialization or modifications to the dialog box or to any of its controls before it is displayed. Among the things you can do are: position or re-size the dialog; change the dialog's caption; and hide, move or add controls. Here is an example on how to position the dialog box relative to its parent window at load time. You need to know the window handle of the parent window and the x and y offset position from the parent window in pixels. Create a point structure type that holds an x and y integer and initialize them to the x and y offset positions. Call the ClientToScreen API function to retrieve the screen coordinates of the offset position, this is where the dialog will be positioned. Call the Move Window API function to position the dialog at that location.

```
Dim rc As RECT
Dim pt As POINTAPI

pt.x=xoffset
pt.y=yoffset
ClientToScreen hwndparent, pt
GetWindowsRect dlgwnd, rc 'get dlg box dimensions
'move window to the specified coordinated of the parent window
'you can also resize the window if you specify a value for lengthoffset and
widthoffset
MoveWindow dlgwnd, pt.x, pt.y, rc.right - re.Left + lengthoffset, rc.bottom
- re.Top + widthoffset, 0
```

Other Cool Things for Your Common Dialogs

Add a "Create Directory" command button in your FileSave common dialog. Hide the "Network..." button in your FileSave or FileOpen common dialogs. Display additional file information (such as file size, last modification, date, etc.) each time the user highlights a file name from the File List box. Add an Image control to the File Open dialog so that you can preview picture files before opening them. Make the Font or Color dialogs modeless so that you can apply the font or color you choose and see the results without closing the dialog box. Add a font text preview text box into the Font dialog so that you can preview a specified text string (instead of "AaBbYyZz") when selecting font attributes. Initialize the Printer Setup dialog's Orientation to Landscape, or PaperSize to Legal without changing the system settings for the printer. Make your common dialogs three dimensional.

Learn More about SpyWorks and Windows with the Common Dialog Toolkit

The Common Dialog Toolkit provides plenty of documented sample code on using SpyWorks controls, Windows API functions and other techniques. One of the goals for the SpyNotes series is to educate SpyWorks users on processing some of the basic Windows messages. Another is to show examples on how to use some of the API functions included in dwspydll.dll, and provide more advanced technical information on Windows and SpyWorks. The *Common Dialog Toolkit* can go a long way towards helping you use these and other advanced Windows programming techniques.

Classes With StorageTools

One of the great new features of Visual Basic 4.0 is the ability to create classes. Classes let you encapsulate private data and public methods for operating on that data. This allows you to package functionality into a reusable unit which can be used without knowledge of how it is actually implemented. Unfortunately, the barrier between a class and the program that uses it is broken when a class has to read or write any information on a disk. Either the class writes its information into a separate file - resulting in a mess - or the class has to be specifically written to write into the program's file format - resulting in a non-reusable class that has to be changed whenever the file format is changed.

A neat solution to this problem can be found in every copy of Desaware's StorageTools. StorageTools includes two Visual Basic 4.0 projects demonstrating examples of class usage with the Storage OLE control. Class.VBP is a OLE DLL class that controls a single graphic figure. ClsTst.VBP is a simple program that uses a number of Class objects. ClsTst writes each picture to a single Structured Storage file using the Storage control. However, each individual figure is saved by that instance of the class. This is done by passing a single stream to each instance of the class. The class then saves its information to that stream.

There are a number of advantages to this method. First, streams within a Structured Storage file can be any size without affecting any other stream. You could easily modify the figure class to write more or less information without changing any other part of the project. Second, streams are independent parts of the Structured Storage file. The class will write to any stream that is passed to it, whether it is in the root storage of a tiny file or 4 levels deep in a much larger one. Changing the entire architecture of the file would not affect the class at all.

Visual Basic User Groups

If you are a leader of a Visual Basic User Group and would like some promotional materials for some of your meetings, please contact Roan Bear in our office. Or just drop us a note and let us know who and where you are!

You can request copies of the current newsletter or special promotional software. Please give us 2-3 weeks notice in requesting materials for your gathering. Thanks!

Persistence of Data

Every application works with data, and most need to save that data between sessions. The term "persisting data" is often used to describe this. Before looking at some of the techniques that are available for persisting data, it is worth considering some of the reasons for doing so.

- You may need to save configuration information for an application.
- You may need to save configuration information for an application on a per user basis.
- You may wish your application to have one or more associated documents. For example: A word processor has document files. A spreadsheet program has spreadsheet files.
- You may wish your application to work with information in a database which can hold multiple records of information on objects that are similar to each other.

There is no one data storage technique that is ideal for all of these purposes. You probably would not want to use a database to save application configuration or setup information. You would not use a private initialization file to save thousands of complex records of the type typically found in a database.

It is not possible to come up with an absolute set of rules for which techniques are appropriate for which applications - certainly not in a short article here, but it is possible to come up with some general guidelines.

For general configuration data, including current settings for an application, a private initialization file or the system registry are appropriate. Initialization files are somewhat easier to use and allow for easy user editing. The registry supports more data types and due to its hierarchical nature is better for per user configuration data.

For docucentric applications, avoid the temptation to use a database. Databases are designed to support multiple records where each record is similar. They are not generally appropriate for documents that contain arbitrary graphics, text and binary data. This is due to the high overhead and programming complexity required to implement this type of document with a database. Instead, docucentric applications should usually use private file formats that are read and written directly. OLE structured storage can be used to simplify the task of organizing complex data within a document. Desaware's StorageTools makes it possible to use OLE structured storage from within Visual Basic.

Applications that need to store sets of data that are similar to each other will typically use databases. This is especially true if the data needs to be accessed by more than one application at once or if searching, filtering and report generation is required.

Introducing - Desaware's new API Class Library

Visual Basic programmer's have long been aware that you can substantially increase the power of your Visual Basic applications by taking advantage of the hundreds of functions that are built into the Windows API. Desaware has a long history of helping programmers take advantage of API functions, first through the Visual Basic Programmer's Guide to the Windows API, and now through the forthcoming Visual Basic Programmer's Guide to the Win32 API.

API functions are powerful, but they can be difficult to use. One way to help programmers learn and use API functions is to encapsulate them into a function, class or object library. Desaware's new API Class Library takes a rather unique approach in this regard. You see, there is no one best way to access API functions. Sometimes it is best to use a standalone API object library. Sometimes it is best to incorporate a class library into your application. Sometimes it is best to add inline code into your own program. By including complete source code, Desaware's Class Library supports all of these approaches. Cut and paste code into your program. Add the classes into your application. Or compile the classes into your own API DLL server - the choice is yours.

The Desaware API Class Library will be part of the February release of SpyWorks Professional, and a partial version is included with the Visual Basic Programmer's Guide to the Win32 API.

SpyWorks 4.0 for 16 and 32 bit OLE Containers

The Standard Edition

The original SpyWorks-VB package became one of the most successful Visual Basic add-on products of all time by allowing programmers to do virtually anything in Visual Basic that is possible with other languages. It does this by supporting powerful Windows programming techniques that are not part of Visual Basic.

SpyWorks 4.0 extends this philosophy to the new world of 32 bit programming for not only Visual Basic 4.0, but other full OLE control containers as well. It does this by providing easy access to low level system capabilities such as subclassing, callbacks and hooks that are rarely built in to higher level programming systems such as Visual Basic and VBA applications. In fact, SpyWorks makes these tasks so easy, that it will often be more economical to use SpyWorks for these tasks even with languages such as C and C++!

Version 4.0 standard edition is a 16 and 32 bit OLE Control based edition of the SpyWorks series.

The Professional Edition: A subscription that Includes 3 free updates!

We know that OLE controls are a new technology, that the containers that you will be using such as Visual Basic 4.0 have only just appeared, as have the operating systems that you will be using: Microsoft Windows® 95 and Windows NT 3.51. What new capabilities are built into the operating systems that SpyWorks can help you utilize? What kind of features will your customers demand? There is a lot to learn, and the Professional Edition is intended to not only help you learn it, but to evolve to meet your needs. Every four months you will receive a complete update of the entire SpyWorks series, 16 and 32 bit OLE Control and 16 bit VBX along with the latest utilities, application notes and so on. We will be adding features to the controls based on the most often requested (and most intriguing) features. **Plus, it includes the full SpyWorks 2.1 package and Common Dialog Toolkit.**

SpyWorks-VB 4.0 Custom Controls:

The DWSBCxx.ocx subclassing control provides you with complete access to the underlying Windows message stream for the forms, controls and other windows in your application or other applications.

The DWSHKxx.ocx hook control allows you to take advantage of Windows hooks. Detect messages for groups of controls, for entire applications or for the entire system. Detect keystrokes on a task or systemwide basis to create "hot keys". Use journaling to create macro recorders or computer assisted training sessions - or to monitor user interaction to test your user interface. The applications are limitless.

The DWCBKxx.ocx control allows you to use windows callbacks. These are Windows API and DLL functions that require a procedure address in order to work.

The DWEASYxx.ocx control provides an easy to use implementation of common subclassing tasks including virtual forms, MouseEnter/MouseExit detection, rollup windows, caption buttons and much more.

The DWSPYxx.dll dynamic link library provides an array of library functions designed to help you take full advantage of both the Windows API and the SpyWorks controls. It also includes indirect property access capabilities, which let you programatically access properties of other forms and controls in your application.

Other SpyWorks-VB 4.0 Features:

The first release of the professional edition includes 32 bit OLE controls and the SpyWorks 2.1 VBX based package. 16 bit OLE controls and additional utilities and application notes will follow in the second release currently scheduled for January '96. The standard edition, containing 16 and 32 bit OLE controls only, will ship in that time-frame as well. **As always, applications created with any SpyWorks edition may be distributed without royalties.**

SpyWorks-VB 2.1 for Visual Basic 3.0 & 4.0(16 bit)

SpyWorks-VB version 2.1 is latest VBX based edition of SpyWorks for 16 bit Visual Basic. With new

features and full support for Windows 95, it is ideal for those VB programmers who are not planning an immediate transition to 32 bit Visual Basic (for those that are, SpyWorks 2.1 is included in the professional edition of SpyWorks 4.0).

You CAN do it in Visual Basic

We can barely begin to describe all of the possibilities provided by SpyWorks-VB, but here are a few:
Create VB add-ins to other applications or VB itself using cross-task subclassing · Printer configuration
· MouseEnter/MouseExit for status bars · Tiny Captions and Rollup Windows · Scrolling Forms/Controls
· True LostFocus/GotFocus detection · Create owner draw controls · Trap tab and alt-tab keys · Use
Windows enumeration functions · Detect WIN.INI changes · Private and owner draw clipboard formats ·
Change the behavior of standard controls · Indirect property access · Obtain an event history for a
program · Detect Windows API parameter errors · Many data conversion and low level access
functions · Free SpyNotes #1 advanced application notes · and more....

SpyWorks-VB 2.1 Custom Controls:

SpyWorks-VB 2.1 contains VBX equivalents to the OLE controls defined above, plus a Visual Basic aware set of system utilities and debugging tools.

SpyWorks-VB 4.0 Professional is \$249. 4.0 Standard and 2.1 are only \$129. For Microsoft Windows 3.1x, Windows NT and Windows 95

StorageTools Version 1.0

The ultimate data storage and file manipulation toolkit! Change the way you work with files and data forever!

You may have heard about OLE 2.0 with its ability to control applications and embed objects from one application into another. But there's another feature built into OLE 2.0 that until now was not accessible to Visual Basic programmers. It's called "Structured Storage" and StorageTools is your key to this powerful technology.

StorageTools allows you to take advantage of the same file storage system used by Microsoft's own applications. Includes sample programs (with source) that let you examine the structure of any OLE 2.0 based file so you can see exactly how they do it!

StorageTools Storage Control:

The Storage control uses Visual Basic OLE Objects to represent storages and streams, creating a familiar interface for manipulating those elements. Within the Structured Storage standard are a number of functions that let you upgrade your file handling procedures easily: you can detect whether files are in Structured Storage format or not, and you can read any normal file as if it was a Structured Storage file. The Storage control also adds a number of features specifically for Visual Basic programmers. It lets you read and write information in any of the styles Visual Basic uses, such as "Sequential", "Binary" or "Random", including arrays.

StorageTools is the key to unlocking the following Structured Storage capabilities:

- Utilize a powerful new method for organizing information within a file or compound document.
- Buffered file modifications allow you to easily undo modifications to a file using Transactioning.
- Expose important information to outside applications by including a standard document information stream.
- You can organize information in memory exactly like you organize information on disk. Only one function call is required to copy information between a Storage in memory and a Storage on disk.
- Reduce disk access time by only saving the parts of the document that have changed.
- All disk space allocation and organization are done for you.
- **And more....**

StorageTools Registry Control:

The Registry Control makes it easy to access the Registry and the Registration Database. It provides all the power of Windows API calls and more. Keys within the Registry are accessed like directories. Values are converted to data types compatible with Visual Basic. Powerful search capabilities are included, allowing you not to only search among keys and value names, but within the value data itself. The documentation includes descriptions of areas in the Registry that might be useful and how to access them.

Using StorageTools - the Registry becomes the key to transforming your Visual Basic program into a truly professional application. Here are just some of the thing you can do:

Register the filename extension to your documents, so your program is automatically launched when a user activates one.

- Create user-specific and machine-specific configuration settings, dramatically improving your user interface.
- Expose DDE links to your program.
- Interface with Windows 95: set icons, register an uninstaller, update reference counts for DLL's you use, and much more.
- Expose your program's version information.
- Read and modify system settings.
- Includes 16 & 32 bit OCX for Visual Basic 4.0 and other OCX containers. Only \$129. Supports Windows 3.1x, Windows NT and Windows 95

VersionStamper version 4.0

Reduce Technical Support Costs!

An end-user or customer calls. Your program is behaving strangely, or no longer loads. Did another program install an older DLL, VBX or OCX on their system? Or maybe a later, but incompatible version? Is it a conflict due to an incompatible DLL already loaded in memory? Has the PATH environment setting changed? Is the file properly registered in the registry? Is a required file missing? Now your program could tell you what's gone wrong... with VersionStamper.

Detect OCX, VBX and DLL Incompatibilities Instantly!

VersionStamper allows you to easily embed into your Visual Basic executable or other OLE container information about all of the dynamic link libraries and custom controls used by that application, along with required current versions, file date and time, and your choice of warning conditions. The VersionStamper OLE custom control can use this information to check the versions of the actual modules that are available on the target system. ***Incompatibilities are instantly detected!***

VersionStamper is designed with your needs in mind. You can perform version verification automatically on load, or at any time you wish under program control, or even dynamically verify a list of files at run time. Plus, a customizable and redistributable "rescue" program can be used to detect and log problems when an application won't load at all. VersionStamper is designed primarily for DLLs, OCXs, and VBXs, but will work with any type of file, even those without embedded version information.

A COMPLETE Solution and Tool Kit.

VersionStamper is easy to use even if you are an absolute beginner - but we didn't forget the experts. Look what else you get:

dwvstp??.ocx - The 16 and 32 bit OLE control includes extensive dialog box support for embedding version information for selected DLLs, OCXs, VBXs and other files. Each control can embed two file lists so you can use a single control to create dual platform executables. It also has the ability to scan Visual Basic 4.0 -based projects to automatically create a list of DLLs, OCXs, and VBXs required by the application. The OLE version even allows you to scan for files not specified in your file list during run-time. The run-time distributable control is royalty free. **These controls are fully compatible with Visual Basic 4.0 and other true OLE Control containers!**

- **dwvstamp.vbx** - This version stamping custom control has extensive dialog box support for embedding version information for selected DLLs, VBXs and other files. This VBX version can also embed true version resources into Visual Basic version 3.0 executables.
- **VerInfo.exe** - A Visual Basic-based program that allows you to quickly view the version information for any executable, DLL, OCX or VBX that contains versioning information. Includes source code. It also produces a complete list of the files required by the application based on information embedded by the **VersionStamper** control.
- **VerResQ.exe** - A Visual Basic-based program that analyzes any Visual Basic-based executable stamped by **VersionStamper**. It instantly detects any incompatibilities that exist between the requested files and those actually present on disk. Includes source code so that it can be customized for distribution with your application.
- **VerSplsh.mak** - This sample project demonstrates using a standalone executable to perform file verification for your main application. It displays a splash screen during file verification. If no conflicts were found, it Shells your application, otherwise a form is displayed notifying the user of the conflicts. This method will allow you to identify any incompatibilities that exist - even if the executable cannot be loaded. Designed to be easily modified so that you can create your own splash screen shell program to distribute with your application.
- **VsRTDemo.mak** - This sample project demonstrates a new feature of **VersionStamper** (OLE control only) - how to scan files dynamically during run-time.
- **Technical Notes** include a complete discussion of the Windows-based system of version stamping and the embedding techniques used by **VersionStamper**. It also includes detailed suggestions and examples for improving the Visual Basic setup toolkit. Version 4.0 extends includes an extensive

discussion of platform dependent issues including Windows 95 and Windows NT.

Whether you are developing for corporate use in house, or for distribution worldwide, **VersionStamper** will pay for itself the very first time a customer calls with a compatibility problem. You'll have a solution in seconds - with **VersionStamper**.

Includes 16 & 32 bit OCX for Visual Basic 4.0 and other OCX containers. Includes VB 3.0 VBX version which can embed true version resources into your VB executables. Only \$129. Supports Microsoft Windows 3.1x, Windows NT and Windows 95

Newsletter Bonus Disks

The first three newsletters had bonus disks associated with them which contained all of the sample programs. These samples can be found in the **\Articles\VBBulletin\Source** directory on the CD-ROM for the Visual Basic Programmer's Guide to the Win32 API.

The samples in this directory are Visual Basic 3.0 programs. Some of them are not compatible with 32 bit operating systems such as Windows NT and Windows 95. Updated samples for many of these applications are included with SpyWorks 4.0. One or two 32 bit examples can be found in the **\Articles\VBBulletin\Source32** directory on this CD-ROM.

Most of these samples require that you be a licensed owner of [SpyWorks-VB 2.1](#) or [VersionStamper 1.0](#) or later in order to run in design mode. However, the executable files will run using the runtime controls and DLL's included in that directory.

