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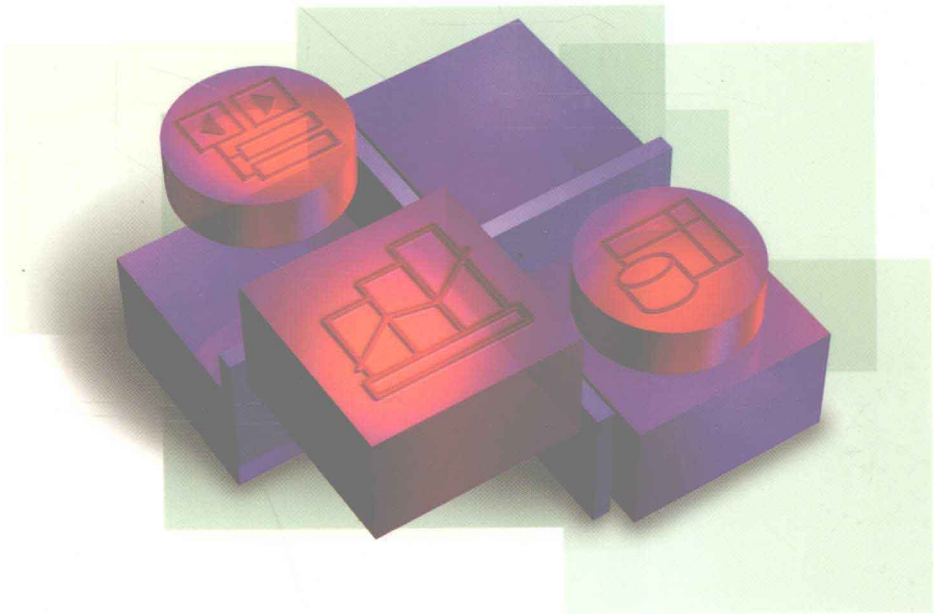
The Essential Guide to
Microsoft Visual Basic 6.0



Microsoft® Visual Basic® 6.0 Programmer's Guide

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Programmer's Guide

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Document Conventions

This manual uses the following typographic conventions.

Example of convention	Description
Sub, If, Case Else, Print, True, BackColor, Click, Debug, Long	Words with initial letter capitalized indicate language-specific keywords.
setup	Words you're instructed to type appear in bold.
event-driven	In text, italic letters can indicate defined terms, usually the first time they occur in the book. Italic formatting is also used occasionally for emphasis.
variable	In syntax and text, italic letters can indicate placeholders for information you supply.
[*expressionlist*]	In syntax, items inside square brackets are optional.
{**While** | **Until**}	In syntax, braces and a vertical bar indicate a choice between two or more items. You must choose one of the items unless all of the items also are enclosed in square brackets.

`Sub HelloButton_Click()`
`Readout.Text = _`
`"Hello, world!"`
`End Sub`
	This font is used for code.

ENTER	Capital letters are used for the names of keys and key sequences, such as ENTER and CTRL+R.
ALT+F1	A plus sign (+) between key names indicates a combination of keys. For example, ALT+F1 means to hold down the ALT key while pressing the F1 key.
DOWN ARROW	Individual direction keys are referred to by the direction of the arrow on the key top (LEFT, RIGHT, UP, or DOWN). The phrase "arrow keys" is used when describing these keys collectively.
BACKSPACE, HOME	Other navigational keys are referred to by their specific names.
c:\Vb\Samples\Calldlls.vbp	Paths and file names are given in mixed case.

Programming Style in This Manual

The following guidelines are used in writing programs in this manual. For more information, see Chapter 5, "Programming Fundamentals."

- Keywords appear with initial letters capitalized:

```
' Sub, If, ChDir, Print, and True are keywords.
Print "Title Page"
```

- Line labels are used instead of line numbers. The use of line labels is restricted to error-handling routines:

```
ErrorHandler:
   Power = conFailure
End Function
```

- An apostrophe (') introduces comments:

```
' This is a comment; these two lines
' are ignored when the program is running.
```

- Control-flow blocks and statements in Sub, Function, and Property procedures are indented from the enclosing code:

```
Private Sub cmdRemove_Click ()
   Dim Ind As Integer

   Ind = lstClient.ListIndex    ' Get index.
   ' Make sure list item is selected.
   If Ind >= 0 Then
      lstClient.RemoveItem Ind ' Remove it
                               ' from list box.
      ' Display number.
      lblDisplay.Caption = lstClient.ListCount
   Else
      Beep           ' If nothing selected, beep.
   End If
End Sub
```

- Lines too long to fit on one line (except comments) may be continued on the next line using a line-continuation character, which is a single leading space followed by an underscore (_):

```
Sub Form_MouseDown (Button As Integer, _
Shift As Integer, X As Single, Y As Single)
```

- Intrinsic constant names are in a mixed-case format, with a two-character prefix indicating the object library that defines the constant. Constants from the Visual Basic (VB) and Visual Basic for applications (VBA) object libraries are prefaced with a "vb"; constants from the data access (DAO) object library are prefaced with a "db"; constants from the Microsoft Excel object library are prefaced with an "xl." For example:

```
vbTileHorizontal
dbAppendOnly
xlDialogBorder
```

  Throughout this book, user-defined constants are usually prefaced with "con" and are mixed case. For example:

```
conYourOwnConstant
```

  When using Windows API constants, however, the code examples still follow the same conventions as in previous versions of Visual Basic. For example:

```
EM_LINESCROLL
```

Programmer's Guide

Welcome to the *Microsoft Visual Basic 6.0 Programmer's Guide*, a comprehensive manual on programming with Visual Basic. To accommodate the wealth of features and capabilities in Visual Basic, the *Microsoft Visual Basic 6.0 Programmer's Guide* is divided into two parts.

The first part covers the basic concepts, providing a foundation for programmers new to Visual Basic. Part 2 covers more advanced programming concepts and techniques. Additional information helpful in using the product is presented in the appendices.

Part 1 Visual Basic Basics

An introduction to programming in Visual Basic.

Part 2 What You Can Do with Visual Basic

Advanced topics on Visual Basic programming.

Appendix A Visual Basic Specifications, Limitations, and File Formats

Technical details for Visual Basic.

Appendix B Visual Basic Coding Conventions

Suggested guidelines for consistent and readable code.

Appendix C Native Code Compiler Switches

Details on command line switches for compiling to native code.

Appendix D Adding Help to Your Application

Guidelines for adding online Help to a Visual Basic application.

Contents

Creating Your Own Constants

The syntax for declaring a constant is:

[Public|Private] Const *constantname*[**As** *type*] = *expression*

The argument *constantname* is a valid symbolic name (the rules are the same as those for creating variable names), and *expression* is composed of numeric or string constants and operators; however, you can't use function calls in *expression*.

A Const statement can represent a mathematical or date/time quantity:

```
Const conPi = 3.14159265358979
Public Const conMaxPlanets As Integer = 9
Const conReleaseDate = #1/1/95#
```

The Const statement can also be used to define string constants:

```
Public Const conVersion = "07.10.A"
Const conCodeName = "Enigma"
```

You can place more than one constant declaration on a single line if you separate them with commas:

```
Public Const conPi = 3.14, conMaxPlanets = 9, _
conWorldPop = 6E+09
```

The expression on the right side of the equal sign (=) is often a number or literal string, but it can also be an expression that results in a number or string (although that expression can't contain calls to functions). You can even define constants in terms of previously defined constants:

```
Const conPi2 = conPi * 2
```

Once you define constants, you can place them in your code to make it more readable. For example:

```
Static SolarSystem(1 To conMaxPlanets)
If numPeople > conWorldPop Then Exit Sub
```

Scoping User-Defined Constants

A Const statement has scope like a variable declaration, and the same rules apply:

- To create a constant that exists only within a procedure, declare it within that procedure.
- To create a constant available to all procedures within a module, but not to any code outside that module, declare it in the Declarations section of the module.

- To create a constant available throughout the application, declare the constant in the Declarations section of a standard module, and place the Public keyword before Const. Public constants cannot be declared in a form or class module.

For More Information For more information regarding scope, see "Understanding the Scope of Variables" earlier in this chapter.

Avoiding Circular References

Because constants can be defined in terms of other constants, you must be careful not to set up a *cycle*, or circular reference between two or more constants. A cycle occurs when you have two or more public constants, each of which is defined in terms of the other.

For example:

```
' In Module 1:
Public Const conA = conB * 2    ' Available throughout
                                ' application.
' In Module 2:
Public Const conB = conA / 2    ' Available throughout
                                ' application.
```

If a cycle occurs, Visual Basic generates an error when you attempt to run your application. You cannot run your code until you resolve the circular reference. To avoid creating a cycle, restrict all your public constants to a single module or, at most, a small number of modules.

Data Types

Variables are placeholders used to store values; they have names and data types. The data type of a variable determines how the bits representing those values are stored in the computer's memory. When you declare a variable, you can also supply a data type for it. All variables have a data type that determines what kind of data they can store.

By default, if you don't supply a data type, the variable is given the Variant data type. The Variant data type is like a chameleon — it can represent many different data types in different situations. You don't have to convert between these types of data when assigning them to a Variant variable: Visual Basic automatically performs any necessary conversion.

If you know that a variable will always store data of a particular type, however, Visual Basic can handle that data more efficiently if you declare a variable of that type. For example, a variable to store a person's name is best represented as a string data type, because a name is always composed of characters.

Data types apply to other things besides variables. When you assign a value to a property, that value has a data type; arguments to functions also have data types. In fact, just about anything in Visual Basic that involves data also involves data types.

You can also declare arrays of any of the fundamental types.

For More Information For more information, see the section, "Arrays," later in this chapter. Selecting data types to improve your application's performance is discussed in Chapter 15, "Designing for Performance and Compatibility."

Declaring Variables with Data Types

Before using a non-Variant variable, you must use the Private, Public, Dim or Static statement to declare it As *type*. For example, the following statements declare an Integer, Double, String, and Currency type, respectively:

```
Private I As Integer
Dim Amt As Double
Static YourName As String
Public BillsPaid As Currency
```

A Declaration statement can combine multiple declarations, as in these statements:

```
Private I As Integer, Amt As Double
Private YourName As String, BillsPaid As Currency
Private Test, Amount, J As Integer
```

> **Note** If you do not supply a data type, the variable is given the default type. In the preceding example, the variables `Test` and `Amount` are of the Variant data type. This may surprise you if your experience with other programming languages leads you to expect all variables in the same declaration statement to have the same specified type (in this case, Integer).

Numeric Data Types

Visual Basic supplies several numeric data types — Integer, Long (long integer), Single (single-precision floating point), Double (double-precision floating point), and Currency. Using a numeric data type generally uses less storage space than a variant.

If you know that a variable will always store whole numbers (such as 12) rather than numbers with a fractional amount (such as 3.57), declare it as an Integer or Long type. Operations are faster with integers, and these types consume less memory than other data types. They are especially useful as the counter variables in For...Next loops.

For More Information To read more about control structures, see "Introduction to Control Structures" later in this chapter.

If the variable contains a fraction, declare it as a Single, Double, or Currency variable. The Currency data type supports up to four digits to the right of the decimal separator and fifteen digits to the left; it is an accurate fixed-point data type suitable for monetary calculations. Floating-point (Single and Double) numbers have much larger ranges than Currency, but can be subject to small rounding errors.