PROGRAMMER'S REFERENCE LIBRARY

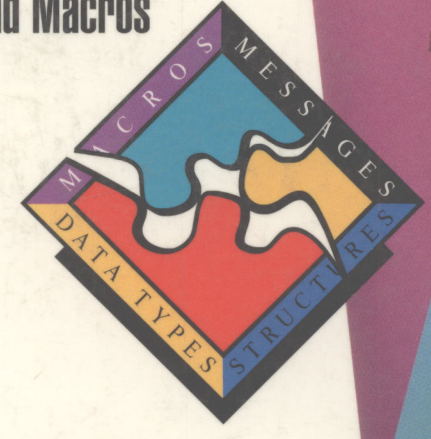
MICROSOFT® WINDOWS™

Microsoft® Windows™ 3.1

Programmer's Reference

Volume 3

Messages, Structures, and Macros



Microsoft PRESS®

Microsoft® Windows™ 3.1

Programmer's Reference

Volume 3

Messages, Structures, and Macros

PUBLISHED BY
Microsoft Press
A Division of Microsoft Corporation
One Microsoft Way
Redmond, Washington 98052-6399

Library of Congress Cataloging-in-Publication Data
Microsoft Windows programmer's reference.
p. cm.
Includes indexes.
Contents: v. 1. Overview -- v. 2. Functions -- v. 3. Messages, structures, macros -- v. 4. Resources.
ISBN 1-55615-453-4 (v. 1). -- ISBN 1-55615-463-1 (v. 2). -- ISBN 1-55615-464-X (v. 3). -- ISBN 1-55615-494-1 (v. 4)
1. Microsoft Windows (Computer program) I. Microsoft Corporation.
QA76.76.W56M532 1992
005.4'3--dc20 91-34199
CIP

Printed and bound in the United States of America.

1 2 3 4 5 6 7 8 9 MLML 7 6 5 4 3 2

Distributed to the book trade in Canada by Macmillan of Canada, a division of Canada Publishing Corporation.

Distributed to the book trade outside the United States and Canada by Penguin Books Ltd.

Penguin Books Ltd., Harmondsworth, Middlesex, England
Penguin Books Australia Ltd., Ringwood, Victoria, Australia
Penguin Books N.Z. Ltd., 182-190 Wairau Road, Auckland 10, New Zealand

British Cataloging-in-Publication Data available.

U.S. Patent No. 4974159

Document No. PC28917-0492

Introduction

This manual, *Microsoft Windows Programmer's Reference, Volume 3*, describes the data types, messages, structures, macros, and printer escapes supported by the Microsoft® Windows™ operating system. In addition, dynamic data exchange (DDE) transactions, File Manager events, raster-operation codes, virtual-key codes, and character tables are presented.

Organization of This Manual

Following are brief descriptions of the chapters and appendixes in this manual:

- Chapter 1, "Data Types," describes the keywords that define the size and meaning of parameter and return values associated with the Windows application programming interface (API).
- Chapter 2, "Messages," describes formatted window messages, through which the Windows operating system communicates with applications, and notification messages, which notify a control's parent window of actions that occur within the control.
- Chapter 3, "Structures," defines the data structures associated with the functions that are part of the Windows API.
- Chapter 4, "Macros," describes the purpose and defines the parameters of macros used to help manipulate data in Windows applications.
- Chapter 5, "Printer Escapes," lists printer escapes for the Windows operating system.
- Chapter 6, "Dynamic Data Exchange Transactions," describes the transactions sent by the Dynamic Data Exchange Management Library (DDEML) to an application's dynamic data exchange (DDE) callback function. The transactions notify the application of DDE activity that affects the application.
- Chapter 7, "File Manager Events and Messages," provides descriptions of the events and menu commands File Manager sends to communicate with a File Manager extension dynamic-link library (DLL). The chapter also describes messages the DLL can send File Manager to retrieve information.
- Chapter 8, "Control Panel Messages," lists the messages Control Panel sends to communicate with a Control Panel DLL.

- Chapter 9, "Common Dialog Box Messages," describes the messages a common dialog box can send to notify applications that the user has made or changed a selection in the dialog box.
- Chapter 10, "Installable Driver Messages," lists the messages the Windows operating system sends to notify installable drivers about specific events.
- Appendix A, "Binary and Ternary Raster-Operation Codes," lists and describes the binary and ternary raster operations used by the graphics device interface (GDI).
- Appendix B, "Virtual-Key Codes," shows the symbolic constant names, hexadecimal values, and keyboard equivalents for Windows virtual-key codes.
- Appendix C, "Character Tables," illustrates the Windows character set, the Symbol character set, and the OEM character set used by the Windows operating system.

Document Conventions

The following conventions are used throughout this manual to define syntax:

Convention	Meaning
Bold text	Denotes a term or character to be typed literally, such as a resource-definition statement or function name (**MENU** or **CreateWindow**), a command, or a command-line option (**/nod**). You must type these terms exactly as shown.
Italic text	Denotes a placeholder or variable: You must provide the actual value. For example, the statement **SetCursorPos**(*X,Y*) requires you to substitute values for the *X* and *Y* parameters.
[ ]	Enclose optional parameters.
|	Separates an either/or choice.
...	Specifies that the preceding item may be repeated.

`BEGIN`
.
.
.
`END`
	Represents an omitted portion of a sample application.

In addition, certain text conventions are used to help you understand this material:

Convention	Meaning
SMALL CAPITALS	Indicate the names of keys, key sequences, and key combinations—for example, ALT+SPACEBAR.
FULL CAPITALS	Indicate filenames and paths, type names and most structure names (which are also bold), and constants.
`monospace`	Sets off code examples and shows syntax spacing.

Contents

Data Types

Chapter 1

Structures

Chapter 3

The data types in this chapter are keywords that define the size and meaning of parameters and return values associated with functions for the Microsoft Windows operating system, version 3.1. The following table contains character, integer, and Boolean types; pointer types; and handles. The character, integer, and Boolean types are common to most C compilers. Most of the pointer-type names begin with a prefix of P, N (for near pointers), or LP (for long pointers). A near pointer accesses data within the current data segment, and a long pointer contains a 32-bit segment:offset value. A Windows application uses a handle to refer to a resource that has been loaded into memory. Windows provides access to these resources through internally maintained tables that contain individual entries for each handle. Each entry in the handle table contains the address of the resource and a means of identifying the resource type.

The Windows data types are defined in the following table:

Type	Definition
ABORTPROC	32-bit pointer to an **AbortProc** callback function.
ATOM	16-bit value used as an atom handle.
BOOL	16-bit Boolean value.
BYTE	8-bit unsigned integer. Use **LPBYTE** to create 32-bit pointers. Use **PBYTE** to create pointers that match the compiler memory model.
CATCHBUF[9]	18-byte buffer used by the **Catch** function.
COLORREF	32-bit value used as a color value.
DLGPROC	32-bit pointer to a dialog box procedure.
DWORD	32-bit unsigned integer or a segment:offset address. Use **LPDWORD** to create 32-bit pointers. Use **PDWORD** to create pointers that match the compiler memory model.
FARPROC	32-bit pointer to a function.
FNCALLBACK	32-bit value identifying the **DdeCallback** function. Use **PFNCALLBACK** to create pointers that match the compiler memory model.
FONTENUMPROC	32-bit pointer to an **EnumFontsProc** callback function.
GLOBALHANDLE	16-bit value used as a handle to a global memory object.
GNOTIFYPROC	32-bit pointer to a **NotifyProc** callback function.
GOBJENUMPROC	32-bit pointer to a **EnumObjectsProc** callback function.
GRAYSTRINGPROC	32-bit pointer to a **GrayStringProc** callback function.

Type	Definition
HANDLE	16-bit value used as a general handle. Use **LPHANDLE** to create 32-bit pointers. Use **SPHANDLE** to create 16-bit pointers. Use **PHANDLE** to create pointers that match the compiler memory model.
HCURSOR	16-bit value used as a cursor handle.
HFILE	16-bit value used as a file handle.
HGDIOBJ	16-bit value used as a graphics device interface (GDI) object handle.
HGLOBAL	16-bit value used as a handle to a global memory object.
HHOOK	32-bit value used as a hook handle.
HKEY	32-bit value used as a handle to a key in the registration database. Use **PHKEY** to create 32-bit pointers.
HLOCAL	16-bit value used as a handle to a local memory object.
HMODULE	16-bit value used as a module handle.
HOBJECT	16-bit value used as a handle to an OLE object.
HWND	16-bit value used as a handle to a window.
HOOKPROC	32-bit pointer to a hook procedure.
HRSRC	16-bit value used as a resource handle.
LHCLIENTDOC	32-bit value used as a handle to an OLE client document.
LHSERVER	32-bit value used as a handle to an OLE server.
LHSERVERDOC	32-bit value used as a handle to an OLE server document.
LINEDDAPROC	32-bit pointer to a **LineDDAProc** callback function.
LOCALHANDLE	16-bit value used as a handle to a local memory object.
LONG	32-bit signed integer.
LPABC	32-bit pointer to an **ABC** structure.
LPARAM	32-bit signed value passed as a parameter to a window procedure or callback function.
LPBI	32-bit pointer to a **BANDINFOSTRUCT** structure.
LPBITMAP	32-bit pointer to a **BITMAP** structure. Use **NPBITMAP** to create 16-bit pointers. Use **PBITMAP** to create pointers that match the compiler memory model.

Type	Definition
LPBITMAPCOREHEADER	32-bit pointer to a **BITMAPCOREHEADER** structure. Use **PBITMAPCOREHEADER** to create pointers that match the compiler memory model.
LPBITMAPCOREINFO	32-bit pointer to a **BITMAPCOREINFO** structure. Use **PBITMAPCOREINFO** to create pointers that match the compiler memory model.
LPBITMAPFILEHEADER	32-bit pointer to a **BITMAPFILEHEADER** structure. Use **PBITMAPFILEHEADER** to create pointers that match the compiler memory model.
LPBITMAPINFO	32-bit pointer to a **BITMAPINFO** structure. Use **PBITMAPINFO** to create pointers that match the compiler memory model.
LPBITMAPINFOHEADER	32-bit pointer to a **BITMAPINFOHEADER** structure. Use **PBITMAPINFOHEADER** to create pointers that match the compiler memory model.
LPCATCHBUF	32-bit pointer to a **CATCHBUF** array.
LPCBT_CREATEWND	32-bit pointer to a **CBT_CREATEWND** structure.
LPCHOOSECOLOR	32-bit pointer to a **CHOOSECOLOR** structure.
LPCHOOSEFONT	32-bit pointer to a **CHOOSEFONT** structure.
LPCLIENTCREATESTRUCT	32-bit pointer to a **CLIENTCREATESTRUCT** structure.
LPCOMPAREITEMSTRUCT	32-bit pointer to a **COMPAREITEMSTRUCT** structure. Use **PCOMPAREITEMSTRUCT** to create pointers that match the compiler memory model.
LPCPLINFO	32-bit pointer to a **CPLINFO** structure. Use **PCPLINFO** to create pointers that match the compiler memory model.
LPCREATESTRUCT	32-bit pointer to a **CREATESTRUCT** structure.
LPCSTR	32-bit pointer to a nonmodifiable character string.
LPCTLINFO	32-bit pointer to a **CTLINFO** structure. Use **PCTLINFO** to create pointers that match the compiler memory model.
LPCTLSTYLE	32-bit pointer to a **CTLSTYLE** structure. Use **PCTLSTYLE** to create pointers that match the compiler memory model.
LPDCB	32-bit pointer to a **DCB** structure.
LPDEBUGHOOKINFO	32-bit pointer to a **DEBUGHOOKINFO** structure.

Type	Definition
LPDELETEITEMSTRUCT	32-bit pointer to a **DELETEITEMSTRUCT** structure. Use **PDELETEITEMSTRUCT** to create pointers that match the compiler memory model.
LPDEVMODE	32-bit pointer to a **DEVMODE** structure. Use **NPDEVMODE** to create 16-bit pointers. Use **PDEVMODE** to create pointers that match the compiler memory model.
LPDEVNAMES	32-bit pointer to a **DEVNAMES** structure.
LPDOCINFO	32-bit pointer to a **DOCINFO** structure.
LPDRAWITEMSTRUCT	32-bit pointer to a **DRAWITEMSTRUCT** structure. Use **PDRAWITEMSTRUCT** to create pointers that match the compiler memory model.
LPDRIVERINFOSTRUCT	32-bit pointer to a **DRIVERINFOSTRUCT** structure.
LPDRVCONFIGINFO	32-bit pointer to a **DRVCONFIGINFO** structure. Use **PDRVCONFIGINFO** to create pointers that match the compiler memory model.
LPEVENTMSG	32-bit pointer to a **EVENTMSG** structure. Use **NPEVENTMSG** to create 16-bit pointers. Use **PEVENTMSG** to create pointers that match the compiler memory model.
LPDRIVERINFOSTRUCT	32-bit pointer to a **DRIVERINFOSTRUCT** structure.
LPFINDREPLACE	32-bit pointer to a **FINDREPLACE** structure.
LPFMS_GETDRIVEINFO	32-bit pointer to a **FMS_GETDRIVEINFO** structure.
LPFMS_GETFILESEL	32-bit pointer to a **FMS_GETFILESEL** structure.
LPFMS_LOAD	32-bit pointer to a **FMS_LOAD** structure.
LPHANDLETABLE	32-bit pointer to a **HANDLETABLE** structure. Use **PHANDLETABLE** to create pointers that match the compiler memory model.
LPHELPWININFO	32-bit pointer to a **HELPWININFO** structure. Use **PHELPWININFO** to create pointers that match the compiler memory model.
LPINT	32-bit pointer to a 16-bit signed value. Use **PINT** to create pointers that match the compiler memory model.
LPKERNINGPAIR	32-bit pointer to a **KERNINGPAIR** structure.

Type	Definition
LPLOGBRUSH	32-bit pointer to a **LOGBRUSH** structure. Use **NPLOGBRUSH** to create 16-bit pointers. Use **PLOGBRUSH** to create pointers that match the compiler memory model.
LPLOGFONT	32-bit pointer to a **LOGFONT** structure. Use **NPLOGFONT** to create 16-bit pointers. Use **PLOGFONT** to create pointers that match the compiler memory model.
LPLOGPALETTE	32-bit pointer to a **LOGPALETTE** structure. Use **NPLOGPALETTE** to create 16-bit pointers. Use **PLOGPALETTE** to create pointers that match the compiler memory model.
LPLOGPEN	32-bit pointer to a **LOGPEN** structure. Use **NPLOGPEN** to create 16-bit pointers. Use **PLOGPEN** to create pointers that match the compiler memory model.
LPLONG	32-bit pointer to a 32-bit signed integer. Use **PLONG** to create pointers that match the compiler memory model.
LPMAT2	32-bit pointer to a **MAT2** structure.
LPMDICREATESTRUCT	32-bit pointer to an **MDICREATESTRUCT** structure.
LPMEASUREITEMSTRUCT	32-bit pointer to a **MEASUREITEMSTRUCT** structure. Use **PMEASUREITEMSTRUCT** to create pointers that match the compiler memory model.
LPMETAFILEPICT	32-bit pointer to a **METAFILEPICT** structure.
LPMETARECORD	32-bit pointer to a **METARECORD** structure. Use **PMETARECORD** to create pointers that match the compiler memory model.
LPMOUSEHOOKSTRUCT	32-bit pointer to a **MOUSEHOOKSTRUCT** structure.
LPMSG	32-bit pointer to an **MSG** structure. Use **NPMSG** to create 16-bit pointers. Use **PMSG** to create pointers that match the compiler memory model.
LPNCCALCSIZE_PARAMS	32-bit pointer to an **NCCALCSIZE_PARAMS** structure.
LPNEWCPLINFO	32-bit pointer to an **NEWCPLINFO** structure. Use **PNEWCPLINFO** to create pointers that match the compiler memory model.

Type	Definition
LPNEWTEXTMETRIC	32-bit pointer to a **NEWTEXTMETRIC** structure. Use **NPNEWTEXTMETRIC** to create 16-bit pointers. Use **PNEWTEXTMETRIC** to create pointers that match the compiler memory model.
LPOFSTRUCT	32-bit pointer to an **OFSTRUCT** structure. Use **NPOFSTRUCT** to create 16-bit pointers. Use **POFSTRUCT** to create pointers that match the compiler memory model.
LPOLECLIENT	32-bit pointer to **OLECLIENT** structure.
LPOLECLIENTVTBL	32-bit pointer to **OLECLIENTVTBL** structure.
LPOLEOBJECT	32-bit pointer to **OLEOBJECT** structure.
LPOLEOBJECTVTBL	32-bit pointer to **OLEOBJECTVTBL** structure.
LPOLESERVER	32-bit pointer to **OLESERVER** structure.
LPOLESERVERDOC	32-bit pointer to **OLESERVERDOC** structure.
LPOLESERVERDOCVTBL	32-bit pointer to **OLESERVERDOCVTBL** structure.
LPOLESERVERVTBL	32-bit pointer to **OLESERVERVTBL** structure.
LPOLESTREAM	32-bit pointer to **OLESTREAM** structure.
LPOLESTREAMVTBL	32-bit pointer to **OLESTREAMVTBL** structure.
LPOLETARGETDEVICE	32-bit pointer to **OLETARGETDEVICE** structure.
LPOPENFILENAME	32-bit pointer to **OPENFILENAME** structure.
LPOUTLINETEXTMETRIC	32-bit pointer to an **OUTLINETEXTMETRIC** structure.
LPPAINTSTRUCT	32-bit pointer to a **PAINTSTRUCT** structure. Use **NPPAINTSTRUCT** to create 16-bit pointers. Use **PPAINTSTRUCT** to create pointers that match the compiler memory model.
LPPALETTEENTRY	32-bit pointer to a **PALETTEENTRY** structure.
LPPOINT	32-bit pointer to a **POINT** structure. Use **NPPOINT** to create 16-bit pointers. Use **PPOINT** to create pointers that match the compiler memory model.
LPPOINTFX	32-bit pointer to a **POINTFX** structure.
LPPRINTDLG	32-bit pointer to a **PRINTDLG** structure.
LPRASTERIZER_STATUS	32-bit pointer to a **RASTERIZER_STATUS** structure.
LPRECT	32-bit pointer to a **RECT** structure. Use **NPRECT** to create 16-bit pointers. Use **PRECT** to create pointers that match the compiler memory model.

Type	Definition
LPRGBQUAD	32-bit pointer to a **RGBQUAD** structure.
LPRGBTRIPLE	32-bit pointer to a **RGBTRIPLE** structure.
LPSEGINFO	32-bit pointer to a **SEGINFO** structure.
LPSIZE	32-bit pointer to a **SIZE** structure. Use **NPSIZE** to create 16-bit pointers. Use **PSIZE** to create pointers that match the compiler memory model.
LPSTR	32-bit pointer to a character string. Use **NPSTR** to create 16-bit pointers. Use **PSTR** to create pointers that match the compiler memory model.
LPTEXTMETRIC	32-bit pointer to a **TEXTMETRIC** structure. Use **NPTEXTMETRIC** to create 16-bit pointers. Use **PTEXTMETRIC** to create pointers that match the compiler memory model.
LPTTPOLYCURVE	32-bit pointer to a **TTPOLYCURVE** structure.
LPTTPOLYGONHEADER	32-bit pointer to a **TTPOLYGONHEADER** structure.
LPVOID	32-bit pointer to an unspecified type.
LPWINDOWPLACEMENT	32-bit pointer to a **WINDOWPLACEMENT** structure. Use **PWINDOWPLACEMENT** to create pointers that match the compiler memory model.
LPWINDOWPOS	32-bit pointer to a **WINDOWPOS** structure.
LPWNDCLASS	32-bit pointer to a **WNDCLASS** structure. Use **NPWNDCLASS** to create 16-bit pointers. Use **PWNDCLASS** to create pointers that match the compiler memory model.
LPWORD	32-bit pointer to a 16-bit unsigned value. Use **PWORD** to create pointers that match the compiler memory model.
LRESULT	32-bit signed value returned from a window procedure or callback function.
MFENUMPROC	32-bit pointer to an **EnumMetaFileProc** callback function.
NEARPROC	16-bit pointer to a function.
OLECLIPFORMAT	16-bit value used as a standard clipboard format.
PATTERN	Equivalent to the **LOGBRUSH** structure. Use **LPPATTERN** to create 32-bit pointers. Use **NPPATTERN** to create 16-bit pointers. Use **PPATTERN** to create pointers that match the compiler memory model.
PCONVCONTEXT	32-bit pointer to a **CONVCONTEXT** structure.
PCONVINFO	32-bit pointer to a **CONVINFO** structure.