

**OS/2 Warp Generation, Volume 1:
OS/2 Warp Version 3, OS/2 Warp with WIN-OS/2
OS/2 Warp Connect and BonusPak**

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Before using this information and the product it supports, be sure to read the general information under "Special Notices" on page xxvii.

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Abstract

This document describes OS/2 Warp Version 3 and investigates some of its new and enhanced functions. The document will provide information and examples of the use of the new features of the base operating system, the Workplace Shell, and the BonusPak that is packed with OS/2 Warp Version 3.

This document was written for IBM and customer technical personnel. Some knowledge of OS/2 2.1 or OS/2 2.11 is assumed.

(573 pages)

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Special Notices

This publication is intended to help IBM and customer support personnel as well as dealers understand the new features of OS/2 Warp Version 3 and its differences from the previous version OS/2 2.1 for Windows. It includes information about OS/2 Warp Version 3 as well as a group of programs packaged as the BonusPak that are being shipped with the product. See the PUBLICATIONS section of the IBM Programming Announcement for OS/2 Warp Version 3 about what publications are considered to be product documentation.

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Preface

This book is the first of two volumes that cover complete information on all existing OS/2 Warp products and the included BonusPak. This includes the following:

- OS/2 Warp Version 3
- OS/2 Warp with WIN-OS/2
- OS/2 Warp Connect

The information provided ranges from installation and configuration of base operating system functions to new enhancements and functions provided. Furthermore it covers the connectivity function of the OS/2 Warp Connect product including installation, configuration, component features such as the new OS/2 Peer and TCP/IP Version 3, Multiprotocol Network Services and interoperability.

The complete series may be ordered using one order number, which provides both volumes. The number to order is SK2T-1304. This includes the following books:

OS/2 Warp Generation, Volume 1: OS/2 Warp Version 3, OS/2 Warp with WIN-OS/2, OS/2 Warp Connect and BonusPak, SG24-4552-00.

OS/2 Warp Generation, Volume 2: Exploring LAN Connectivity With OS/2 Warp Connect, GG24-4505-00.

This document is the first volume, and describes OS/2 Warp Version 3, OS/2 Warp with WIN-OS/2 and OS/2 Warp Connect. It contains information about the base operating system, its enhancements and the BonusPak which is shipped with each product. The document describes the OS/2 Warp Connect features only regarding the base operating system and not the connectivity features. The connectivity features are covered in the second volume of this book series *OS/2 Warp Generation, Volume 2: Exploring LAN Connectivity With OS/2 Warp Connect, GG24-4505-00.*

This document was written for customers, dealers, system engineers, consultants, and others who need to know what is new in this product and to understand the benefits. A knowledge of OS/2 2.11 is assumed.

How This Document is Organized

The document is organized as follows:

- Chapter 1, “Overview of OS/2 Warp Version 3”
This chapter provides an overview of OS/2 Warp Version 3.
- Chapter 2, “Installation Planning for OS/2 Warp Version 3”
This chapter describes the installation and configuration enhancements and considerations for OS/2 Warp Version 3.
- Chapter 3, “Installation of OS/2 Warp Version 3”
This chapter describes the new enhancements in the installation paths and procedures specific to OS/2 Warp Version 3.
- Chapter 4, “Installation of OS/2 Warp with WIN-OS/2”
This chapter describes the installation considerations for OS/2 Warp with WIN-OS/2.
- Chapter 5, “Information and Help for OS/2 Warp Version 3”
This chapter describes the new enhancements in the online help, the tutorial and the printed documentation.
- Chapter 6, “Base Operating System Enhancements”
This chapter describes the major changes in OS/2 Warp Version 3 regarding the base operating system.
- Chapter 7, “Workplace Shell”
This chapter describes the new features and enhancements of the Workplace Shell.
- Chapter 8, “DOS and Windows”
This chapter describes the enhancements and additional support for DOS and Windows in OS/2 Warp Version 3.
- Chapter 9, “Printing”
This chapter describes the enhancements and changes to the OS/2 print subsystem.
- Chapter 10, “Multimedia in OS/2 Warp Version 3”
This chapter describes the enhancements to the multimedia features in OS/2 Warp Version 3.
- Chapter 11, “Hardware Support and Enhancements”

This chapter describes the major enhancements regarding hardware support in OS/2 Warp Version 3.

- Chapter 12, “Diagnosis and Recovery”

This chapter describes the enhancements in OS/2 Warp Version 3 regarding the diagnosis and recovery features.

- Chapter 13, “BonusPak Installation”

This chapter describes the new BonusPak, which is a suite of applications being shipped in addition to OS/2 Warp Version 3.

- Chapter 14, “ IBM Works and Personal Information Manager”

This chapter describes IBM Works and Personal Information Manager, which are applications within the BonusPak.

- Chapter 15, “IBM Internet Connection for OS/2”

This chapter describes IBM Internet Connection for OS/2, which is an application within the BonusPak.

- Chapter 16, “CompuServe Information Manager”

This chapter describes CompuServe Information Manager, which is an application within the BonusPak.

- Chapter 17, “Person to Person”

This chapter describes Person to Person, which is an application within the BonusPak.

- Chapter 18, “System Information Tool”

This chapter describes the System Information Tool, which is an application within the BonusPak.

- Chapter 19, “Multimedia Viewer”

This chapter describes Multimedia Viewer, which is an application within the BonusPak.

- Chapter 20, “Video IN/2”

This chapter describes Video IN/2, which is an application within the BonusPak.

- Chapter 21, “HyperAccess Lite”

This chapter describes HyperACCESS Lite, which is an application within the BonusPak.

- Chapter 22, “FaxWorks for OS/2”

This chapter describes FaxWorks for OS/2, which is an application within the BonusPak.

- Appendix A, “Hard Disk Partitioning Considerations”
This appendix describes considerations for partitioning your hard disk.
- Appendix B, “Considerations for Preloaded Systems”
This appendix describes the considerations for systems that were preloaded with OS/2 Warp Version 3.
- Appendix C, “CID Install”
This appendix lists the new and changed keywords that assist users when performing a CID installation in OS/2 Warp Version 3.
- Appendix D, “DOS and WIN-OS/2 Settings”
This appendix provides information on DOS and WIN-OS/2 settings.
- Appendix E, “CONFIG.SYS”
This appendix covers the structure and contents of the CONFIG.SYS. In addition it provides hints and tips on tuning your system.
- Appendix F, “Dual Display System Using Image Adapter A/A”
This appendix describes how to install the device driver for this adapter and on how to configure it under OS/2 Warp Version 3.
- Appendix G, “FixPak WRU005”
This appendix describes the Warp Fixpak and provides a list of APARs.
- Appendix H, “New REXX Utility Functions”
This appendix lists the new REXX utility functions of OS/2 Warp with WIN-OS/2.
- Appendix I, “IBM Internet Access Configuration Sheets”
This appendix provides the Internet access configuration sheets.
This appendix lists the worldwide Bulletin Board Systems.

Related Publications

The publications listed in this section are considered particularly suitable for a more detailed discussion of the topics covered in this document:

- *IBM TCP/IP V2.0 Command Reference*, SX75-0070
- *IBM TCP/IP V2.0 User's Guide*, SC31-6076
- *IBM TCP/IP Tutorial and Technical Overview*, GG24-3376
- *The Whole Internet User's Guide and Catalog*, ISBN 1-56592-025-2
- *Internetworking with TCP/IP Volume 1*, ISBN 0-13-468505-9
- *Internet: Getting Started*, ISBN 0-13-327933-1

International Technical Support Organization Publications

- *OS/2 Warp Generation, Volume 2: Exploring LAN Connectivity With OS/2 Warp Connect*, GG24-4505-00
- *OS/2 2.11, OS/2 for Windows, New OS/2 Device Drivers, and Updates to OS/2 2.1*, GG24-4212
- *OS/2 2.11 Power Techniques*, GG24-4346
- *OS/2 Configuration Techniques: "Cracking" the Workplace Shell*, GG24-4201
- *OS/2 2.1 Technical Update*, GG24-3948
- *Multimedia in OS/2 Warp Version 3*, GG24-2516
- *OS/2 Installation Techniques; CID Guide*, GG24-4295

A complete list of International Technical Support Organization publications, with a brief description of each, may be found in:

Bibliography of International Technical Support Organization Technical Bulletins, GG24-3070.

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Internet users may find information about redbooks on the ITSO World Wide Web home page. To access the ITSO Web pages, point your Web browser (such as WebExplorer from the OS/2 3.0 Warp BonusPak) to the following:

<http://www.redbooks.ibm.com/redbooks>

IBM employees may access LIST3820s of redbooks as well. Point your web browser to the IBM Redbooks home page:

<http://w3.itsc.pok.ibm.com/redbooks/redbooks.html>

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Part 1. OS/2 Warp Version 3

Chapter 1. Overview of OS/2 Warp Version 3

OS/2 Warp Version 3 is designed for business, mobile and home PC users. It combines the maturity of the OS/2 32-bit operating environment with new features for mobility and quick productivity in a fast, fun, and easy-to-use environment.

Many enhancements have been incorporated into OS/2 Warp Version 3. The vast majority of these are in response to feedback from customers. All have been made to ensure that OS/2 is, and will remain, competitive as an operating system for users who require a 32-bit, preemptive multitasking operating system.

OS/2 Warp Version 3 is a new version of OS/2, the first release since OS/2 2.1 for Windows. This new version of OS/2 has been designed to:

- Use less memory. (It is usable on a system with only 4MB of RAM.)
- Make OS/2 faster, more usable and fun.
- Be easier to install.
- Include an expanded set of functions.
- Have enhanced device support.

OS/2 Warp Version 3 also comes with a BonusPak. The BonusPak includes a suite of productivity applications which are intended to demonstrate the capabilities of the Workplace Shell and OS/2. A complete list of the contents of the BonusPak appears later in this chapter.

1.1 Installation and Configuration

OS/2 Warp Version 3 will install on the following systems:

- A PC with no operating system installed.
- OS/2 2.1 for Windows (with or without ServicePak XR06300 for OS/2 2.1 for Windows).
- DOS 3.3 or higher (with or without Windows installed).
- Windows 3.1 or 3.11.
- Windows for Workgroups 3.1 or 3.11.

Like OS/2 2.1 for Windows, if you want to be able to run Windows 3.1 programs on your OS/2 Warp Version 3 system, you need Microsoft Windows 3.1 or 3.11, or Windows for Workgroups 3.1 or 3.11 currently installed on your computer.

Changes have been made to the installation process and the configuration process, to ensure greater ease of installation, more successful installs and improved recovery capabilities in the event that problems do arise.

There are now two installation options:

- Easy
- Advanced

The “Easy” install is designed to be a “one-button” installation process that provides a default installation. The “Advanced” installation gives the user control over all aspects of the installation.

The format used for the OS/2 Warp Version 3 diskettes has also changed. The installation diskette and Diskette 1 use the standard diskette format. All of the other diskettes are now formatted in XDF format. This allows each diskette to hold 1.86MB of data.

Note: XDF formatted diskettes cannot be copied using the DISKCOPY command.

OS/2 now boots to a very simple Desktop, known as the Maintenance Desktop, after Diskette 6. This allows earlier detection of install problems and makes it easier to fix any problems that may have arisen.

Many of the messages issued during the installation process have been updated to include instructions that are relevant to the operation being performed.

OS/2 Warp Version 3's capability to detect hardware and recover from possible errors has been improved.

There is now a “Smart” installation for DOS and Windows applications, which allows OS/2 Warp Version 3 to recognize many of the popular DOS and Windows applications during installation and set up the correct settings for these products.

1.2 Technical Information Online

The OS/2 online tutorial has been completely redone.

The online Help has been updated and the search arguments are now more user friendly.

The system error messages have been reviewed and in many cases rewritten so that they now supply useful instructions as well as a description of the event that generated the message.

1.3 Base Operating System

In the base OS/2 operating system, there have been many changes designed to enhance performance and memory allocation and to make OS/2 even more reliable.

The system boot has been speeded up by threading some elements of the system startup.

Changes have been made to COM.SYS to improve modem performance.

The ability to dynamically change the LIBPATH entries has been added.

Improvements have been made to increase the performance of the FAT and HPFS file system formats.

Changes have taken place in the Swapper to improve performance.

OS/2 Commands have been updated and Basing introduced.

1.4 Workplace Shell Enhancements

A LaunchPad has been added to allow users to start their most frequently used applications with a single click of the mouse. The Workplace Shell now supports System Object Model (SOM) Version 2.1.

The Comet Cursor is now an option for users. This makes the mouse pointer more visible on the screen by leaving a "trail" behind it. This is especially useful for portable computer users.

Presentation Manager is now 32-bit and has been optimized for greater speed. The Color Palette now comes in two versions: a 16-color palette and a 256-color palette.

The Scheme Palette now has a much wider range of ready-to-use color schemes for the Workplace Shell.

There are now 3-D icons for some of the system objects and some "animated" icons are provided for folders to indicate when a folder is open or closed.

The FIND and INCLUDE functions for Workplace Shell objects have also been improved.

1.5 DOS and Windows Support

The DOS and Windows session settings have been changed, both in the way you access them, and in the default values set for each new session.

The DOS environment under OS/2 now has virtual ASPI support.

OS/2 Warp Version 3 can be installed onto systems that already have Microsoft Windows 3.1, 3.11 or Microsoft Windows for Workgroups 3.1 or 3.11 installed, or support for Windows can be added later.

The number of applications OS/2 will recognize for migration has been expanded.

Windows drivers for many popular sound cards have been included.

1.6 Printing

The majority of the printer drivers supplied with OS/2 Warp Version 3 are now 32-bit drivers and their memory requirements have been reduced.

A new, parallel port option which uses polling, instead of interrupts, for each character has been implemented.

1.7 Multi-Media Enhancements

Support for compressed audio and DSP (Digital Signal Processor) has been added.

AutoDesk (FLC/FLI) animation support has been added to MMPM.

Sharing of audio adapters, that support sharing, is now supported in OS/2 and DOS environments.

1.8 Hardware Support and Enhancements

PCMCIA support has been expanded and the Plug and Play for PCMCIA application has been added to make the installation and use of PCMCIA devices much easier:

- Support for the ATA client driver.
- Socket Services 1 and 2.

A display configuration utility has been added to the System icon in the System Setup folder. It supports DMQS-capable video adapters and allows the user to configure them for the monitor type they have connected to the system.

Many new drivers have been added for:

- Printers.
- Video chip sets and video cards.
- CD-ROM drives (IDE support has been added).
- Sound driver support for a wide range of Audio adapters - both Windows and OS/2.
- Enhanced SCSI support, more adapters are supported.
- Scanner support.

1.9 Problem Diagnosis and Recovery

A visual prompt has been added to the system startup, to make it easier to identify when the recovery options are available and allow the user to choose from a list of previously stored configurations, or to initiate recovery procedures in the event of problems.

Alt+F1 now allows you to have a menu of recovery choices. Up to four system configurations are supported. You can choose one of these options or reset your video to VGA or simply choose to do nothing.

OS/2 Warp Version 3 has an option which archives your current configuration at each system startup if a user wishes to save the configuration on a regular basis.

Alt+F2 displays each device driver name as it is loaded.

Commands and options have been added to improve system trace and dump capabilities.

1.10 BonusPak

The IBM Works suite of integrated applications have been included. This includes a word processor, spreadsheet, chart builder, report writer, flat-file database, and Personal Information Manager.

Internet connectivity (including TCP/IP, Web Explorer, mail, Gopher, FTP, and Telnet) has been added.

The CompuServe Information Manager (OS/2 CIM) for OS/2 is included.

IBM's Person to Person workgroup software has been included.

The SysInfo application has been added to aid users in determining important details about the configuration of their systems.

MultiMedia Viewer application software has also been included.

Video IN/2 has been included to allow video capture and editing.

The HyperAccess Lite communications program has been provided.

Faxworks a send and receive fax program is also supplied.

Chapter 2. Installation Planning for OS/2 Warp Version 3

This chapter focuses on the enhancements and special features that are available with OS/2 Warp Version 3 to aid the installation and configuration of the system.

As OS/2 comes in several *flavors*. The chapters Chapter 4, "Installation of OS/2 Warp with WIN-OS/2" on page 77 and Chapter 24, "Installation Planning for OS/2 Warp Connect" on page 431 cover the specific issues related to these products.

This chapter is not to be used as an installation guide but rather is a supplement to the documentation that comes with OS/2 Warp Version 3. Please refer to *User's Guide to OS/2 Warp* documentation for more detailed installation information.

Among the enhancements included in OS/2 Warp Version 3 are:

- Expanded support for various versions of Windows
- Improved hardware detection and support
- Improved installation support for DOS and Windows applications
- XDF format diskettes to reduce the number of diskettes shipped
- Integrated MMPM/2 installation
- Multiple printer installation support

Special considerations for OS/2 Warp Version 3 Installation include:

- Upgrade matrix for users with existing OS/2, DOS and Windows versions (see Table 3 on page 14)
- Selective Install for various components
- Migrating DOS and Windows applications

2.1 Hardware Requirements

The minimum hardware requirements to install OS/2 Warp Version 3 is documented in the *User's Guide to OS/2 Warp*. There is a wide selection of hardware available on the market which conforms to these requirements. Additional memory, disk space and other adapters may be required above the minimum to perform any particular set of tasks.

Table 1. OS/2 Warp Version 3 Hardware Summary

Memory		Hard Disk Space				
Min	CID	Min	MMPM/2	DOS	Windows	Swap file
4MB	6MB	25-45MB	5MB	2-8MB	10-16MB	7+MB

IBM maintains a document called *The PCM Table* that lists all the systems IBM has tested OS/2 Warp Version 3 on. This document can be downloaded from many online sources.

1. Amount of memory required:

- Minimum amount of RAM required for installation is 4MB. However, if you are planning to run several applications concurrently, we recommend at least 6MB of RAM to achieve acceptable performance. If you are running large applications, your memory requirement may be much higher.

If you are using CID to install OS/2 Warp Version 3, the minimum amount of memory required is 6MB.

- Some systems use 128KB, or more, for Read-Only Memory (ROM) to Random Access Memory (RAM) remapping, also known as ROM BIOS Shadowing. On a system with 4MB of RAM, this 128+KB is not available to OS/2 Warp Version 3, taking the available memory below the minimum required for installation. On these systems, you might need another 512KB-1MB above the 4MB already installed, to satisfy the minimum requirement. Check your system to see if it is capable of disabling ROM BIOS Shadowing and recapturing memory so that you can regain the minimum requirement.

Some systems, not all, will install with less than 4MB of RAM available to OS/2 Warp Version 3. In this special case the following components will *not* be installed:

- MMPM/2
- HPFS
- WIN-OS/2 even if Windows is installed

2. Amount of hard disk space required:

- Minimum amount of disk space required on the hard drive is 25MB to 45MB and an additional 5MB for MMPM/2 support.
- Amount of disk space required for installing DOS ranges from 2MB to 8MB, depending on what version of DOS you are installing.

- Please refer to your Windows documentation for the amount of hard disk space to install different versions of Windows.
- You should always allow some extra space for the SWAPPER.DAT to grow.

Currently, *Stacker for OS/2 and DOS* is the only disk compression utility that supports OS/2 Warp Version 3. Previous versions of Stacker for OS/2 are not supported. Hard disks that are compressed using another utility must be de-compressed before installing OS/2 Warp Version 3. Table 2 outlines the hard disk space requirements for installation of the OS/2 Warp Version 3 components.

Table 2 (Page 1 of 2). Hard Disk Space Requirements for OS/2 Warp Version 3 Components

Feature	Components	DASD
Documentation	OS/2 Tutorial	1592KB
	OS/2 Command Reference	464KB
	REXX Information	200KB
Fonts	Courier	200KB
	Helvetica	428KB
	System Mono-Spaced	68KB
	Times Roman	344KB
	Courier (Outline)	283KB
	Helvetica (Outline)	258KB
	Times New Roman (Outline)	282KB

Table 2 (Page 2 of 2). Hard Disk Space Requirements for OS/2 Warp Version 3 Components

Feature	Components	DASD
Optional System Utilities	Backup Hard Disk	32KB
	Change File Attribute	40KB
	Display Directory Tree	36KB
	Manage Partitions	232KB
	Label Diskettes	36KB
	Link Object Modules	472KB
	Picture Viewer	124KB
	PMREXX	92KB
	Recover Files	48KB
	Restore Backed-up Files	36KB
	Sort Filter	32KB
	Installation Utilities	400KB
	Tools and Games	Enhanced Editor
Search and Scan Tool		76KB
Solitaire - Klondike		376KB
Pulse		43KB
Chess		264KB
Mahjongg Solitaire		952KB
OS/2 DOS Support	DOS Protect Mode Interface	28KB
	Virtual Expanded Memory Management	24KB
	Virtual Extended Memory Support	16KB
WIN-OS/2 Support		1024KB
Multimedia Software Support	Software Motion Video	680KB
	Base Multimedia Support	1152KB
High Performance File System		320KB
Serviceability and Diagnostic Aids		460KB
Optional Bitmaps		730KB

2.2 Software Requirements

OS/2 Warp Version 3 can be installed on a system with no other software loaded. This provides an excellent platform for users who wish to run OS/2 and DOS programs. For those users who wish to run their existing Windows programs, OS/2 Warp Version 3, if WIN-OS/2 support is selected during the installation process, will run these programs, under the control of the existing Windows code, in a DOS VDM. These Windows programs can be run alongside OS/2 programs, or in a separate, full-screen session. To support this mode of operation, display drivers and custom code are installed to support specific versions of Windows. Other versions of Windows are not supported.

To support Windows applications, OS/2 Warp Version 3 can install over, and use the Windows code from the following releases:

- Windows 3.1
- Windows 3.11
- Windows for Workgroups 3.1
- Windows for Workgroups 3.11

Note

Windows for Workgroups 3.1 or 3.11 is supported but OS/2 Warp Version 3 does not enable the LAN connectivity function of Windows for Workgroups 3.1 or 3.11. (See *OS/2 Warp Generation, Volume 2: Exploring LAN Connectivity With OS/2 Warp Connect* for details on how to run in a Windows for Workgroups 3.1 or 3.11 environment.)

Windows code is required *only* if you want the WIN-OS/2 support on your system.

OS/2 Warp Version 3 will recognize and will migrate the existing setup for the following versions of OS/2:

- OS/2 2.1 for Windows
- OS/2 2.1 for Windows with Service Pak

You can install OS/2 Warp Version 3 on a system with other versions of OS/2 already installed, but you *must* format the installation partition during, or before, installation. If you do not reformat, the installation program will display an error and stop.

OS/2 Warp Version 3 cannot be installed over any system which has the OS/2 Warp Version 3 beta code installed on it. To install OS/2 Warp Version 3 in this environment, you must format the partition before starting the installation procedure.

2.3 Upgrade Matrix

Currently, many people are already using OS/2 on their computers. It is very important to know if the current version of OS/2 they are running is compatible with OS/2 Warp Version 3 before installing it. The following section shows common scenarios which most users come across. In addition, we have outlined the Syslevel, Internal Revision Level, and Type information for the previous versions of OS/2 in Table 5 on page 18, to help you to identify which version you are running.

Existing Operating System	OS/2	VDM	WIN-OS/2	Windows	Dual Boot
No system	√	√			
DOS 3.3 or later	√	√			√
DOS 3.3 or later Windows	√	√	√	√	√
OS/2 1.x	Not Supported				
OS/2 Version 2.x	Not Supported				
OS/2 2.1 for Windows	√	√	as before	as before	√

Table 3 shows the major components that a user can expect to find after OS/2 Warp Version 3 has been installed.

Table 4 (Page 1 of 3). Installation Scenarios

Existing Operating System	Format Hard Disk	File System	Install Method	Results
None with <6MB of RAM	Yes	FAT (default)	Easy Install	<ul style="list-style-type: none"> • MPPM/2 Support is de-selected during system configuration. • HPFS Support is de-selected during system configuration. • Choice to install DOS, if selected then Dual Boot Icon exists in Command Prompts folder.
None	Yes	FAT (default)	Easy Install	<ul style="list-style-type: none"> • Choice to install DOS, if selected then Dual Boot Icon exists in Command Prompts folder.
None	Yes	HPFS	Advanced Install	<ul style="list-style-type: none"> • No Dual Boot Icon in Command Prompts folder. • WIN-OS/2 support is not selectable during system configuration. • Windows applications cannot be run.

Table 4 (Page 2 of 3). Installation Scenarios

Existing Operating System	Format Hard Disk	File System	Install Method	Results
<ul style="list-style-type: none"> • DOS 3.3 or later • Windows 	No	FAT	Easy Install	<ul style="list-style-type: none"> • CONFIG.SYS and AUTOEXEC.BAT backed up under \OS2\SYSTEM. • WIN-OS/2 Support is preselected during system configuration. • Dual Boot Icon exists in Command Prompts folder. • Dual Boot is functional. • WIN-OS/2 Full Screen Icon exists. • WIN-OS/2 Window Icon exists. • Windows applications can be run.

Table 4 (Page 3 of 3). Installation Scenarios

Existing Operating System	Format Hard Disk	File System	Install Method	Results
<ul style="list-style-type: none"> • DOS 3.3 or later • Windows • OS/2 2.1 for Windows 	No	FAT	Advanced Install	<ul style="list-style-type: none"> • WIN-OS/2 Support is preselected during system configuration. • You can add existing programs to the Desktop. • You can migrate existing configuration files. • You can view and edit migration results at the end. • Dual Boot Icon exists in Command Prompts folder. • Dual Boot is functional. • WIN-OS/2 Full Screen Icon exists. • WIN-OS/2 Window Icon exists. • Windows applications can be run.
OS/2 Version 2.x and later versions	No			Not supported

Table 4 on page 15 provides information on which functions will be installed based upon the options chosen by the user.

Table 5 on page 18 outlines the Syslevel, Internal Revision Level, and Type information for previous versions of OS/2.

Table 5. Syslevel, Type and Revision for OS/2 Versions

Version	Syslevel	Type	Internal Rev.	OS/2 Warp Version 3 Installable
OS/2 2.0	XR02000	0	6.307	No
OS/2 2.001 (Preload)	XR02005	PT	6.427	No
OS/2 2.0 (Service Pak I)	XR06055	0	6.466	No
OS/2 2.0 (Service Pak II)	XR06100	0	6.543	No
OS/2 2.1	XR02010	0-2	6.514	No
OS/2 2.1 for Windows	XR02011	W-2	6.514	Yes
OS/2 2.1 (Service Pak)	XR06200	0-2	6.617	No
OS/2 2.11	XR06200	0-2	6.617	No
OS/2 2.1 for Windows (Service Pak)	XRC6300	W-2	6.624	Yes
OS/2 Warp Beta2	XR02012	W-Beta2	8.152	No
OS/2 Warp Version 3	XR03000	W	8.162	Yes
OS/2 Warp Version 3 Preload	XR03000	WP	8.162	Yes
OS/2 Warp with WIN-OS/2 Preload	XR03001	0P	8.200	No
OS/2 Warp with WIN-OS/2	XR03001	0	8.200	No
OS/2 Warp Connect	XR03003	0	8.209	No
OS/2 Warp Connect with WIN-OS/2	XR03004	WC	8.210	No

2.4 OS/2 Warp Version 3 Installation Changes

There have been many changes in the installation process for OS/2 Warp Version 3 from previous versions of OS/2:

- The installation procedure has been enhanced to be easier to use and to support more hardware and software configurations.
- In previous versions of OS/2 Version 2.x, MPPM/2 was required to be installed after OS/2 was installed. MPPM/2 installation has now been integrated into the OS/2 Warp Version 3 install process.
- Multiple printers can be installed and configured. Under OS/2 Version 2.x you could only install one printer during the installation. Additional printers could be added by running Selective Install afterwards.
- The Maintenance Desktop is a new feature that allows you to run the second phase of the OS/2 install program. It provides a minimal Desktop only.
- XDF (eXtended Diskette Format) installation media reduces the number of diskettes in the product package, and reduces the time taken to install.

The Maintenance Desktop can be restarted by selecting the *Maintenance Desktop* option from the Recovery Choices Menu. (See Chapter 12, “Diagnosis and Recovery” on page 247 for more information.)

See also 2.4.6, “DOS and Windows Settings” on page 23.

2.4.1 Installation Procedure

The OS/2 Warp Version 3 installation procedure gives you the choice of two following installation methods. These are *Easy Installation* and *Advanced Installation*.

Easy Installation is designed to be a one-button install, whereas the Advanced Installation gives the user control over the install process.

The following shows the difference between Easy Installation and Advanced Installation:

1. Easy Installation

With the Easy Installation, OS/2 Warp Version 3 will make installation decisions for you based upon the hardware and software it detects. These are:

- OS/2 Warp Version 3 will be installed on the C drive.

- The FAT file system will be used.
- Dual Boot will be installed.
- All the fonts, online documentation and utilities will be installed.

You will be prompted to select a default printer at the System Configuration dialog (see Figure 1 on page 49) if you attempt to install OS/2 Warp Version 3 without defining one.

Easy Installation defaults:

Easy Installation uses defaults for the following:

- Partitioning your hard disk
- Install drive (C:)
- Formatting the installation partition
- Dual Boot
- Video chip set
- CD-ROM drive support
- SCSI support
- APM (Advanced Power Management) support
- Printer
- Online documentation
- Fonts (a set of default fonts)
- Utilities
- Tools and games
- OS/2 DOS support
- Windows
- Serviceability aids
- Bitmaps
- Migrate DOS, Windows or OS/2 applications to the Desktop.

If your system has more than 6MB of RAM, the following defaults will be installed:

- HPFS support
- MPM/2 support
- Multimedia software and support

For more details see 3.2, "Installation Procedure" on page 43 for the installation dialogs.

2. **Advanced Installation**

If you are taking the Advanced Installation path, OS/2 Warp Version 3 provides you with the flexibility to configure your system the way you want it. This is similar to the previous versions of OS/2 Version 2.x. It is designed to allow more experienced users to choose the way the system is installed.

Using Advanced Installation you are allowed to control the following:

- Repartitioning of the disk(s)
- Formatting of the installation partition:
 - FAT
 - HPFS
- Which optional components are installed
- OS/2 configuration parameters in CONFIG.SYS
- DOS configuration parameters in CONFIG.SYS
- Formatting of other drives

For more details see 3.2, "Installation Procedure" on page 43 for the installation dialogs.

2.4.2 **MMPM/2**

Unlike OS/2 Version 2.x, the multimedia installation has been integrated into the OS/2 Warp Version 3 installation and no separate installation is necessary. When you perform an Easy Installation, the system makes all the decisions for you based on the hardware it detects. If you have less than 6MB of RAM, MMPM/2 will not be installed automatically. If you wish to run MMPM/2 on a machine with less than 6MB of RAM, you must select MMPM/2 support on the Software Configuration panel during installation (see 3.2, "Installation Procedure" on page 43), or run Selective Installation after the install has completed.

2.4.3 Multiple Printer Install Support

During the installation you can:

- Install more than one printer object
- Assign each object to a different port
- Assign more than one printer to the same port

With previous versions of OS/2 you cannot define multiple printers during the installation.

2.4.4 Formatting Multiple Partitions

If you have more than one partition and selected the Advanced Installation option, you can elect to have them formatted during the installation process. Each drive can be formatted either FAT or HPFS. This feature is accessed by clicking on the **Options** menu, then clicking on **Format...**

2.4.5 Maintenance Desktop

After the first reboot, the OS/2 kernel, Presentation Manager, and the Workplace Shell are loaded and operational. At this point the system loads the **Maintenance Desktop**, and starts the second, graphical part of the install program.

If there is a fundamental hardware or driver problem, then this second boot will not complete. It is better to find out at this stage that OS/2 will not install rather than at the end of 13, or more, diskettes!

The Maintenance Desktop allows you to:

- View the online help
- Run OS/2 commands from a command prompt
- Run the second, graphical part of the OS/2 Warp Version 3 installation

No other components have been installed at this stage.

See 2.5.7, "Windows Considerations" on page 35, for details about installing with Windows.

2.4.6 DOS and Windows Settings

Some of the default DOS and Windows settings that are available after the installation of OS/2 Warp Version 3 have changed to the previous OS/2 versions.

See 3.6, “DOS and Windows Settings” on page 74 for all the default DOS and Windows settings.

2.4.7 XDF Diskette Format

XDF is a higher-capacity diskette image format used for most of the OS/2 Warp Version 3 install diskettes. All of the diskettes except the Installation Diskette and Diskette 1 in the OS/2 Warp Version 3 package are formatted using XDF, which allows a diskette to hold 1865216 bytes of data. This format reduces the number of diskettes required during installation, and reduces the installation time.

In order to access the data on XDF diskettes, drivers and a utility are provided on the first two diskettes. XDFLOPPY.FLT is a new filter file added in OS/2 Warp Version 3 to serve as an interface between the DMD (Device Manager Driver) layer and the ADD (Adapter Device Driver) layer.

IBM1FLPY.ADD (for non-Micro Channel systems) and IBM2FLPY.ADD (for Micro Channel systems) are placed into the \OS2\BOOT subdirectory during installation to support subsequent access to these types of diskettes.

XDFCOPY is the only utility that can write to an XDF format diskette. It is used to:

- Transfer the contents of an XDF diskette to an image file
- Transfer an image file to a diskette
- Transfer the contents of an XDF diskette to another diskette

Note

Since all the XDF diskettes have software write protection, you can only *read* these diskettes. If you want to back up your diskettes, you must use XDFCOPY.

You cannot write to any of the XDF formatted diskettes, erase files, or bundle files because the diskettes are write protected. Using the DISKCOPY command will make an XDF diskette unreadable. You would then have to reformat the diskette or use XDFCOPY to recreate the diskette.

The Installation Diskette and Diskette 1 are still FAT format diskettes, that is 1.44MB. This enables users to copy, delete and edit files from these diskettes using the existing OS/2 utilities, such as COPY, DEL, and TEDIT.

You cannot use DISKCOPY to copy XDF diskettes.

All the image transfer programs, such as OS2IMAGE, IMAGE and LOADDSKF used with previous versions of OS/2, can still be used to create diskette images of the Installation Diskette and Diskette 1.

Microsoft now also uses a similar diskette format for the latest versions of its products called DMF (Distribution Media Format). DMF diskettes are not directly supported by OS/2 Warp Version 3, although OS/2 Warp with WIN-OS/2 and OS/2 Warp Connect do have this support. See 3.3.1, "DMF Diskette Support" on page 68 for more information.

2.4.7.1 Creating Backup Diskettes with XDF Format

To create images of the XDF diskettes, two new files are needed: XDFLOPPY.FLT and XDFCOPY.EXE. New versions of IBM1FLPY and IBM2FLPY are also needed. IBM1FLPY.ADD and IBM2FLPY.ADD are copied into the \OS2\BOOT subdirectory during installation.

XDFLOPPY.FLT is a new filter file added in OS/2 Warp Version 3 to serve as an interface between the DMD layer and the ADD layer. XDFCOPY is a utility that formats a diskette in the XDF format and then performs the same function as DISKCOPY.

Diskette image utilities that are not aware of XDF format diskettes will not be able to back up diskettes other than the Install Diskette and Diskette 1.

All the necessary files and drivers to process XDF diskettes are on the OS/2 Warp Version 3 installation diskettes, and are installed as part of the normal installation process.

However, the drivers and the XDFCOPY utility will work with versions of OS/2 Version 2.x.

- Installing XDF support: To add support for XDF diskettes on OS/2 Version 2.x, assuming OS/2 is installed on the C: drive, do the following:

- **For non-Micro Channel systems:**

1. Insert the Installation Diskette into drive A.
2. Type `COPY A:\XDFCOPY.EXE C:\OS2` and press Enter.
3. Type `RENAME C:\OS2\IBM1FLPY.ADD IBM1FLPY.OLD` and press Enter.
4. Remove the Installation Diskette from drive A and insert Diskette 1 into drive A.
5. Type `COPY A:\XDFLOPPY.FLT C:\OS2` and press Enter.
6. Type `COPY A:\IBM1FLPY.ADD C:\OS2` and press Enter.
7. Edit the CONFIG.SYS file to include the statement
`BASEDEV=XDFLOPPY.FLT.`
8. You will have to shut down and reboot to enable these changes.

- **For Micro Channel Systems:**

1. Insert Installation Diskette into drive A.
2. Type `COPY A:\XDFCOPY.EXE C:\OS2` and press Enter.
3. Type `RENAME C:\OS2\IBM1FLPY.ADD IBM1FLPY.OLD` and press Enter.
4. Type `RENAME C:\OS2\IBM2FLPY.ADD IBM2FLPY.OLD` and press Enter.
5. Remove the Installation Diskette from drive A and insert Diskette 1.
6. Type `COPY A:\XDFLOPPY.FLT C:\OS2` and press Enter.
7. Type `COPY A:\IBM1FLPY.ADD C:\OS2` and press Enter.
8. Type `COPY A:\IBM2FLPY.ADD C:\OS2` and press Enter.
9. Edit the CONFIG.SYS file to include the statement
`BASEDEV=XDFLOPPY.FLT.`
10. You will have to shut down and reboot to enable these changes.

Note

The XDF support was implemented in the IBM1FLPY.ADD only and *not* in IBM2FLPY.ADD. You must have this file support if you intend to access XDF diskettes (such as OS/2 Warp Version 3 and BonusPak).

IBM2FLPY.ADD calls IBM1FLPY.ADD to do the processing.

Thus on Micro Channel machines you need *both* if (and only if) you need to access an XDF formatted diskette (Disk 2 to 'n' of the installation package).

If you will only be using the CD-ROM, then you don't need both device drivers.

- XDF image to diskette: To make a diskette from an image, type the following from a command prompt:

```
XDFCOPY <IMAGENAME> A:
```

- XDF diskette to diskette: To make an XDF diskette from an XDF diskette, type the following from a command prompt:

```
XDFCOPY A: B:
```

Note

XDFCOPY is limited to one OS/2 or DOS command prompt session at a time. Starting XDFCOPY under a second OS/2 or DOS session will hang the system.

Remember, DISKCOPY will not correctly copy an XDF format diskette.

2.4.8 CID Install

Installing OS/2 Warp Version 3 for multiple users is a very tedious and time-consuming process. That is why most system administrators would choose to install OS/2 Warp Version 3 via CID. With CID install, OS/2 Warp Version 3 is copied onto a system which is set up as a code server on a network and allows others to access the code and install it on their own machines. This eliminates the need to insert diskettes on each machine and if all the users are using the same response file to download the code, they will have identical configurations. This helps the system administrator to maintain all the systems and to have better control.

The procedure for installing OS/2 Warp Version 3 via CID is the same as in the previous version of OS/2. Appendix C, "CID Install" on page 477

contains a list of all the new and changed keywords in OS/2 Warp Version 3 that can be used in a response file during CID install.

On a OS/2 Warp Version 3 system, a sample response file SAMPLE.RSP can be found in the \OS2\INSTALL directory that lists all of the available keywords and their options.

For your installation planning, be aware that the CID installation requires a minimum of 6MB of RAM.

OS/2 Installation Techniques: CID Guide, GG24-4295 exists fully explains the current CID implementation with OS/2 Warp Version 3.

2.5 Installation Planning

The following section describes changes in OS/2 Warp Version 3 which you should be aware of before installation.

You will save installation time and attempts, if you have made up your mind about whether or not you wish to install the Dual Boot feature, how you plan to partition your hardfile (FAT, or HPFS), whether you wish to migrate your applets from OS/2 Version 2.x, what video support you are using or if you have an existing Windows version you wish to install OS/2 Warp Version 3 onto.

2.5.1 Dual Boot

Dual Boot is a feature that allows OS/2 and DOS to co-exist on a C drive. Running the utility, BOOT.COM, will make either OS/2 or DOS active at the next boot.

Note

You can have more than one C drive, but only one can be active at a time. If you wish to have more than one C: then you will have to use Boot Manager to switch between them. See also Appendix A, "Hard Disk Partitioning Considerations" on page 447.

The BOOT.COM utility provides the necessary logic to copy the configuration files and the boot record of the C drive, and will replace them with either OS/2 or DOS versions.

During Easy Installation, the Dual Boot feature is automatically set up for you and a Dual Boot icon is created inside the Command Prompts folder. (This is not the case with OS/2 Warp with WIN-OS/2 although BOOT.COM is installed.)

During Advanced Installation, Dual Boot will be installed if:

- OS/2 is installed on C:
- C: uses the FAT file system

Note

For both Easy Installation and Advanced Installation, if your C: is using the HPFS file system, no Dual Boot icon will be created in the Command Prompts folder because DOS cannot reside on an HPFS partition.

After OS/2 Warp Version 3 is installed, you can open the Dual Boot object to switch to native DOS.

2.5.1.1 Installing DOS Using Dual Boot

If DOS is not installed and you start the Dual Boot feature it will warn you that DOS system files could not be found, as shown below:

```
SYS1740: Warning! DOS system files were not found, DOS cannot be started.
If you continue, the OS/2 system files will be saved and you may
install DOS on drive C:.
Once DOS is installed, you may return to OS/2
by using the command BOOT/OS2.

You requested to start DOS from drive C:.
Do you want to continue (Y/N)?
```

If your response is Y, the system saves the OS/2 boot files (BOOT.OS2, CONFIG.OS2 and AUTOEXEC.OS2) in the C:\OS2\SYSTEM subdirectory.

You must then shut down as prompted and install DOS on the primary partition. During the DOS installation, you will see a pop-up message similar to the following example:

```
PC DOS 6.3 Setup...
```

```
OS/2 Dual Boot System
```

```
To return to OS/2 after the install, type BOOT /OS2.  
To return to DOS. type BOOT /DOS. BOOT.COM is located  
in the C:\OS2 directory. BOOT.COM is an OS/2 file.
```

```
Press enter to continue
```

During the DOS installation, the DOS boot record, CONFIG.SYS, and AUTOEXEC.BAT are created. When the installation completes, restart the system. If you type `C:\OS2\BOOT /OS2`, BOOT.COM will save the DOS boot files, (BOOT.DOS, CONFIG.DOS and AUTOEXEC.DOS) and restore the OS/2 Boot files before switching back to OS/2.

2.5.1.2 Switching Between DOS and OS/2

To switch between OS/2 and DOS you use the BOOT.COM utility. You can do this by using the Dual Boot object in the Command Prompts folder, or by entering the command at a command prompt.

In both cases, type one of the following:

- `C:\OS2\BOOT /OS2` or
- `C:\OS2\BOOT /DOS`

You are prompted to confirm if you want to continue. If your response is **Y**, the system automatically restarts itself. To suppress the restart, specify the `/NOBOOT` switch with your BOOT.COM command. If you type `C:\OS2\BOOT /OS2 /N` or `C:\OS2\BOOT /DOS /N` the system will suppress the reboot. If you are running OS/2 this allows you to do an orderly shutdown before switching to DOS.

You can add this switch to the Parameters field of the settings for the Dual Boot object. Closing the Dual Boot object before you shut down and reboot prevents OS/2 restarting Dual Boot when you switch back to OS/2 later.

```
[C:\]C:\OS2\BOOT /DOS /N
```

```
You requested to start DOS from drive C:.  
Do you want to continue (Y/N)? Y
```

```
The hard disk is being prepared. Please wait...  
The hard disk preparation is complete.  
SYS1716: Warning! You should now restart your system by  
selecting Shutdown from the Desktop, or pressing Ctrl+Alt+Del.  
Press any key to continue.
```

When you press a key, a command prompt appears. To boot to DOS, simply do a shutdown. When you reboot the system will come back up in DOS.

If you receive the following message when you switch from the DOS Shell to the command prompt:

```
Unable to load command.com (or dosswap.exe), Retry (y/n)?
```

make sure you have the following line in your CONFIG.SYS:

```
SHELL=C:\DOS\COMMAND.COM C:\DOS /P
```

where /P indicates COMMAND.COM should be loaded permanently.

If you install OS/2 Warp Version 3 over DOS, the system automatically adds the statement for you. However, if DOS is installed after OS/2, then you will have to verify if the above statement has been added to the CONFIG.SYS.

If you type `C:\OS2\BOOT /Q` at the command prompt, the system tells you which operating system is ready to boot next. You should see a screen similar to the following:

```
[C:\]C:\OS2\BOOT /Q  
The next system reset will start DOS from drive C:.
```

During the installation of OS/2, default copies of BOOT.OS2, CONFIG.OS2, and AUTOEXEC.OS2 are created.

With OS/2 2.1 for Windows, in order to install Dual Boot after installation, the DBPREP package prepared the system and let you recover to OS/2 if a problem occurred during the DOS installation.

With OS/2 Warp Version 3, BOOT.COM has been modified to provide additional functions that allow you to install native DOS after OS/2 has been installed, DBPREP is no longer required.

2.5.2 Hard Disk Partitioning

Before installing operating systems on your hard disk, you should consider how to split up your hard disk space. To do that you will need to partition the hard disk. See Appendix A, "Hard Disk Partitioning Considerations" on page 447.

You may want to choose, during your system startup, which operating system you wish to boot. Boot Manager provides this facility.

Most machines on the market have BIOS that can only address 1024 cylinders, and for this reason the Boot Manager must reside on the first 1024 cylinders of the first hard drive. This restriction applies to any bootable partition (for DOS, OS/2 and Boot Manager).

Some operating systems must write their boot record on the first 1MB of the hard disk. If you are using such an operating system, install the Boot Manager at the end of the hard disk.

With the previous versions of OS/2, it was recommended that about 5MB be reserved to set up a maintenance partition, which is useful in case of a boot failure, especially when a CHKDSK is required. When you start up the system from the hard disk, many files are opened and, for example, if you want to do a CHKDSK /F, the system would not allow you to do it because of the open files.

With OS/2 Warp Version 3, this is no longer necessary because of the Archive and Recovery feature. See 12.5, "Archive and Recover System Files" on page 251.

2.5.3 Hard Disk Formatting

The installation procedure in OS/2 Warp Version 3 uses the Quick formatting option. This will only reset the directory entries in the disk, and will not erase all the data and rescan the entire surface for bad sectors. This can lead to the following problems:

- Data corruption if defective sectors on the disk are not marked as *Bad*.
- If the disk is HPFS and you do a `CHKDSK /F:3` you may get files recovered as lost data.

For new disks that may have defective sectors that have not been marked as Bad, and where you wish to ensure *all* the data from the disk is erased, you should format the disk with the Long option. For example, to format the D drive using the HPFS file system, to scan for defective sectors, and to erase all the data you would do the following:

- Insert the Installation Diskette in drive A
- Press Ctrl+Alt+Del
- When the IBM logo screen is displayed, remove the Installation Diskette from drive A and insert the Diskette 1; press Enter
- When the "Welcome to OS/2" screen is displayed, press F3
- Type `FORMAT D: /FS:HPFS /L`

2.5.4 FAT versus HPFS

If you have a system with only 4MB of memory, it is recommended that you use the FAT file system instead of HPFS.

With earlier versions of OS/2, support for HPFS was always installed and the IFS statement was automatically added to the CONFIG.SYS. With OS/2 Warp Version 3, if you choose the FAT file system and you have less than 6MB of RAM, HPFS support is not installed. If you decide to format a partition with HPFS, you must perform a Selective Install to add HPFS support. See also Appendix A, "Hard Disk Partitioning Considerations" on page 447 for more details on managing disks.

2.5.5 Productivity Applets

The following OS/2 Version 2.x Productivity Applets are not part of the OS/2 Warp Version 3 product:

- Diary
- To-Do List
- Sticky Pad
- Note Pad
- Tune Editor
- Database
- Spreadsheet
- Alarm
- Calculator
- PMChart
- PMTerminal

If you are upgrading from OS/2 2.1 for Windows to OS/2 Warp Version 3, then these files will not be removed. However, no objects will be created for them in the Productivity folder. If you wish to use any of the above utilities you will have to create a program object for each Applet manually, or use the Add Programs object.

To install all the Productivity Applets and games on OS/2 Warp Version 3 do the following:

- Insert OS/2 2.1 for Windows diskette 7 in drive A.
Type:
`UNPACK A:SCRAMBLE`
`UNPACK A:SOFTTERM`
- Insert OS/2 2.1 for Windows diskette 8 in drive A.
Type:
`UNPACK A:PMCHART`
- Insert OS/2 2.1 for Windows diskette 9 in drive A.
Type:
`UNPACK A:JIGSAW`
- Insert OS/2 2.1 for Windows diskette 11 in drive A.
Type:

UNPACK A:PMDIARY
UNPACK A:NEKO

To create program objects for the Productivity Applets:

- Open the System Setup folder
- Open the Add Programs object
- Select **Search for and select programs to add**
- Select **C:**, or the OS/2 drive
- Select **OS/2**, deselect DOS and Windows
- Select **OK**
 - If the message "there were no programs" . . . is displayed, select **Yes**
 - Otherwise select **Other Programs...**
- Scroll down to the \OS2\APPS entries
- Select the executable file from the Available Programs list
- Select **Add>>>**
- Select other programs as required
- Select **OK**
- Select **OK**
- Select **Exit**

The programs will be added to the Additional OS/2 Programs folder. This folder will be created if it does not exist.

There are no utilities provided with OS/2 Warp Version 3 to migrate data between the Productivity Applets and the applications provided in the BonusPak.

2.5.6 Video Configuration

This section covers the issues related to installing video support with OS/2 Warp Version 3.

1. The installation program will detect if the system has SVGA display support. To correctly identify the chipset and capabilities of the SVGA support for each machine, the **SVGA** utility is run. SVGA.EXE is a DOS-mode program and will not run if you deselect DOS support in the Advanced Install path, or if installing via CID.

The SVGA utility supports the most popular SVGA chipsets and adapters, but if your system has specific capabilities, and an SVGA setup utility you can run this as part of the installation. Select **Install Using Display Adapter Utility Program** in the Monitor Configuration/Selection Utility dialog.

2. Dual Display configuration is very common in companies where the daily activities involve imaging. In most cases, because of the required resolution and the requirement to support a variety of monitors, the Image Adapter A/A is used. OS/2 Warp Version 3 supports the use of this adapter and although the Image Adapter A/A (IAA/A) has been widely used, the use of this adapter in an OS/2 environment has not been explained in detail. Appendix F, "Dual Display System Using Image Adapter A/A" on page 527 describes the procedure to install the driver for this adapter and provides some hints and tips on how to configure your system for OS/2 Warp Version 3.

2.5.7 Windows Considerations

OS/2 Warp Version 3 is not supplied with the IBM version of Windows code (WIN-OS/2), but if DOS and Windows are already installed, OS/2 Warp Version 3 will allow you to fully utilize the Windows support, as with OS/2 2.1 for Windows.

OS/2 Warp Version 3 supports the following versions of Windows:

- Windows 3.1
- Windows 3.11
- Windows for Workgroups 3.1
- Windows for Workgroups 3.11

Installation support over Windows for Workgroups is available. However, no network capability is available with OS/2 Warp Version 3. See the online book, *Application Considerations*, for more information on this.

Enhancements have been made to the CID response file to support installation of multiple versions of Windows. Keywords such as *WindowsSupport* and **ExistingWindowsPath** have been added or changed in OS/2 Warp Version 3. These can be used to specify versions of Windows and the path to the existing Windows system. See Appendix C, "CID Install" on page 477 for more information on CID.

With a default install, Windows code will be on the C drive. If Windows is installed on another local drive then OS/2 Warp Version 3 will load Windows support from there.

The installation program will normally detect if your system has images of the Windows diskettes on the hard disk, as is the case with preloaded machines from IBM and other OEMs. However, if the OEM did not correctly modify SETUP.INF then you will be prompted for the Windows diskettes during the install. Assuming the images of the diskettes are in the C:\IMAGES directory, editing the following lines in SETUP.INF will allow the install program to use the images, rather than prompt for diskettes:

```
[disks]
C:\IMAGES\DISK_W1,"Microsoft Windows 3.1 Disk #1",disk1
C:\IMAGES\DISK_W2,"Microsoft Windows 3.1 Disk #1",disk2
C:\IMAGES\DISK_W3,"Microsoft Windows 3.1 Disk #1",disk3
C:\IMAGES\DISK_W4,"Microsoft Windows 3.1 Disk #1",disk4
C:\IMAGES\DISK_W5,"Microsoft Windows 3.1 Disk #1",disk5
C:\IMAGES\DISK_W6,"Microsoft Windows 3.1 Disk #1",disk6
```

If you want to copy all files from the Windows diskettes to a single directory then you will only need the following lines in SETUP.INF:

```
[disks]
C:\IMAGES\ALLDISKS,"Microsoft Windows 3.1 Disk #1",disk1
```

For details of the changes made by the OS/2 Warp Version 3 install program to Windows files, see 3.3.2, "Changes made to DOS and Windows Files" on page 68.

If you wish to use Windows from an HPFS drive, this is not directly supported. However, you can use the following workaround to allow OS/2 Warp Version 3 to use this code:

- Back up the Windows code to another drive or to diskettes
- Install OS/2 Warp Version 3
- When the Maintenance Desktop is displayed after the first installation phase:
 - Open a command prompt
 - Restore the Windows code to the same directories
 - Close the command prompt
 - Continue with the OS/2 Warp Version 3 installation

Note

Once Windows code has been installed in this manner then there is no way to modify its configuration through the Windows **SETUP** program. This is because **SETUP** *cannot* be run under OS/2, and DOS cannot access HPFS drives. You will have to completely refresh the Windows code if you wanted to upgrade a component, such as the video support.

The same principles apply to using the WIN-OS/2 code shipped with OS/2 Version 2.x.

- Save the \OS2\MDOS\WINOS2 directory, and all its subdirectories from an OS/2 Version 2.x system before you install OS/2 Warp Version 3.
- Copy this directory tree back onto an OS/2 Warp Version 3 system after the install process has completed.
- You will need to unpack the following files from OS/2 Warp Version 3 Installation Diskette 9:
 - \OS2\DLL\WINPRF.DLL
 - \OS2\DLL\PMDDDE.DLL
 - \OS2\MDOS\VWIN.SYS
 - \OS2\DLL\PMCLIP.DLL
 - \OS2\MDOS\VW32S.SYS
 - \OS2\PMCONTRL.INF

This is done by typing the following command while in the C:\ directory:

```
UNPACK A:\WINBASE
```

Make the following changes to CONFIG.SYS to enable WIN-OS/2 support at the next reboot:

- Add the line `DEVICE=x:\OS2\MDOS\VWIN.SYS`
- Add the line `DEVICE=x:\OS2\MDOS\VW32S.SYS`
- To the `SET PATH=` statement add `x:\OS2\MDOS\WINOS2;`

Note

Running Selective Install to reinstall WIN-OS/2 support will "break" the code installed from OS/2 Version 2.x. This is because OS/2 Warp Version 3 expects to find native Windows code.

Chapter 3. Installation of OS/2 Warp Version 3

This chapter covers the various paths through the installation procedure of OS/2 Warp Version 3, and the dialogs you will be shown. Before you start installing OS/2 Warp Version 3 you should be aware of these installation paths in order to be sure which installation method is best for you.

3.1 Installation Paths

The installation procedure of OS/2 Warp Version 3 allows you to choose the right installation path for your system. You may wish to install your operating system with a basic set of functions without answering any questions from installation panels. You may have to install only one operating system or a number of combinations of operating systems. You may wish to select a different source or target drive and select another disk format.

Since there are many possible installation scenarios, you should look at the installation paths shown in this chapter to gain help in your decision making.

OS/2 Warp Version 3 - Base Installation Path

```
-----
-Install DOS- -Install Windows-
--Install OS/2 Warp Version 3-- -Easy Install-----
                                -Advanced Install-
-----
-----
-Selective Install---
-Selective Uninstall-
```

The base installation path shows that you may install OS/2 Warp Version 3 on DOS and/or Windows. The installation routine of OS/2 Warp Version 3 then allows you to choose between Easy Installation and Advanced Installation. After the completion of OS/2 Warp Version 3, you have the choice of either selectively installing single features on top of OS/2 Warp Version 3 or selectively de-installing features from OS/2 Warp Version 3.

As described in 2.4.1, "Installation Procedure" on page 19, there are two installation procedures in OS/2 Warp Version 3. These are Easy Installation

and Advanced Installation. Both the Easy and the Advanced procedures use a two-phase approach to the installation.

3.1.1 Installation Phase 1

OS/2 Warp Version 3 - Installation Path - Phase 1

```
--Installation Diskette--IBM Logo--Disk 1--Welcome to OS/2-----  
--Easy-----  
-Adv--Drive C-----  
-FDISK-----Format--HPFS--  
-Partition-(1)-----FAT--  
--Disk 2...6--Installation Disk--Disk 1--(Reboot)-----
```

Note:
¹ If partitions are modified within the FDISK utility you must reboot at this point. You will then have to insert the Installation Diskette and start from the beginning.

Phase 1 installs OS/2 Warp Version 3 following these steps:

1. Boots the system from the Installation Diskette and Disk 1.
2. Checks the hardware.
3. Asks you to choose Easy or Advanced installation:
 - a. **Easy Installation:**
 - Defines default partition and formats it if required.
 - Installs using the defaults (for details see 3.2, "Installation Procedure" on page 43).
 - b. **Advanced installation:**
 - Asks you if C: is the target for the installation drive.
 - If not: FDISK is run. You may repartition your hard disk. This may require a reboot if partitions are changed.
 - Asks you if the installation partition is to be formatted.
 - If yes, asks you which file system is required:
FAT or HPFS
4. Copies the base system files to enable a Maintenance Desktop to be loaded.
5. Reboots the system.

3.1.2 Installation Phase 2

Phase 2 proceeds with the following steps for Easy and Advanced Installation:

1. Loads the Maintenance Desktop
2. Displays the System Configuration dialog

This allows the user to change:

- Country and keyboard settings
- Mouse support
- Serial device support
- Primary and secondary display
- APM support
- PCMCIA support
- CD-ROM device support
- Printer support
- Multimedia device support
- SCSI device support

3. For Advanced Installation path only:

- Displays the OS/2 Setup and Installation dialog.

This allows the user to control which optional components are installed.

4. For both Easy and Advanced Installation

- Completes the installation, prompting for diskettes if necessary.

OS/2 Warp Version 3 - Installation Path - Phase 2

```
--Maintenance Desktop-----
-----
---System Config-----
      -Device Support-- -Country-----
                                -Keyboard-----
                                -Mouse-----
                                -Primary Display---
                                -Serial Device-----
                                -Secondary Display-
                                -APM-----
                                -PCMCIA-----
                                -CD-ROM Device-----
                                -Printer-----
                                -Multimedia Device-
                                -SCSI Adapter-----

-- -Easy----- -Disk 7...13---
|-----|-----
-Adv-----
      -Setup-- -Format Partitions-----
            -OS/2 Settings-----
            -DOS Settings-----
            -Documentation-----
            -Fonts-----
            -Optional System Utils-
            -Tools And Games-----
            -OS/2 DOS Support-----
            -WIN-OS/2 Support-----
            -Multimedia Software---
            -Service / Diagnostic--
            -Optional Bitmaps-----

-- -----Printer 1...4-----
-Windows 1...5-(1)

-- -----Display 1...4-----
-Monitor Config-(2)-----
      -Monitor Util-

--Setup Complete--(Reboot)--Tutorial--Desktop-----
```

Notes:

¹ Prompts for Windows disks only if WIN-OS/2 support to be installed.

² SVGA installation only.

3.2 Installation Procedure

During the installation of OS/2 Warp Version 3 the dialogs in the following sections are displayed. This section will only show the major dialogs where you have to make a choice or which are different from previous OS/2 versions.

```
Installing Operating System/2

Welcome to OS/2!

To begin the installation, select one of the following methods.
Then press Enter.

1. Easy Installation

Easy Installation is intended for most users of OS/2. The
system makes decisions for you based on your current computer
setup. Press F1 now for more information.

2. Advanced Installation

Advanced Installation is intended for experienced technical
users. You must make decisions about your computer setup.
Press F1 now for more information.

Enter F3=Command Prompt F1=Help
```

After inserting the Installation Diskette and Disk 1 you will reach the welcome screen of OS/2 Warp Version 3. Here you have the choice between Easy and Advanced Installation.

1. Easy Installation

If you choose Easy Installation at that point, the following defaults will be installed on your system.

- Partitioning

If the first disk is not partitioned, then a single partition will be created that is the size of the disk.

- Formatting

If the installation partition is not formatted, then it will be formatted using the FAT file system.

If the installation partition is formatted (HPFS or FAT), then no format will be done.

All formatting during installation uses the Quick formatting option. (See 2.5.3, "Hard Disk Formatting" on page 32 for possible problems using Quick formatting.)

- **Install drive**

OS/2 Warp Version 3 will be installed on drive C:

- **Dual Boot** will be installed.

- **HPFS**

If the system has more than 6MB of RAM, HPFS support will be installed.

- **Video**

If a supported high resolution video chip set is detected, its support will be installed.

If the chipset is not supported or not identified then VGA support will be installed.

- **MMPM/2** If the system has more than 6MB of RAM and a supported multimedia adapter is detected, MMPM/2 support will be installed.

- **CD-ROM**

If a supported CD-ROM drive is detected, CD-ROM support will be installed.

- **SCSI**

If a supported SCSI adapter is detected, SCSI support will be installed.

- **Advanced Power Management (APM)**

If APM features are detected, APM support will be installed.

- **Printer**

You will be prompted to accept the default printer or to select a printer

- **Documentation**

All the online documentation will be installed.

- **Fonts**

The following fonts will be installed:

- System Proportional
- Swiss
- Symbol Set
- System VIO
- Courier
- Helvetica
- System Mono-Spaced
- Times Roman
- Courier Outline
- Helvetica Outline
- **Utilities**

All of the following system utilities will be installed:

 - Backup Hard Disk
 - Change File Attributes
 - Display Directory Tree
 - Manage Partitions
 - Label Diskettes
 - Link Object Modules
 - Picture Viewer
 - PMREXX
 - Recover Files
 - Restore Backed-up Files
 - Sort Filter
 - Installation Utilities
 - Create Utility Diskettes
- **Tools and Games**

All of the following tools and games will be installed.

 - Enhanced Editor
 - Search and Scan Tool
 - Solitaire - Klondike
 - Pulse
 - Chess
 - Mahjongg Solitaire
- **OS/2 DOS**

OS/2 DOS support will be installed.
- **Windows**

If Windows is found on any partition, WIN-OS/2 support will be installed.

- **Multimedia**

If the system has more than 6MB of RAM, multimedia software will be installed.

- **Serviceability Aids and Diagnostic Aids** will be installed.

- **Bitmaps** will be installed.

- **Migrate Applications**

If any DOS, Windows or OS/2 applications are found they will be migrated to the desktop.

2. **Advanced Installation**

If you choose Advanced Installation at the welcome screen, you get the chance to choose which features you wish to install.

```

                                Installation Drive Selection

If you want multiple versions of DOS, OS/2 or other operating
systems on the same hard disk, refer to the OS/2 documentation
for information on OS/2 hard disk management before continuing.

If you have multiple primary partitions set up on your hard
disk, select option 2 to verify that the correct partition is
active.

OS/2 will be installed on drive C :

Select an option:

    1. Accept the drive

    2. Specify a different drive or partition

If you select option 2, the FDISK screen is displayed.

Enter  Esc=Cancel  F3=Exit  F1=Help

```

At that point you will be asked whether you accept the default drive C or if you wish to specify another drive.

If you accept the drive, then OS/2 Warp Version 3 will be installed on drive C.

If you select option 2, specify a different drive or partition, then the FDISK screen is displayed.

If you modify any partitions on the hard disk then the following warning is displayed:

Attention!

When partitions on a hard disk are modified, all data in those partitions is deleted. You should back up all necessary data before continuing.

In many cases, you may wish to keep your data on drive C and install OS/2 Warp Version 3 on another partition. For details and hints on what to take into consideration when partitioning your hard disk, refer to Appendix A, "Hard Disk Partitioning Considerations" on page 447.

```

                                FDISK

Disk 1
-----
Partition Information
Name           Status           Access           FS Type           MBytes
-----
FAT PART      Startable           : Primary       BOOT MANAGER      1
              Bootable           C: Primary      HPFS              202

-----
F1=Help           F3=Exit           Enter=Options Menu

```

The FDISK screen shows which partitions are defined, the file system, and the size. The example above shows two partitions; one is reserved for the Boot Manager, the other is a 202MB HPFS partition.

If you modify any partitions, then the system must be rebooted to recognize the new partition sizes. The following message is displayed:

The hard disk partitioning is complete.
The system must be restarted so that the partitions can be recognized during system installation.

After partitioning the hard disk you get the choice of formatting the partition or not. We recommend that you format the partition on which you are installing OS/2 Warp Version 3. If you choose to format the partition, the Quick format of OS/2 Warp Version 3 will be used. The advantage of this formatting option is that it is faster than the usual format. The disadvantage of it is, that it will not mark defective sectors as *Bad* on the disk. For further details refer to 2.5.3, "Hard Disk Formatting" on page 32.

If you choose to format your partition, you will get the choice of formatting your disk with either of two file systems. These are FAT or HPFS. If you need more information on what they are, refer to Appendix A, "Hard Disk Partitioning Considerations" on page 447.

After you have formatted your partition, the installation process continues by asking you to insert OS/2 Warp Version 3 Disks 2 - 6 in your diskette drive.

At the end of Phase 1 of the installation process you have to insert the Installation Diskette one more time.

After that you have to remove that diskette and press the Enter key which will reboot the system. At that point OS/2 Warp Version 3 has already installed the basic operating system files and will boot from the hard disk for the first time since the beginning of the installation process.

Now Phase 2 of the installation process starts.

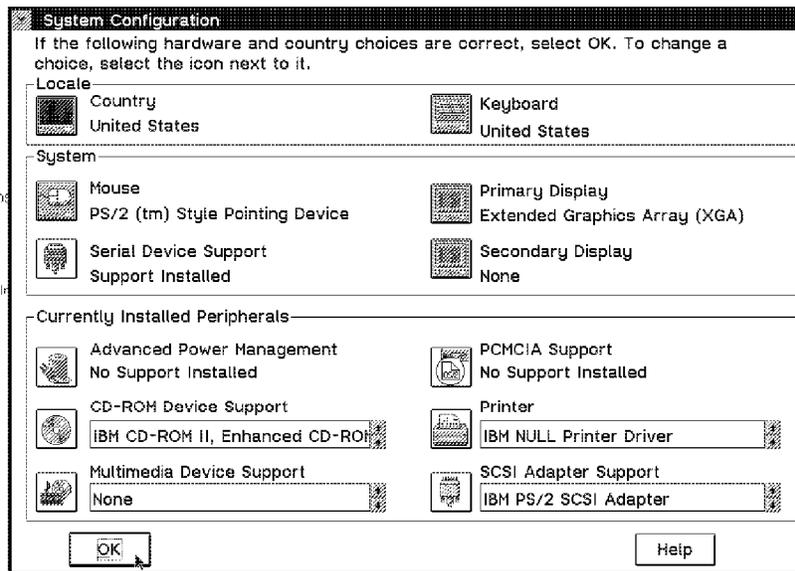


Figure 1. System Configuration

After the base operating system files have been installed and the system has rebooted to the Maintenance Desktop, the dialog shown in Figure 1 is displayed. By moving the dialog you will be able to see two folders on the Desktop:

- OS/2 System
- Information

These folders contain the following objects:

- OS/2 System:
 - OS/2 Full Screen
 - OS/2 Window
- Information:
 - Master Help Index
 - Glossary
 - README

At this point you may either explore the Maintenance Desktop or continue the installation with the System Configuration.

In the System Configuration dialog you may select features for your system in both Easy and Advanced Installation paths.

- In the *Locale* box you may set the Keyboard and Country settings from information on the installation diskettes.
- In the *System Box* you can set values for the mouse and display, or keep the defaults that are preset by the hardware detection routines. It is important to check these values.
- *Currently Installed Peripherals* shows the devices that have been detected for which device drivers will be installed. If you wish to modify any of these, then you should click on the appropriate icon. If your hardware has not been correctly identified then there may be a conflict with IRQ or I/O port addresses, or your hardware is not supported.

In OS/2 Warp Version 3 the following new device drivers can be installed from the System Configuration dialog:

- Advanced Power Management (APM)
- PCMCIA
- Multimedia

Changes have been made to improve the device support for the following devices:

- Video
- CD-ROM
- SCSI

If you have not selected a default printer then clicking on **OK** will display the Select Default System Printer dialog. If you have selected a default printer, clicking on **OK** will do the following:

- In the Easy Installation, it will invoke Phase 2 of the installation.
- In the Advanced Installation, the dialog shown in Figure 11 on page 60 is displayed.

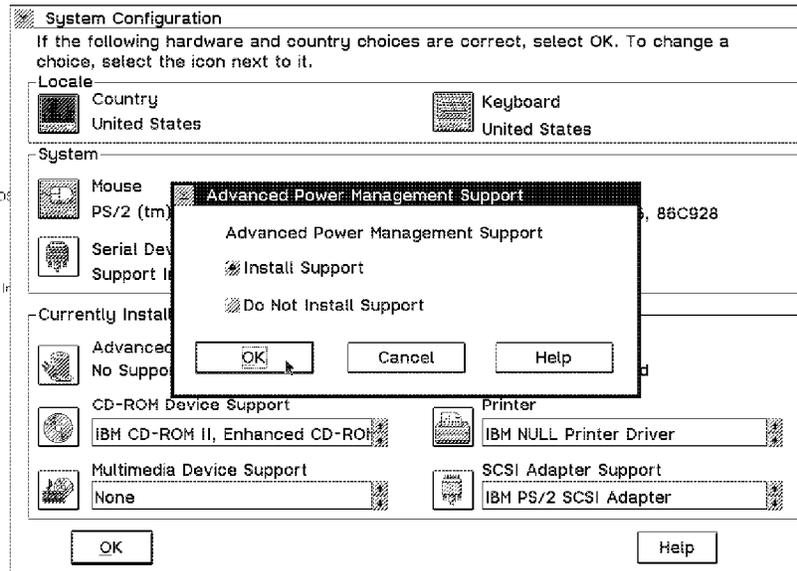


Figure 2. Display Driver Install

This dialog is displayed if you click on the **Primary Display** icon shown in Figure 1 on page 49. The dialog shown in Figure 2 shows the detected display adapter chipset. From here you can choose another display adapter chipset.

Warning!

If you choose a display adapter chipset that is not compatible with the one installed in your system, then you may experience problems. These could range from lack of color support to no display at all. See 12.5.2, "Reset Primary Video Display Back to VGA" on page 254 for details on how to reset your display adapter support back to VGA.

If you have video-related problems with your system, select **VGA**. VGA support is likely to work with all systems.

You can also change the Video Driver support by running Selective Install after OS/2 Warp Version 3 has installed.

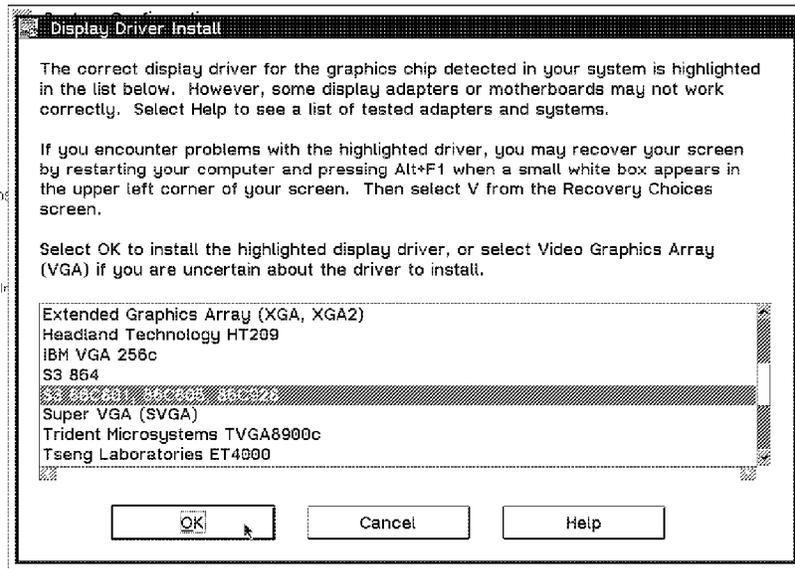


Figure 3. Advanced Power Management Support

This dialog is displayed if you click on the **Advanced Power Management** icon shown in Figure 1 on page 49.

APM is automatically selected if your hardware supports it. If you do not wish APM to be installed, you can deselect it.

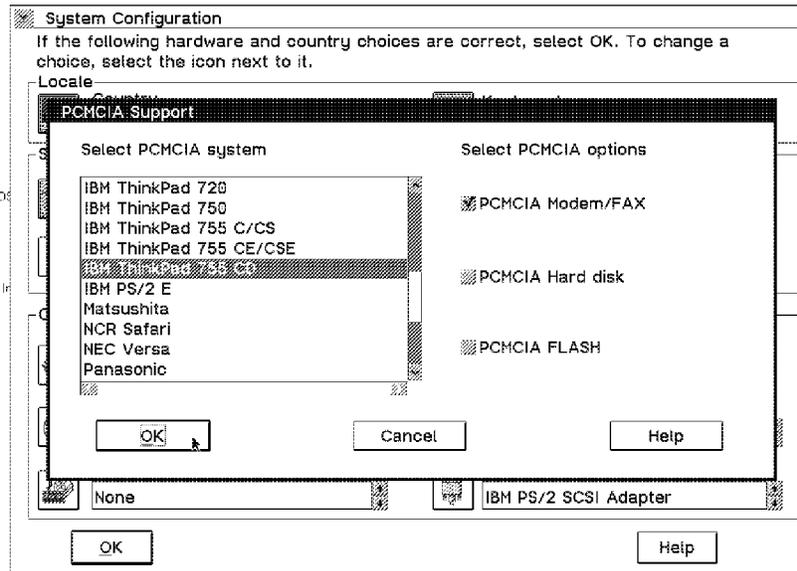


Figure 4. PCMCIA Support

This dialog is displayed if you click on the PCMCIA Support icon shown in Figure 1 on page 49.

PCMCIA is automatically selected if your hardware supports it. If you do not wish PCMCIA to be installed you can deselect it.

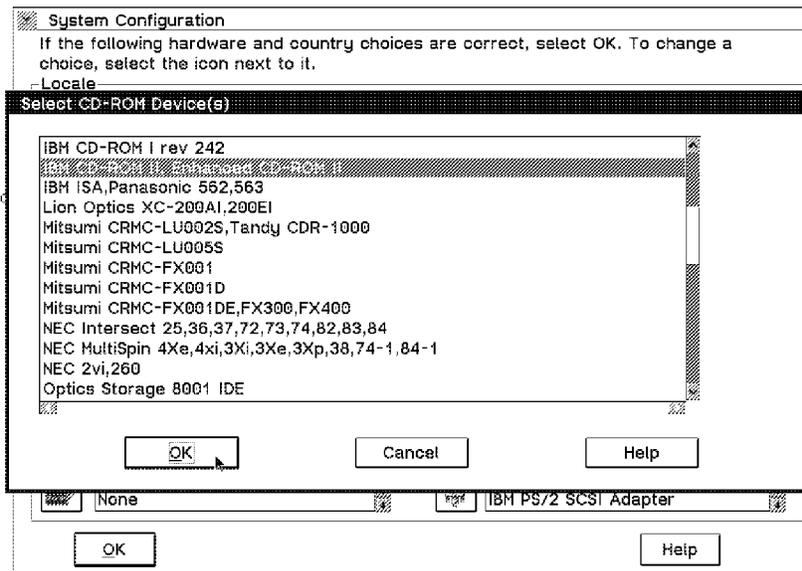


Figure 5. Select CD-ROM Device(s)

This dialog is displayed if you click on the **CD-ROM Device Support** icon shown in Figure 1 on page 49.

The Select CD-ROM Device(s) dialog allows you to select support for one or more CD-ROM drives. If you do not have a CD-ROM drive then leave this set to *NONE*.

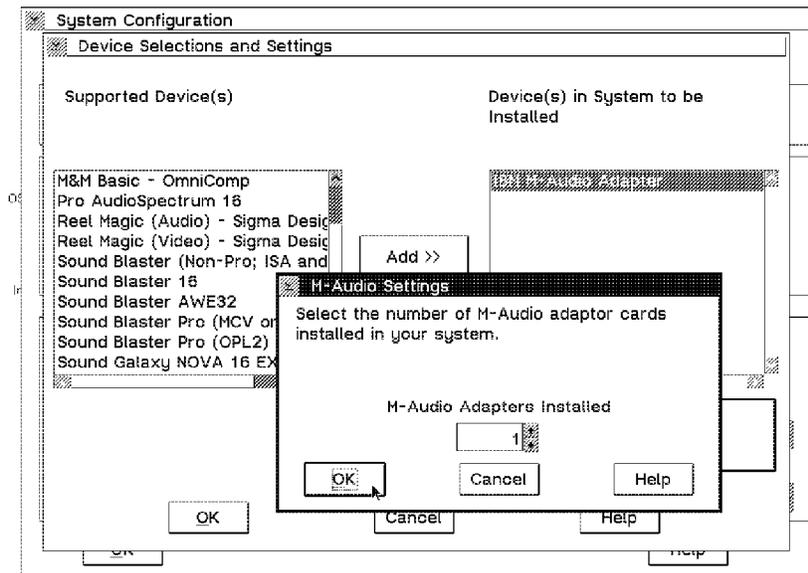


Figure 6. Device Selections and Settings

This dialog is displayed if you click on the Multimedia Device Support icon shown in Figure 1 on page 49.

The Device Selections and Settings dialog allows you to select support for a wide variety of multimedia adapters. Clicking the **Settings...** button will allow you to make changes to the settings for the adapter. If you make changes to the adapter settings, you must ensure that the necessary changes, if any, are also made to the DIP switches or Jumpers that may be on the adapter.

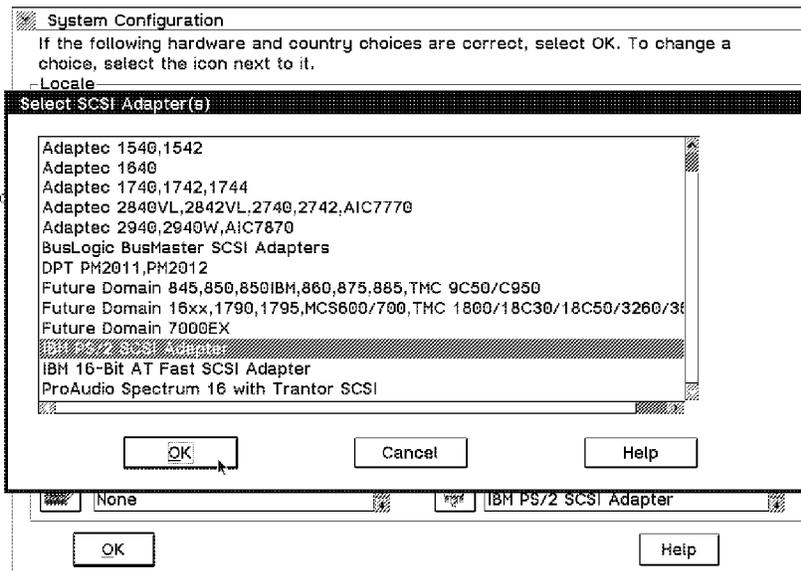


Figure 7. Select SCSI Adapter(s)

This dialog is displayed if you click on the **SCSI Adapter Support** icon shown in Figure 1 on page 49.

The Select SCSI Adapter(s) dialog allows you to select support for a wide variety of SCSI adapters.

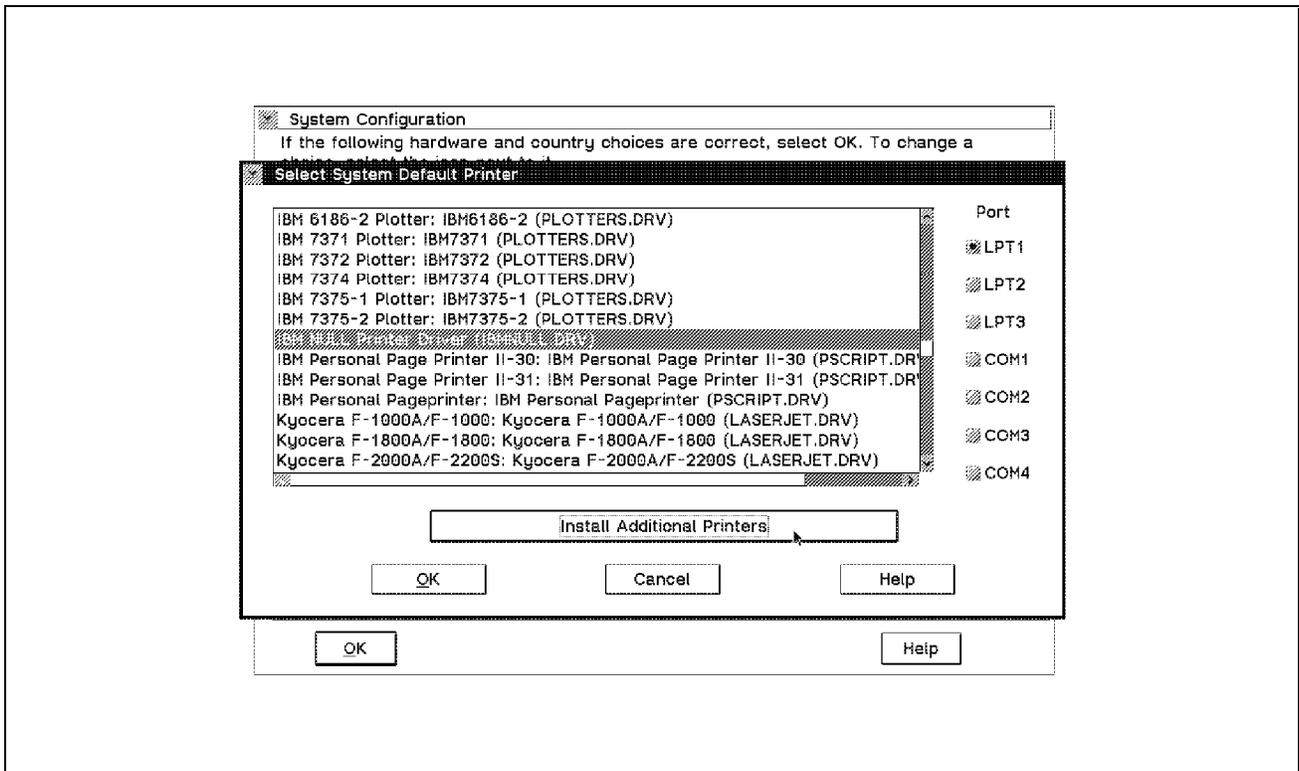


Figure 8. Select System Default Printer

This dialog is displayed if you click on the **Printer** icon shown in Figure 1 on page 49.

The Select System Default Printer dialog allows you to select support for printers and define the ports they are connected to. The system default printer is selected on this screen. Clicking on the **Install Additional Printers** allows you to define other printers and the ports they connect to.

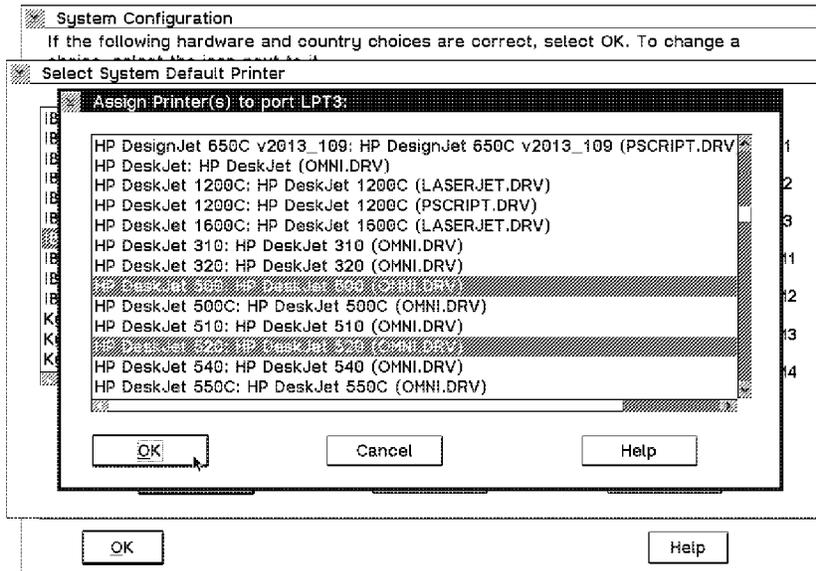


Figure 9. Assign Printers to LPT3:

This dialog shows an example of how you can define two printers being associated to port LPT3:.

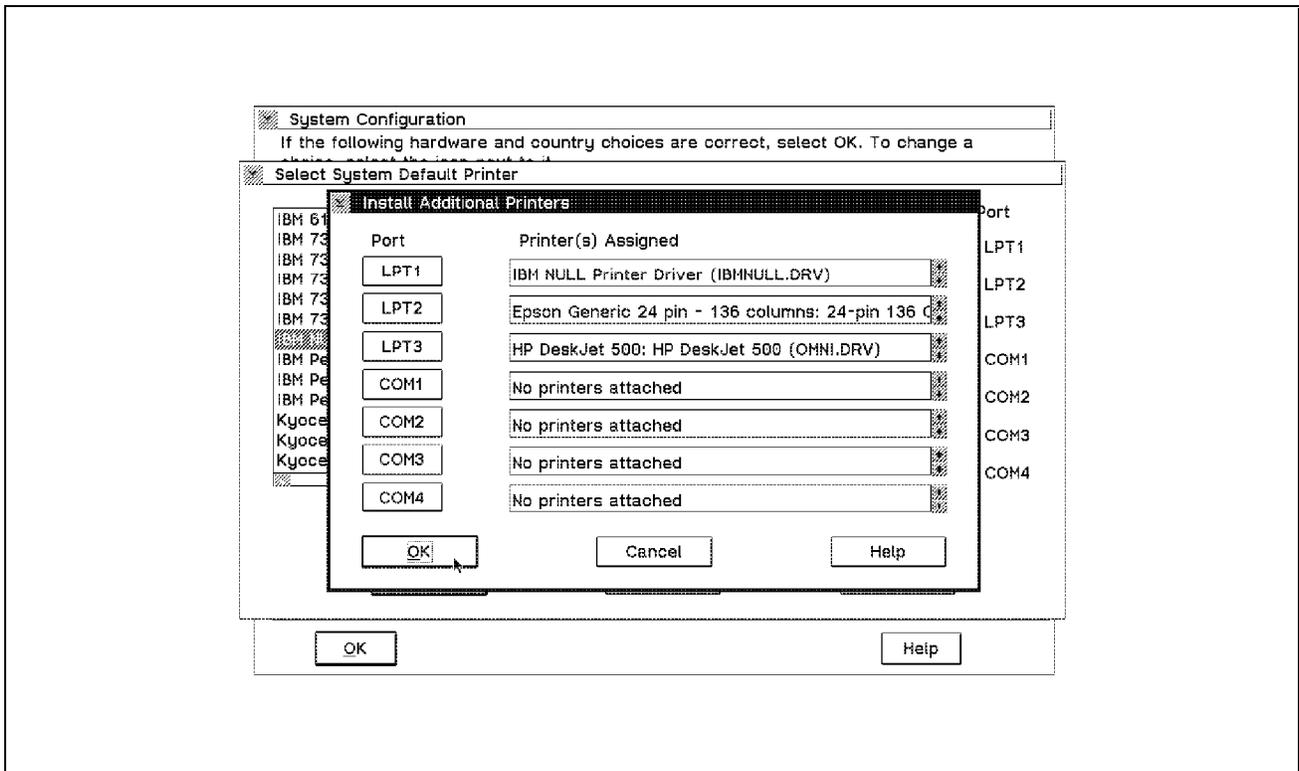


Figure 10. Install Additional Printers

Clicking on **Install Additional Printers** allows you to define other printers and the ports they connect to. Several printers can be assigned to each port, and ports LPT1 to LPT3, and COM1 to COM4 can be defined.

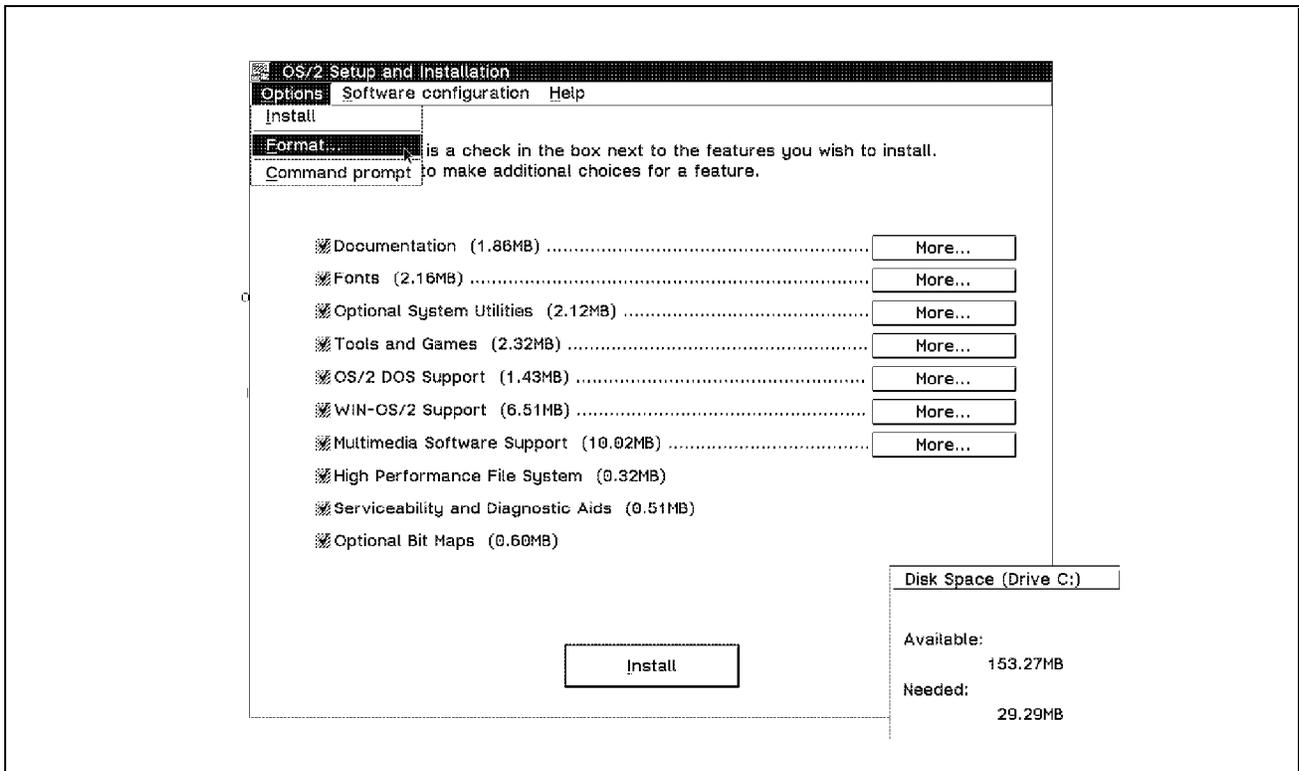


Figure 11. OS/2 Setup and Installation

The dialog in Figure 11 shows the optional components that will be installed by default. You can deselect any item to prevent it from being installed. Where there is a **More...** button to the right of the item, you can click on **More...** to display another dialog that allows you to select sub-components to be installed.

Notice that this dialog has a new choice compared to previous OS/2 versions, which allows you an integrated installation of the Multimedia Device Support.

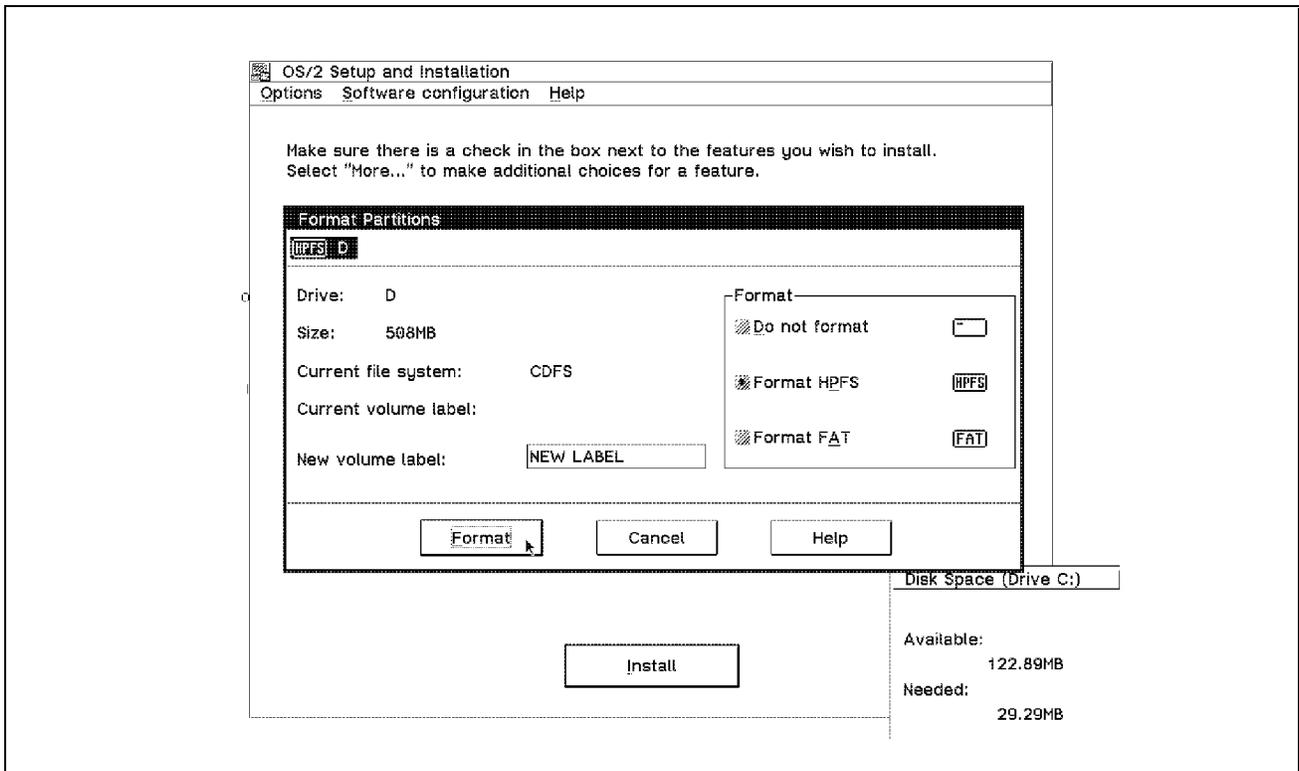


Figure 12. Setup and Installation, Format Partitions

This dialog allows you to format partitions, other than the installation partition, as part of the install process. To display this dialog, from the OS/2 Setup and Installation Dialog select **Options**, then **Format...**

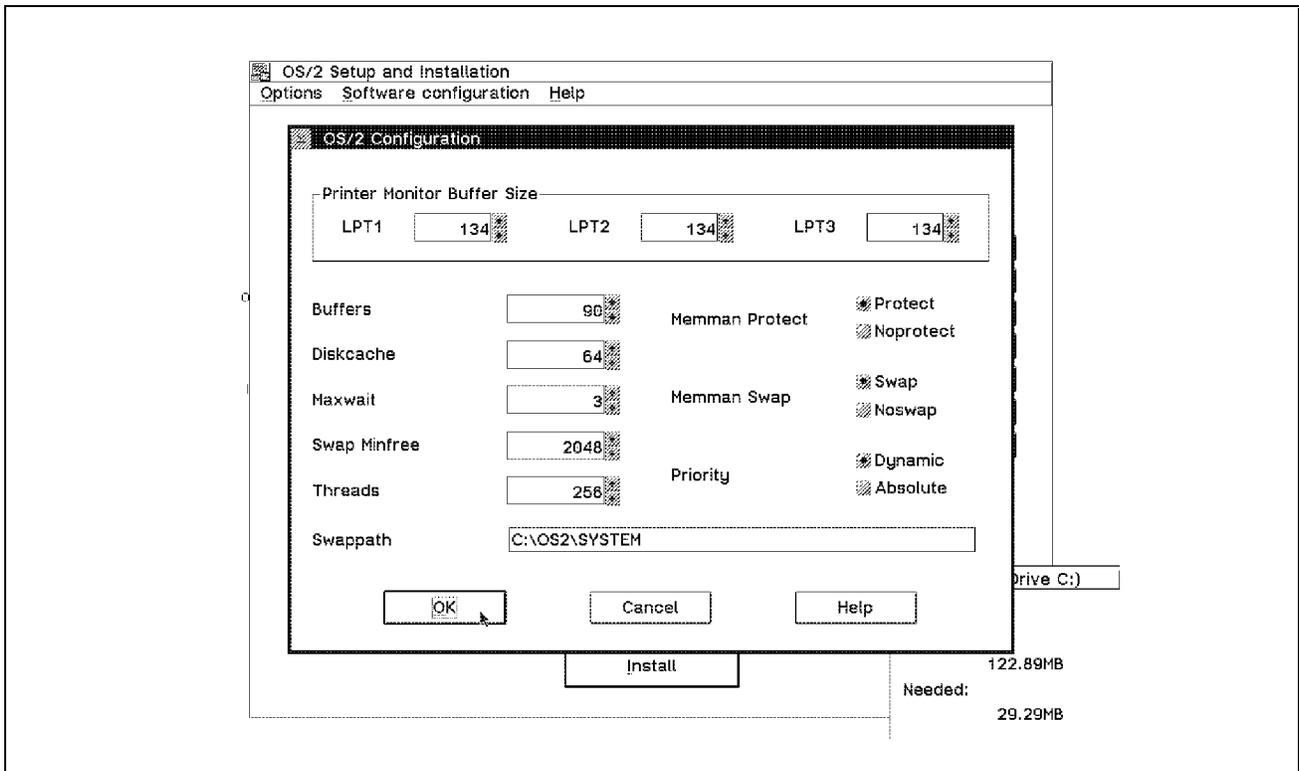


Figure 13. OS/2 Setup and Installation, OS/2 Configuration

This dialog allows you to change the OS/2 parameters that will be written to the CONFIG.SYS as part of the install process. To display this dialog, from the OS/2 Setup and Installation Dialog select **Software configuration**, then **Change OS/2 parameters...**

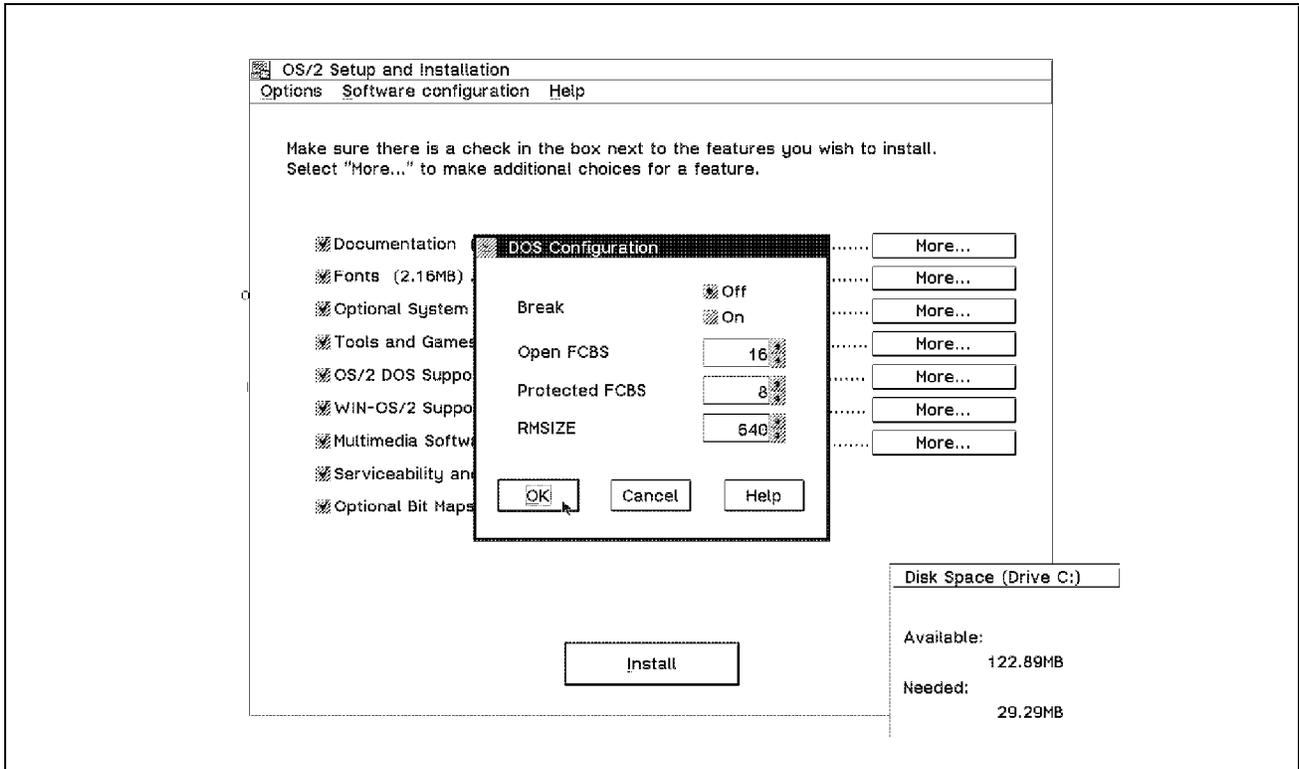


Figure 14. OS/2 Setup and Installation, DOS Configuration

This dialog allows you to change the DOS parameters that will be written to the CONFIG.SYS as part of the install process. To display this dialog, from the OS/2 Setup and Installation Dialog select **Software configuration**, then **Change DOS parameters...**

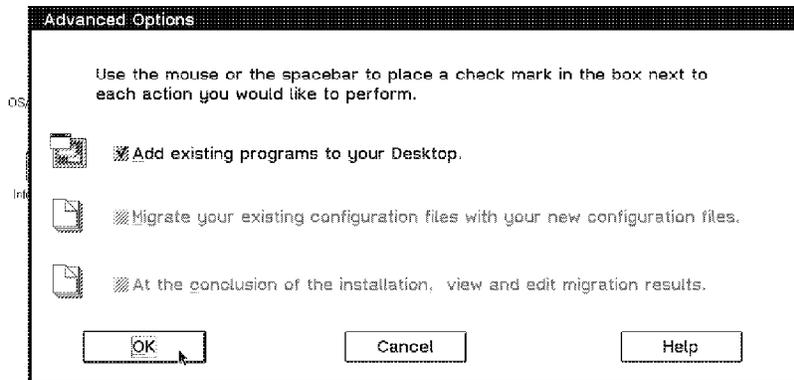


Figure 15. Advanced Options

This dialog controls if you want the installation program to:

- Add programs to your Desktop. This was known as *Migrate* in OS/2 Version 2.x. If you are installing OS/2 Warp Version 3 on a system that already has OS/2 Warp Version 3 or OS/2 2.1 for Windows, then you will be able to click on the other two options:
 - Migrate your existing configuration files with your new configuration, and
 - At the conclusion of the installation, view and edit migration results

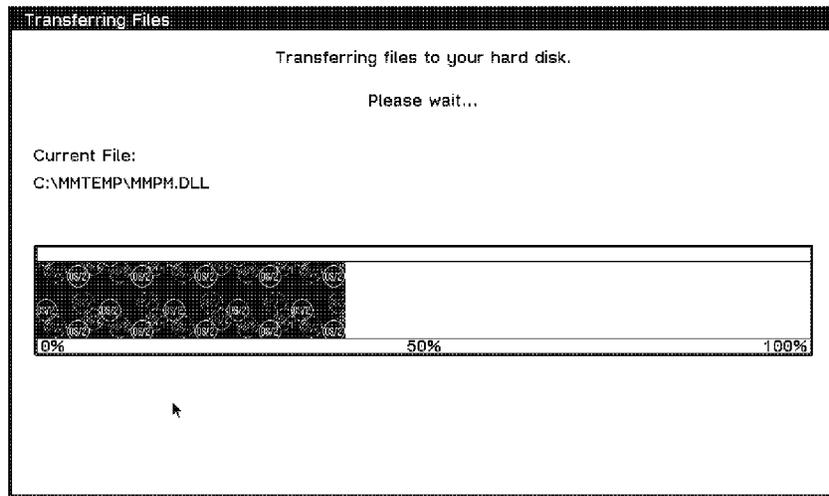


Figure 16. Transferring Files to Hard Disk

This dialog is displayed while the install program is transferring files. The bar gives an approximate indication of the number of files transferred. If you are performing a diskette install, then an icon for each diskette in the package will be displayed, with the current diskette highlighted.

If you installed SVGA support then this dialog is displayed when the display driver diskettes are being processed. If you select **Install Using Defaults for Monitor Type**, the install program will run the SVGA.EXE utility from a full screen DOS prompt.

If you select **Install Using Display Adapter Utility Program**, the following dialog prompts you for the path to your display adapter utility. This utility should be provided through the vendor of your display adapter with special or non-standard capabilities.

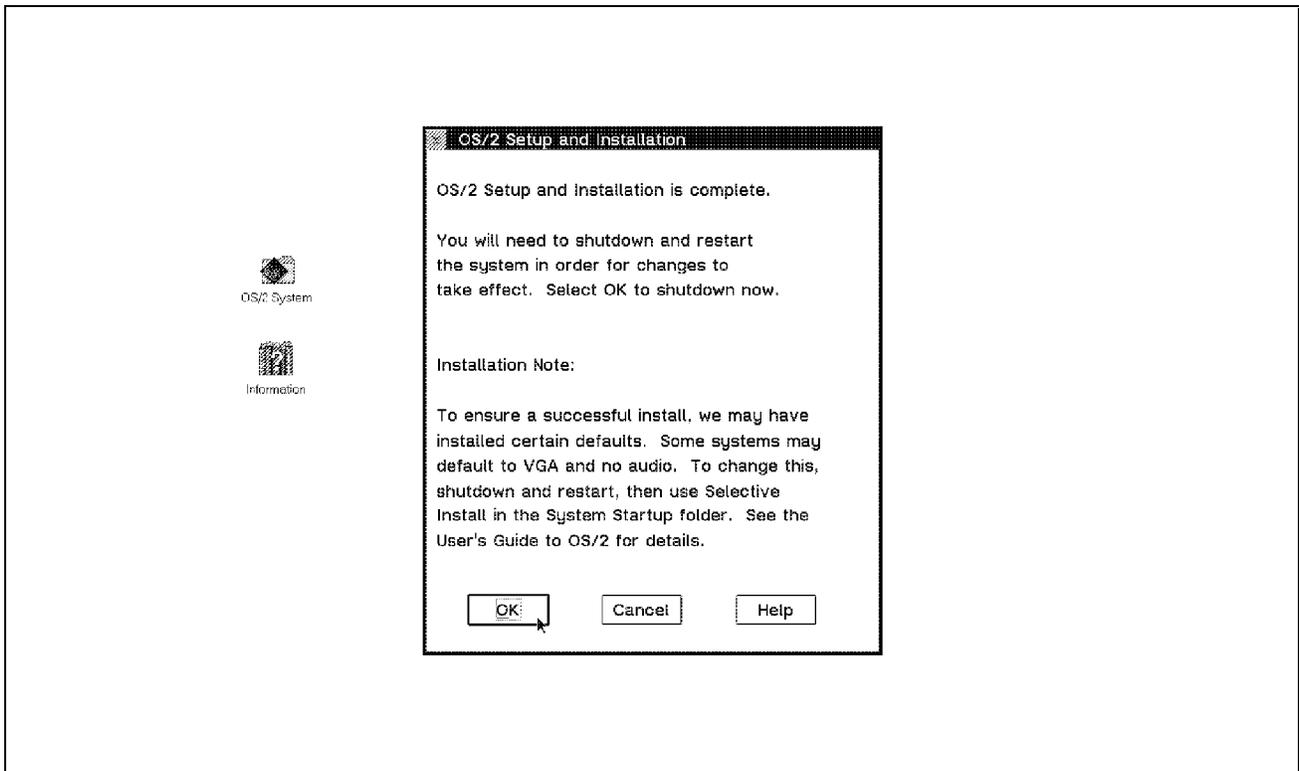


Figure 17. OS/2 Setup and Installation Complete

This dialog is shown when the install program has finished. Clicking on **OK** will shut down and reboot the system. Clicking on **Cancel** will close the dialog and leave the Maintenance Desktop active.

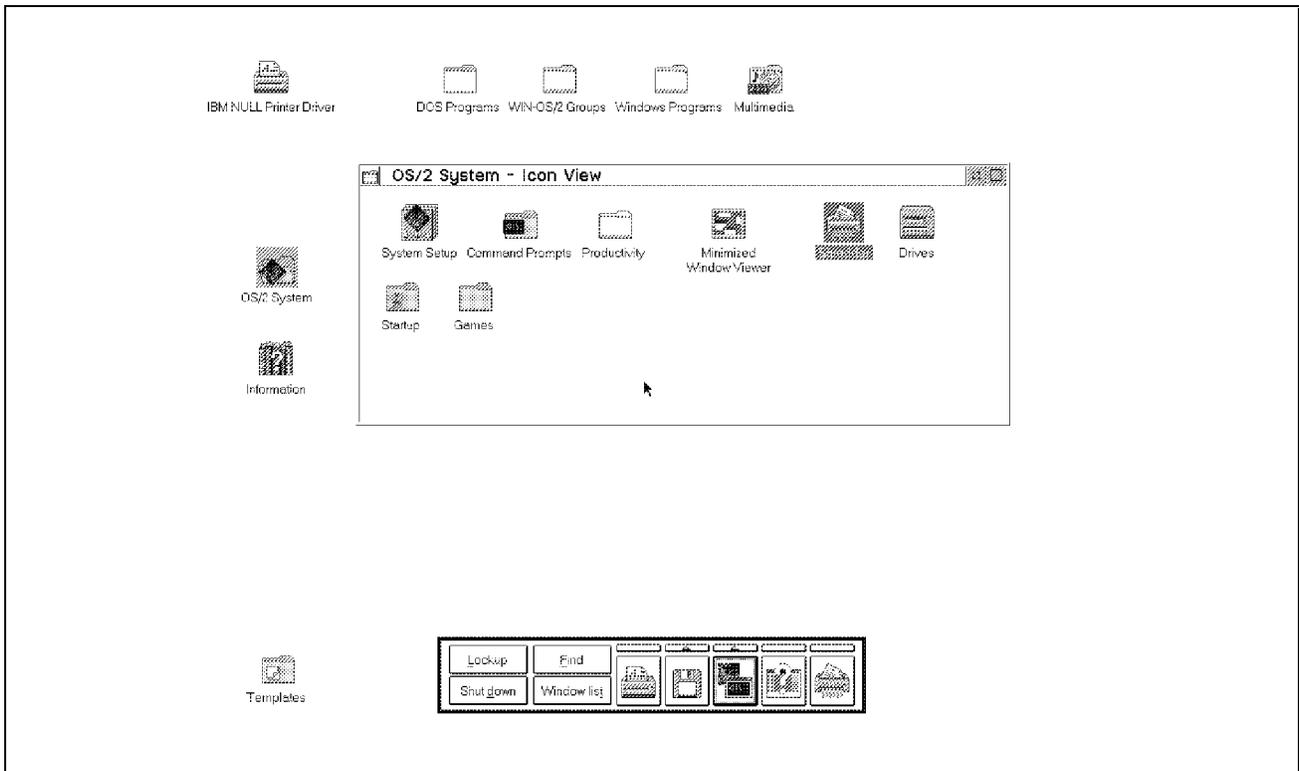


Figure 18. Default Desktop

When you reboot after installation, the Tutorial is started and the default Desktop is built. When you close the Tutorial, the default Desktop appears, as shown in Figure 18.

3.3 Installing onto Windows

This section covers the issues that may affect users when OS/2 Warp Version 3 is installed on a system with Windows present, and WIN-OS/2 support is loaded. This section provides information for users who:

- Use a heavily customized Windows setup
- Have problems getting WIN-OS/2 support working
- Wish to understand how OS/2 Warp Version 3 and Windows co-exist

3.3.1 DMF Diskette Support

Distribution Media Format (DMF) diskettes are used by Microsoft to distribute their latest software products. The support for DMF is included in OS/2 Warp with WIN-OS/2, and OS/2 Warp Connect, but not in OS/2 Warp Version 3.

DMF support on Personal System/2 machines requires the CONFIG.SYS file to be modified. Personal System/2 (Micro Channel machines) normally use the IBM2FLPY.ADD base system driver. In order to support DMF diskettes, IBM1FLPY.ADD must be used with the /MCA parameter.

There is a REXX exec that will make the necessary changes to the CONFIG.SYS file for you, called DMF_PS2.CMD. This exec will change:

```
BASEDEV=IBM2FLPY.ADD  
BASEDEV=IBM1FLPY.ADD
```

to:

```
REM BASEDEV=IBM2FLPY.ADD  
BASEDEV=IBM1FLPY.ADD /MCA
```

3.3.2 Changes made to DOS and Windows Files

To enable Windows to operate under OS/2 Warp Version 3, several changes are made to Windows system files. The name and placement of these files will vary from installation to installation. On a machine that has been installed using all the defaults, the following changes will be made:

- **WIN.INI**

- [Desktop] Section - line added:
 - IconSpacing=100
- [Ports] Section - lines added:
 - LPT1.OS2=
 - LPT2.OS2=
 - LPT3.OS2=
- [fonts] Section - lines deleted:
 - Courier New (TrueType)=COUR.FOT
 - Courier New Bold (TrueType)=COURBD.FOT
 - Courier New Italic (TrueType)=COURI.FOT
 - Courier New Bold Italic (TrueType)=COURBI.FOR
 - Symbol (TrueType)=SYMBOL.FOT
 - MS Sans Serif 8,10,12,14,18,24 (VGA res)=SSERIFE.FON
 - Courier 10,12,15 (VGA res)=COURE.FON
 - MS Serif 8,10,12,14,18,24 (VGA res)=SERIFE.FON
 - Symbol 8,10,12,14,18,24 (VGA res)=SYMOLE.FON

- [fonts] Section - lines added:
 - MS Sans Serif 8,10,12,14,18,24 (8514/a res)=sseriff.fon
 - Courier 10,12,15 (8514/a res)=courf.fon
 - MS Serif 8,10,12,14,18,24 (8514/a res)=seriff.fon
 - Symbol 8,10,12,14,18,24 (8514/a res)=symbolf.fon
 - Small Fonts (8514/a res)=smallf.fon
- **SYSTEM.INI**
 - [boot] Section - lines deleted:
 - language.dll=
 - language.dll=langeng.dll
 - system.driv=system.driv
 - system.driv=atmsys.driv
 - oemfonts.fon=vgoem.fon
 - oemfonts.fon=8514oem.fon
 - fixedfon.fon=vgafix.fon
 - [boot] Section - lines added:
 - fixedfon.fon=8514fix.fon
 - MAVDMApps=
 - os2mouse.driv=mouse.driv
 - atm.system.driv=system.driv
 - useos2shield=1
 - os2shield=winsheld.exe
 - sdisplay.driv=sxga.driv
 - fdisplay.driv=fxga.driv
 - keyboard.dll=
 - keyboard.dll=kbdus.dll
 - fdisplay.driv=XGA
 - [XGA_Display] section added:
 - XGA_Resolution=2
 - [timer.driv]
 - TIMERMax386Res=10
 - TIMERMax286Res=10
- Other files
 - The following files are moved / renamed / copied / deleted:
 - C:\COMMAND.COM deleted, copy already in C:\DOS
 - C:\CONFIG.SYS copied to C:\OS2\SYSTEM\CONFIG.DOS
 - C:\AUTOEXEC.BAT copied to C:\OS2\SYSTEM\AUTOEXEC.DOS
 - C:\WINDOWS\WIN.COM renamed to WINDOS.COM
 - the boot sector is copied to C:\OS2\SYSTEM\BOOT.DOS
 - The following files are replaced by OS/2 equivalents:

- CONFIG.SYS
 - AUTOEXEC.BAT
 - The boot sector
- The following files are added:
- C:\WINDOWS\ATM.GRP
 - C:\WINDOWS\ATM.INI
 - C:\WINDOWS\ATMCNTRL.EXE
 - C:\WINDOWS\CPANELS.SCR
 - C:\WINDOWS\FASTLOAD.EXE
 - C:\WINDOWS\WINOS2.COM
 - C:\WINDOWS\WINOS2.ICO
 - C:\WINDOWS\WINSAGNT.EXE
 - C:\WINDOWS\WINSHELD.EXE
 - C:\WINDOWS\SYSTEM\8514FIX.FON
 - C:\WINDOWS\SYSTEM\8514FIX.FO_
 - C:\WINDOWS\SYSTEM\8514OEM.FON
 - C:\WINDOWS\SYSTEM\8514OEM.FO_
 - C:\WINDOWS\SYSTEM\8514SYS.FON
 - C:\WINDOWS\SYSTEM\8514SYS.FO_
 - C:\WINDOWS\SYSTEM\ATM16.DLL
 - C:\WINDOWS\SYSTEM\ATM32.DLL
 - C:\WINDOWS\SYSTEM\ATMSYS.DRV
 - C:\WINDOWS\SYSTEM\COMMS.SCR
 - C:\WINDOWS\SYSTEM\CONTROLS.SCR
 - C:\WINDOWS\SYSTEM\COURE.FO_
 - C:\WINDOWS\SYSTEM\COURF.FON
 - C:\WINDOWS\SYSTEM\COURF.FO_
 - C:\WINDOWS\SYSTEM\DRVMAP.INF
 - C:\WINDOWS\SYSTEM\FIXMGR.DLL
 - C:\WINDOWS\SYSTEM\FXGA.DRV
 - C:\WINDOWS\SYSTEM\GDIS.SCR
 - C:\WINDOWS\SYSTEM\KBDUS.DLL
 - C:\WINDOWS\SYSTEM\KBDUS.DL_
 - C:\WINDOWS\SYSTEM\LANGENG.DL_
 - C:\WINDOWS\SYSTEM\MAINCPIS.SCR
 - C:\WINDOWS\SYSTEM\MCISEQS.SCR
 - C:\WINDOWS\SYSTEM\MOUSE.DR_
 - C:\WINDOWS\SYSTEM\MOUSES.SCR
 - C:\WINDOWS\SYSTEM\SERIFE.FO_
 - C:\WINDOWS\SYSTEM\SERIFF.FON
 - C:\WINDOWS\SYSTEM\SERIFF.FO_
 - C:\WINDOWS\SYSTEM\SMALLE.FO_

- C:\WINDOWS\SYSTEM\SMALLF.FON
- C:\WINDOWS\SYSTEM\SMALLF.FO_
- C:\WINDOWS\SYSTEM\SSERIFE.FO_
- C:\WINDOWS\SYSTEM\SSERIFF.FON
- C:\WINDOWS\SYSTEM\SSERIFF.FO_
- C:\WINDOWS\SYSTEM\SXGA.DRV
- C:\WINDOWS\SYSTEM\SYMBOLE.FO_
- C:\WINDOWS\SYSTEM\SYMBOLF.FON
- C:\WINDOWS\SYSTEM\SYMBOLF.FO_
- C:\WINDOWS\SYSTEM\TIMERS.SCR
- C:\WINDOWS\SYSTEM\TTY.DR_
- C:\WINDOWS\SYSTEM\TTY.HL_
- C:\WINDOWS\SYSTEM\USERS.SCR
- C:\WINDOWS\SYSTEM\VGA.DR_
- C:\WINDOWS\SYSTEM\VGAFIX.FO_
- C:\WINDOWS\SYSTEM\VGAOEM.FO_
- C:\WINDOWS\SYSTEM\VGAS.SCR
- C:\WINDOWS\SYSTEM\VGASYS.FO_
- C:\WINDOWS\SYSTEM\WINASPI.DLL
- C:\WINDOWS\SYSTEM\WINFILES.SCR
- C:\WINDOWS\SYSTEM\WINSCLIP.DLL
- C:\WINDOWS\SYSTEM\WINSDDDE.DLL
- C:\WINDOWS\SYSTEM\WINSMSG.DLL

3.3.2.1 Non-Standard Windows Files

Some manufacturers pre-load Windows on their machines with non-standard file names. For example, on Hewlett-Packard machines the following non-standard entries are found:

```
[boot]
...
atm.system.drv = hpsystem.drv
...
[boot.description]
...
system.drv = Hewlett-Packard
...
[386Enh]
...
ebios = hpbios.386,*bios
...
```

These need to be restored to the standard entries to allow OS/2 Warp Version 3 to correctly install WIN-OS/2 support, as in the example below:

```
[boot]
...
atm.system.driv = system.driv
...
[boot.description]
...
system.driv=MS-DOS System
...
[386Enh]
ebios=*ebios
```

3.4 Installing onto OS/2 2.1 for Windows

OS/2 Warp Version 3 has several changes to the file and directory structure from previous versions of OS/2.

The most important change to the directory structure is that drivers are now loaded from \OS2\BOOT. Previous versions of OS/2 loaded drivers from the \OS2 directory.

- The following new files in OS/2 Warp Version 3 will be of interest to most system administrators:
 - C:\OS2\ARCINST.EXE
 - C:\OS2\ARCRECOV.EXE
 - C:\OS2\BLDLEVEL.EXE
 - C:\OS2\COMETRUN.EXE
 - C:\OS2\MONITOR.DIF
 - C:\OS2\PATCHWP.CMD
 - C:\OS2\RMVIEW.EXE
 - C:\OS2\SOMDD.EXE
 - C:\OS2\SOMDSVR.EXE
 - C:\OS2\SRD2FIX.CMD
 - C:\OS2\TEDIT.EXE
 - C:\OS2\TEDIT.HLP
 - C:\OS2\VIOTBL.ISO
 - C:\OS2\WPDSACTV.EXE
 - C:\OS2\WPDSINIT.EXE
 - C:\OS2\XDFCOPY.EXE
 - C:\OS2\HELP\OS2MHELP.HLP
 - C:\OS2\HELP\README.INS
 - C:\OS2\HELP\UNINSTAL.HLP
- The following OS/2 2.1 for Windows files are not in OS/2 Warp Version 3:
 - C:\MMOS2\DLL\QRYAD.DLL

- C:\MMOS2\DLL\QRYADH.HLP
- C:\MMOS2\DLL\QRYADMRI.DLL
- C:\MMOS2\DLL\QRYSBMRI.DLL
- C:\MMOS2\DLL\QRYUM.DLL
- C:\MMOS2\DLL\QRYUMMRI.DLL
- C:\MMOS2\SOUNDS\APPLAUSE.WAV
- C:\MMOS2\SOUNDS\CHARGE.WAV
- C:\MMOS2\SOUNDS\RATATTAT.WAV
- C:\MMOS2\SOUNDS\TONK.WAV
- C:\MMOS2\SOUNDS\ZIPPER.WAV
- C:\OS2\CREATEDD.EXE
- C:\OS2\DOSCALLS.LIB
- C:\OS2\STHR.EXE
- C:\OS2\DLL\DRAG.DLL
- C:\OS2\DLL\PMSHAPIM.DLL
- C:\OS2\HELP\ANIMAT.AMT
- C:\OS2\HELP\WPINDEX.HLP
- C:\OS2\INSTALL\INSTSHEL.EXE

3.5 FixPak for OS/2 Warp Version 3

At the time when OS/2 Warp with WIN-OS/2 was made available, IBM has released the *FixPak XR0W005* for OS/2 Warp Version 3, which contains most of the fixes that have been incorporated into OS/2 Warp with WIN-OS/2 and OS/2 Warp Connect. The FixPak is obtainable from your local support organization and is constantly updated. This FixPak will be a prerequisite for all future OS/2 Warp Version 3 fixes.

All OS/2 Warp Version 3 FixPaks require the OS/2 Warp Version 3 Corrective Service Facility boot disks installed to be able to install. The boot diskette package will be available from your service representative.

The README.1ST file on the first diskette contains important information that you should read before you install the FixPak.

The file README2 on the first diskette contains a summary of the fixes contained in the package. See Appendix G, "FixPak WRU005" on page 535 for the list of APARs.

3.6 DOS and Windows Settings

The following tables list the default values of the DOS and Windows settings after installation. For more details on the DOS and Windows settings, please refer to Appendix D, "DOS and WIN-OS/2 Settings" on page 485.

Table 6. WIN-OS/2 Settings

DOS/Windows Settings	Default Value
WIN_RUN_MODE	3.1 Enhanced
WIN_DDE	OFF
WIN_CLIPBOARD	OFF
WIN_ATM	OFF

Table 7. DOS Keyboard Settings

DOS/Windows Settings	Default Value
KBD_ALTHOME_BYPASS	OFF
KBD_BUFFER_EXTEND	ON
KBD_CTRL_BYPASS	NONE
KBD_RATE_LOCK	OFF

Table 8 (Page 1 of 2). DOS Memory Settings

DOS/Windows Settings	Default Value
DOS_HIGH	OFF
DOS_RMSIZE	640
DOS_UMB	OFF
DPMI_DOS_API	AUTO
DPMI_MEMORY_LIMIT	4
DPMI_NETWORK_BUFF_SIZE	8
EMS_FRAME_LOCATION	AUTO
EMS_HIGH_OS_MAP_REGION	0
EMS_LOW_OS_MAP_REGION	384
EMS_MEMORY_LIMIT	2048
MEM_EXCLUDE_REGIONS	--- Blank ---

Table 8 (Page 2 of 2). DOS Memory Settings

DOS/Windows Settings	Default Value
MEM_INCLUDE_REGIONS	--- Blank ---
XMS_HANDLES	32
XMS_MEMORY_LIMIT	2048
XMS_MINIMUM_HMA	0

Table 9. DOS Mouse and Touch Screen Settings

DOS/Windows Setting	Default Value
MOUSE_EXCLUSIVE_ACCESS	OFF

Table 10. DOS Printer Settings

DOS/Windows Settings	Default Value
PRINT_SEPARATE_OUTPUT	ON
PRINT_TIMEOUT	15

Table 11. DOS Video Settings

DOS/Windows Settings	Default Value
VIDEO_8514A_XGA_IOTRAP	ON
VIDEO_FASTPASTE	OFF
VIDEO_MODE_RESTRICTION	NONE
VIDEO_ONDEMAND_MEMORY	ON
VIDEO_RETRACE_EMULATION	OFF
VIDEO_ROM_EMULATION	ON
VIDEO_SWITCH_NOTIFICATION	OFF
VIDEO_WINDOW_REFRESH	1

Table 12 (Page 1 of 2). Other Settings

DOS/Windows Settings	Default Value
COM_DIRECT_ACCESS	OFF

Table 12 (Page 2 of 2). Other Settings

DOS/Windows Settings	Default Value
COM_HOLD	OFF
COM_RECEIVE_BUFFER_FLUSH	NONE
COM_SELECT	ALL
DOS_AUTOEXEC	C:\AUTOEXEC.BAT
DOS_BACKGROUND EXECUTION	ON
DOS_BREAK	OFF
DOS_DEVICE	--- Blank ---
DOS_FCBS	16
DOS_FCBS_KEEP	8
DOS_FILES	20
DOS_LASTDRIVE	Z
DOS_SHELL	C:\OS2\MDOS\COMMAND.COM C:\OS2\MDOS
DOS_STARTUP_DRIVE	--- Blank ---
DOS_VERSION	DCJSS02.EXE,3,40,255 DFIA0MOD.SYS,3,40,255 DXMA0MOD.SYS,3,40,255 EXCEL.EXE,10,10,4 IBMCACHE.COM,3,40,255 IBMCACHE.SYS,3,40,255 ISAM.EXE,3,40,255 ISAM2.EXE,3,40,255 ISQL.EXE,3,40,255 MSD.EXE,5,00,255 NET3.COM,3,40,255 NETX.COM,4,00,255 NETX.EXE,5,00,255 PSCPG.COM,3,40,255 SAF.EXE,3,40,255 WIN200.BIN,10,10,4
HW_NOSOUND	OFF
HW_ROM_TO_RAM	OFF
HW_TIMER	OFF
IDLE_SECONDS	0
IDLE_SENSITIVITY	75
INT_DURING_IO	OFF
SESSION PRIORITY	1

Chapter 4. Installation of OS/2 Warp with WIN-OS/2

This chapter covers the additional considerations that apply when installing OS/2 Warp with WIN-OS/2, rather than OS/2 Warp Version 3.

The OS/2 Warp with WIN-OS/2 package, often referred to as the *FullPak*, includes all the necessary Windows code to support Windows applications. This is generically referred to as WIN-OS/2.

The OS/2 Warp with WIN-OS/2 package can be distinguished from the OS/2 Warp Version 3 package by the blue side on the package, as opposed to the red side on the OS/2 Warp Version 3 box.

The OS/2 Warp with WIN-OS/2 package has 15 diskettes for OS/2 as well as 5 Printer Driver diskettes and 4 Display Driver diskettes.

Conceptually, installing OS/2 Warp with WIN-OS/2 is equivalent to installing Windows and OS/2 Warp Version 3. There are, however, some minor differences that will be highlighted in this chapter.

The IBM version of Windows code, WIN-OS/2, is functionally equivalent to Windows 3.1 with several fixes, and optimized to run under OS/2.

OS/2 Warp with WIN-OS/2 also includes several OS/2 fixes that are now part of the OS/2 Warp Version 3 FixPak XR0W005. The APAR list for XR0W005 is included in 3.5, "FixPak for OS/2 Warp Version 3" on page 73.

The BonusPak for OS/2 Warp with WIN-OS/2 has been updated to include the IBM Web Explorer. For OS/2 Warp Version 3 this had to be downloaded from the Internet.

4.1 Hardware Requirements

The Hardware requirements for OS/2 Warp with WIN-OS/2 are similar to OS/2 Warp Version 3. See 2.1, "Hardware Requirements" on page 9 for details.

The only difference in the hardware requirement for OS/2 Warp with WIN-OS/2 is the amount of hard disk space required:

- Minimum amount of disk space required on the hard drive is 25MB to 60MB and an additional 5MB for MMPM/2 support.

- WIN-OS/2 support will require 6.72MB. This differs from OS/2 Warp Version 3, as the IBM Windows code needs to be copied to the hard disk.

4.2 Software Requirements

OS/2 Warp with WIN-OS/2 has no software requirements to enable the full functionality of the product. WIN-OS/2 support is included in the package.

Several *upgrade* installation packages are also available to allow you to upgrade from:

- OS/2 2.0
- OS/2 2.1
- OS/2 2.11

These upgrade packages will *not* allow you to upgrade from:

- OS/2 2.1 for Windows
- OS/2 Warp Version 3

The installation routine on these upgrade packages checks that a version of OS/2 *with WIN-OS/2* is currently installed during the processing of diskette 2. The installation routine will allow you to format the installation partition during installation, and will allow you to re-install the upgrade package. If you do try to install one of the upgrades on top of, for example, OS/2 2.1 for Windows or DOS, the following panel will display this message:

```
Installation of the OS/2 Warp Upgrade cannot proceed.  
A specific version of the OS/2 operating system must  
be present on the hard disk. Refer to the instructions  
included with the OS/2 Warp upgrade package.
```

This restriction may cause a problem if you have to completely reinstall the operating system (for example if you repartitioned your hard disk). In this case you will have to install OS/2 Version 2.x, then install the OS/2 Warp with WIN-OS/2 upgrade package.

Note

Current reports on the forum suggest that having the file
C:\OS2INSTALL\SYSLEVEL.OS2 from OS/2 2.1 or OS/2 Warp with WIN-OS/2
will satisfy the "sniffer" and allow you to install.

4.3 Upgrade Matrix

The upgrade matrix for OS/2 Warp with WIN-OS/2 is similar to OS/2 Warp Version 3, except that:

- WIN-OS/2 support can be installed, whether or not DOS and Windows is already installed.
- Only OS/2 versions including WIN-OS/2 support are supported.

Dual Boot will only be installed if you are installing OS/2 to the C drive, and the C drive is using the FAT file system.

Table 13. Migration Scenarios

Existing Operating System	OS/2	VDM	WIN-OS/2	Windows	Dual Boot
No system	√	√	√		√
DOS 3.3 or later	√	√	√		√
DOS 3.3 or later Windows	√	√	√	√	√
OS/2 1.x	Not Supported				
OS/2 Version 2.x	√	√	√		√
OS/2 2.1 for Windows	Not Supported				
OS/2 Warp Version 3	Not Supported				

4.4 Installation Changes

The only installation change for OS/2 Warp with WIN-OS/2 is that the installation procedure does not prompt for Windows diskettes. The same Easy and Advanced Installation paths exist. The same dialogs are displayed as for OS/2 Warp Version 3 installation.

4.5 Installation Considerations

The only differences between OS/2 Warp Version 3 and OS/2 Warp with WIN-OS/2 are:

- The inclusion of FixPak XR0W005
- The inclusion of WIN-OS/2

OS/2 Warp with WIN-OS/2 will not modify any existing Windows files as part of the installation. All the necessary files to enable WIN-OS/2 support are installed in the \OS2\MDOS\WINOS2 directory. See 3.5, "FixPak for OS/2 Warp Version 3" on page 73 for details of the fixes that have been integrated into OS/2 Warp with WIN-OS/2.

4.6 Installation Paths

The installation paths for OS/2 Warp with WIN-OS/2 differ in the area of WIN-OS/2 support. As the OS/2 Warp with WIN-OS/2 package includes all the necessary Windows code, you will not be asked for the Windows diskettes during the installation. WIN-OS/2 support will, by default, be installed on the same partition as OS/2.

```
OS/2 Warp with WIN-OS/2 - Installation Paths
-----
-Install DOS-
--Install OS/2 Warp with WIN-OS/2-- -Easy Install-----
                                     -Advanced Install-
-----
-Selective Install---
-Selective Uninstall-
```

If OS/2 Warp with WIN-OS/2 is installed on a FAT C drive, then Dual Boot will be installed. If you run Windows from DOS, rather than OS/2 Warp with WIN-OS/2, you will be running a separate copy of Windows code, with a separate configuration. If you make changes to your WIN-OS/2 environment, these will not be reflected in the native Windows environment, and vice versa.

You can get OS/2 to synchronize your WIN-OS/2 and Windows desktops by selecting the following from the Advanced Installation path:

- WIN-OS/2 support
- Select **More...**
- Select **Advanced configuration**
- Select **Update Windows desktop when WIN-OS/2 desktop is modified**

4.7 OS/2 Warp Version 3 versus OS/2 Warp with WIN-OS/2

The following differences exist between OS/2 Warp Version 3 and OS/2 Warp with WIN-OS/2:

- CONFIG.SYS
 - References to the \WINDOWS directory have been replaced with \OS2\MDOS\WINOS2 in:
 - PATH
 - DPATH
 - The SWAPPATH statement has changed to preallocate a larger SWAPPER.DAT file. This is now 8192KB, rather than 4096KB for OS/2 Warp Version 3.
- AUTOEXEC.BAT
 - References to \WINDOWS directories have been replaced with \OS2\MDOS\WINOS2.
- The **BLDLEVEL** command will return a build level of 8.200 for OS/2 Warp with WIN-OS/2 .EXE and .DLL files. For OS/2 Warp Version 3 the build level is 8.612.
- The VER /R command will return a revision level of 8.200.

Chapter 5. Information and Help for OS/2 Warp Version 3

OS/2 Warp Version 3 includes completely revised documentation, both in hardcopy form and softcopy form. The goal of any supplied documentation is to assist the user in installing, using and configuring the system and applications, and to provide any relevant troubleshooting information.

5.1 Online Information

OS/2 Warp Version 3 comes with extensive online documentation. The case for online documentation is compelling. It is cheaper to produce, easily upgraded and can be distributed world wide in hours at low cost. The environmental impact of "soft" documentation is almost nil.

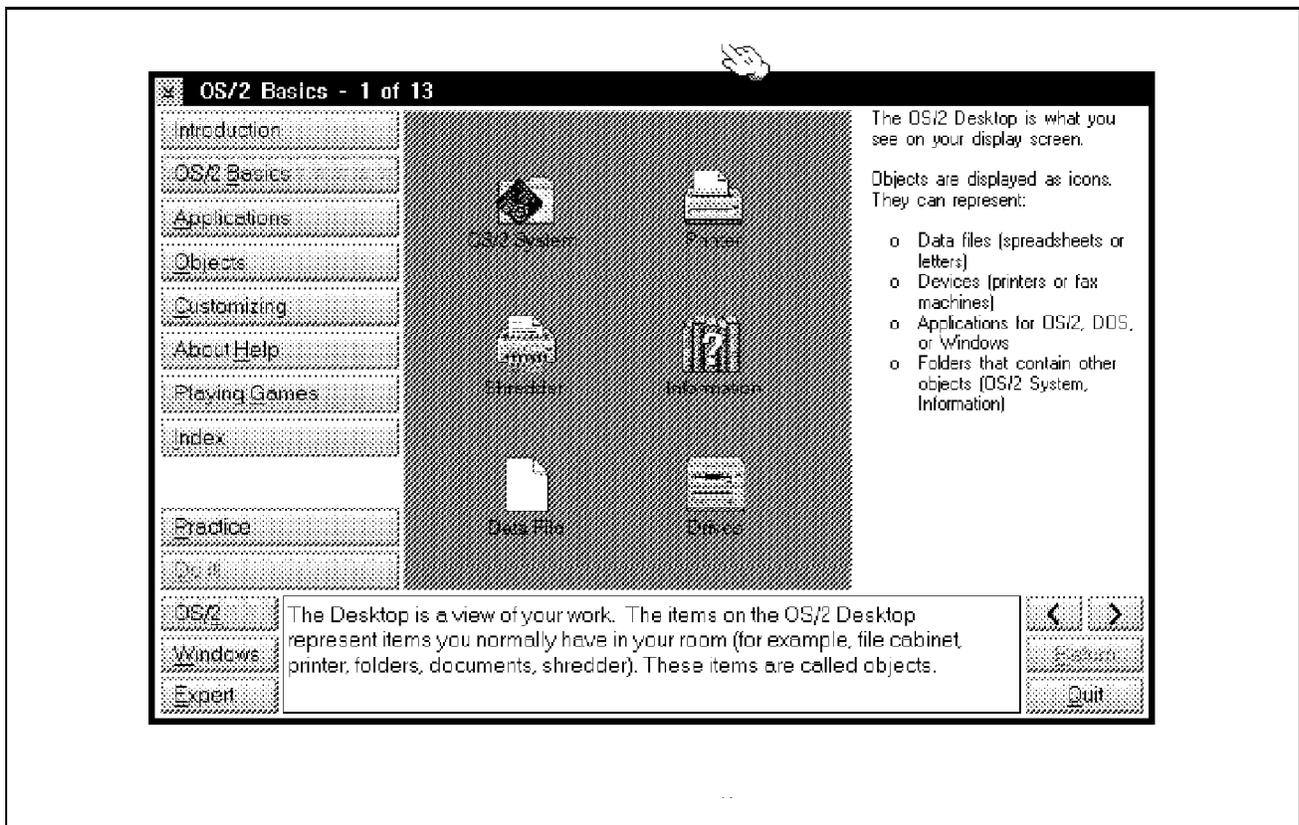


Figure 19. OS/2 Warp Version 3 Tutorial

The Information folder has been expanded to include more topics, such as Application Considerations and Performance Considerations.

5.1.1 Tutorial

The tutorial supplied with OS/2 Warp Version 3 has been completely rewritten and provides a lot more useful information than previous versions.

Information available includes:

- OS/2 Basics such as moving windows, sizing windows, displaying pop-ups, the LaunchPad, and shutting down
- Customizing the system by changing colors and fonts
- Running OS/2, DOS, and Windows applications
- Objects, such as creating folder, shadows, and printing
- Using Multimedia
- Running games

The tutorial is more task-oriented than previous versions. This means that the user may choose to see how a task is done under OS/2 and can then ask for information about how the equivalent task would be performed under Windows. There is also an Expert mode, which will provide the user with more advanced information on the topic being viewed. The index provides a list of all the tasks in the tutorial and the Command Reference and Master Help Index are available from within the program.

The tutorial is started automatically the first time OS/2 Warp Version 3 loads after installation. It can also be started at any time from the Information folder.

5.1.2 Master Help Index and Online Help

The Online Help has been revised to make it easier to use. Instructions have been included where appropriate. The keywords used to search for subjects have been revised and been user-tested for relevance. The hierarchy in the Help has been revised to make things easier to find.

The error messages have been revised to include instructions and provide more guidance, where appropriate.

5.2 Printed Documentation

In the United States, OS/2 Warp Version 3 includes a hardcopy manual called the *OS/2 Warp Version 3 User Guide to OS/2*. In other countries, OS/2 users receive documentation that is appropriate for that country.

The *OS/2 Warp Version 3 User Guide to OS/2* has five parts:

1. Installing OS/2
2. Exploring OS/2
3. Using OS/2
4. Troubleshooting
5. Advanced Installation

The *OS/2 Warp Version 3 User Guide to OS/2* has been revised. It is now much smaller than the manual included in the packages of previous versions of OS/2. Much of the data that changes rapidly has been removed from the hardcopy *OS/2 Warp Version 3 User Guide to OS/2* and included as INF online references. This allows the information to be updated using the easier and cheaper method of electronic distribution via online services, computer bulletin boards and the Internet.

Chapter 6. Base Operating System Enhancements

This chapter discusses the major changes in OS/2 Warp Version 3 regarding the base operating system including the kernel, linker and loader, libpath, file systems and swapper.

6.1 Kernel, Linker and Loader

To improve the performance and decrease the size of OS/2 Warp Version 3, there are many changes in the whole base system. Some of the most important changes have been made in the kernel, loader and linker of OS/2 Warp Version 3.

The size of the kernel has been reduced by 200KB, although it has extended functionality. A swappable kernel, as in the OS/2 Performance Beta I, is not included anymore. The kernel delivered with OS/2 Warp Version 3 has the full function that was provided in OS/2 Performance Beta I and some new function. It is SOM II enabled, is extended by the LaunchPad feature and also the new archiving function for the system configuration files.

All these functional enhancements mean additional load for the kernel. But due to the optimizations made in the kernel and base system, the whole system becomes faster than OS/2 Version 2.x.

6.1.1 EXEPACK2 Option of the Linker

The most conspicuous change of the linker is the new EXEPACK2 option. With this option you are able to get smaller EXEs and DLLs. Also the resource files and message files were reduced in size by 20-30%. This reduction in file size affects the loading time, so that applications are loaded two to three percent faster.

Note

New programs which are linked with the new EXEPACK2 option of the linker, do not run on OS/2 Version 2.x because the compressed EXE and DLL files need the enhanced loader included in OS/2 Warp Version 3.

However, there is no problem running old programs linked on OS/2 Version 2.x on OS/2 Warp Version 3.

6.2 Memory Management, SWAPPER.DAT

Changes to the memory management have been made in order to reduce the used disk space, size of SWAPPER.DAT, load and execution time.

6.2.1 Compressed Page Frames

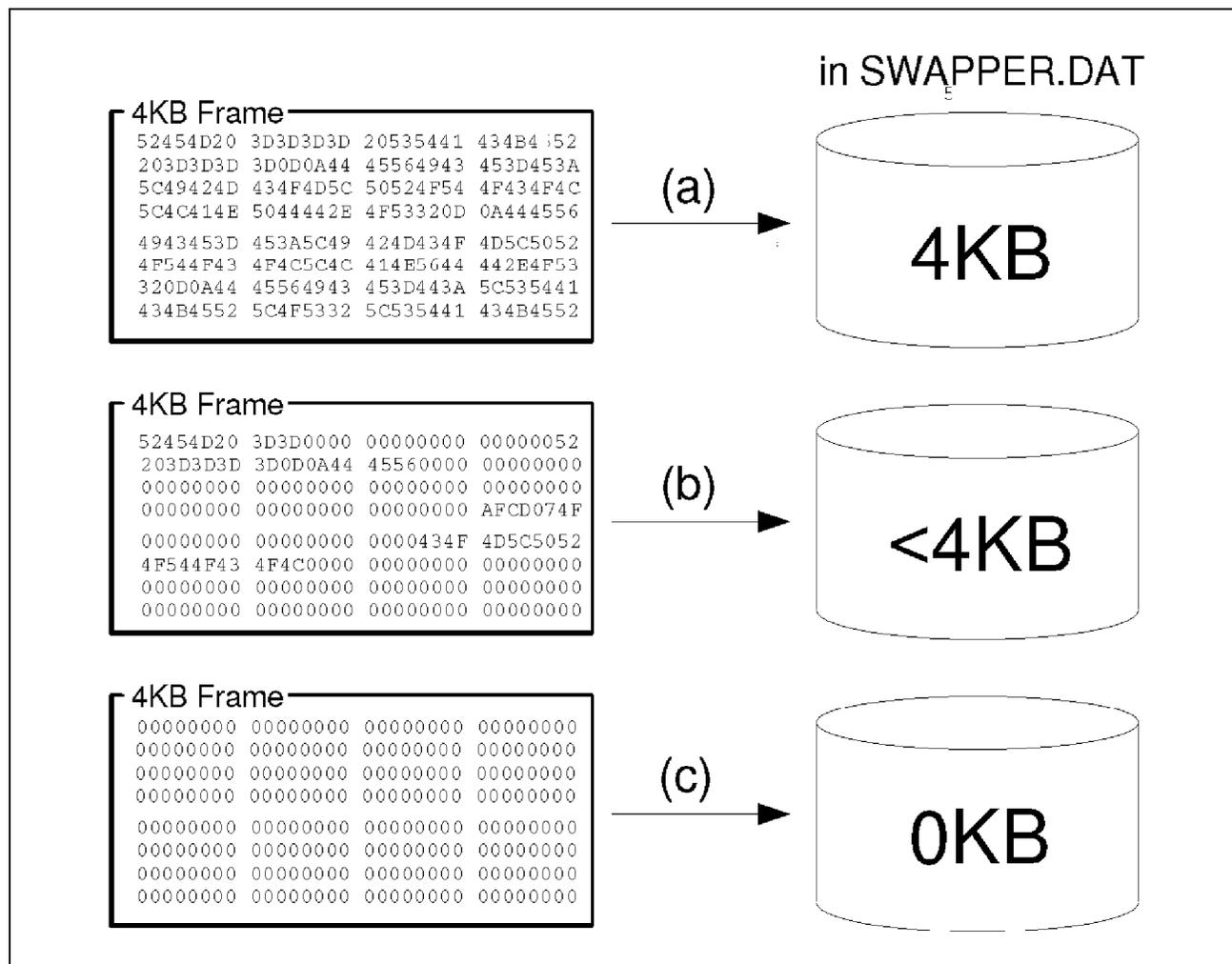


Figure 20. Compressed Page Frames

In OS/2 Version 2.x, committed memory is paged in SWAPPER.DAT without any optimization. To save space in SWAPPER.DAT, OS/2 Warp Version 3 does some optimization with the page frames. Page frames with a lot of zeros are compressed and then paged out. If there are page frames with only zero data, the frame will be marked as empty in the page table and nothing will be paged out.

In Figure 20, (a) shows that a page frame full of data is written to SWAPPER.DAT unmodified, (b) shows that a page frame containing a small amount of data is compressed, and (c) shows that an empty page frame is not saved in SWAPPER.DAT.

6.2.2 Prepaged System DLLs

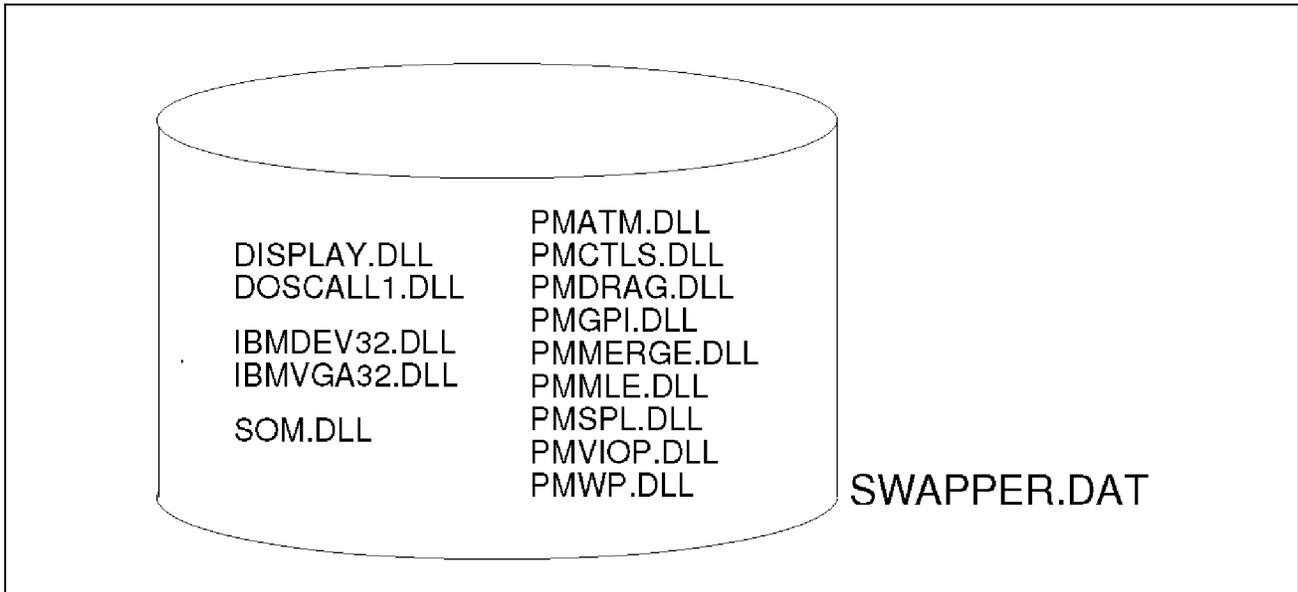


Figure 21. System DLLs Prepaged in SWAPPER.DAT During Boot Time

In OS/2 Version 2.x, only committed memory is paged out in the swapper file. Data from DLLs and EXEs is directly reloaded from the source files.

Loading a page directly from the data file is much slower than loading it from SWAPPER.DAT, because you have the load time overhead from the loader.

Load time overhead from the loader means that a page from a DLL or EXE must be searched and resolved by the MTE (Module Table Entry), then the page is read and then *fixups* are applied.

Note: Fixups are parts of a EXE or DLL file which must be changed by the loader during the loading process.

Not only committed data in OS/2 Warp Version 3 is written to the SWAPPER.DAT, but also some system DLLs (see Figure 21).

This increases the space used by SWAPPER.DAT on the hard disk, but reloading parts of the system DLLs becomes much faster because of reduced

load time overhead. For this reason, all system DLLs are prepagged in SWAPPER.DAT during boot time.

6.2.3 Basing

To reduce the load time for all system DLLs, another method called *basing* is used.

As explained in 6.2.2, "Prepagged System DLLs" on page 89, it is necessary to scan the DLL file for fixups that have to be applied and then apply them.

In OS/2 Warp Version 3, certain system DLLs are strictly fixed to an absolute address to reduce the load time overhead. So when loading those DLLs, the operating system does not have to apply any fixups.

A problem that may occur when using this method is when a DLL grows (with fixes etc.) so much that it does not fit anymore in its assigned address space. If this happens, the system DLL will not use *basing* anymore, but will be loaded like a "normal" executable.

Most system DLLs have been based. Those that are supplied by vendors, such as some of the video support DLLs, have not been based as yet.

6.2.4 Global Shared Data for PMWIN and PMGRE

There have been changes to improve the performance of data access from DLLs, such as PMWIN and PMGRE.

In OS/2 2.X, PMWIN and PMGRE allocated private data and then have access to other applications. Now in OS/2 Warp Version 3, all data is converted to *global shared data*. Every application has read access to this global shared data, but only the system DLLs can write in this area.

Reading global shared data is much faster than getting allocated private data, because fewer messages are necessary to access the data.

6.2.5 FAT File System Changes for SWAPPER.DAT

To increase the speed of access to SWAPPER.DAT, changes have been made in the FAT file system.

In OS/2 Version 2.x, the SWAPPER.DAT was handled like a normal file in the file system. In OS/2 Warp Version 3, the SWAPPER.DAT is treated differently.

When allocating space for SWAPPER.DAT, the kernel looks for the largest, contiguous free space area on the disk to avoid fragmentation of SWAPPER.DAT.

The system is allocated a minimum of 4KB (size of a memory page frame) for the SWAPPER.DAT, *even* when your SWAPPER.DAT is located in a FAT partition with less than 128MB. In this case the cluster size of the partition is only 2KB, but OS/2 Warp Version 3 ignores the cluster size and allocates 4KB blocks.

Allocating at least 4KB, the size of the page frame, prevents a page fragmentation.

For example, in an 80MB partition with a cluster size of 2KB it was necessary to allocate two clusters for one page frame. These two clusters might not be contiguous, so the page frame could be fragmented. Allocating a minimum space of 4KB for each page eliminates this problem.

6.2.6 Combined DLLs

In OS/2 Warp Version 3 a number of DLLs have been combined to allow applications written for OS/2 Warp Version 3 to take advantage of it. We will explain in this chapter why DLLs were combined in OS/2 Warp Version 3 and what are the advantages.

Combining DLLs has several advantages. It is mainly used to reduce memory working set sizes. This is done by removing fixup records since the routines are within the same DLL and they are based (see 6.2.3, "Basing" on page 90).

Reducing the fixup records not only reduces the memory required but also reduces I/O, since they do not have to be read. This improves performance, since the fixup record does not have to be applied when the page is brought into memory.

Many of the combined DLLs call routines within them that used to be external. Now, since they are in the same DLL, they are placed in the same memory page instead of two different pages.

Figure 22 on page 92 shows that application A is directly using the new combined DLL, while application B is using the old DLLs. Each call from application B will be forwarded to the combined DLL.

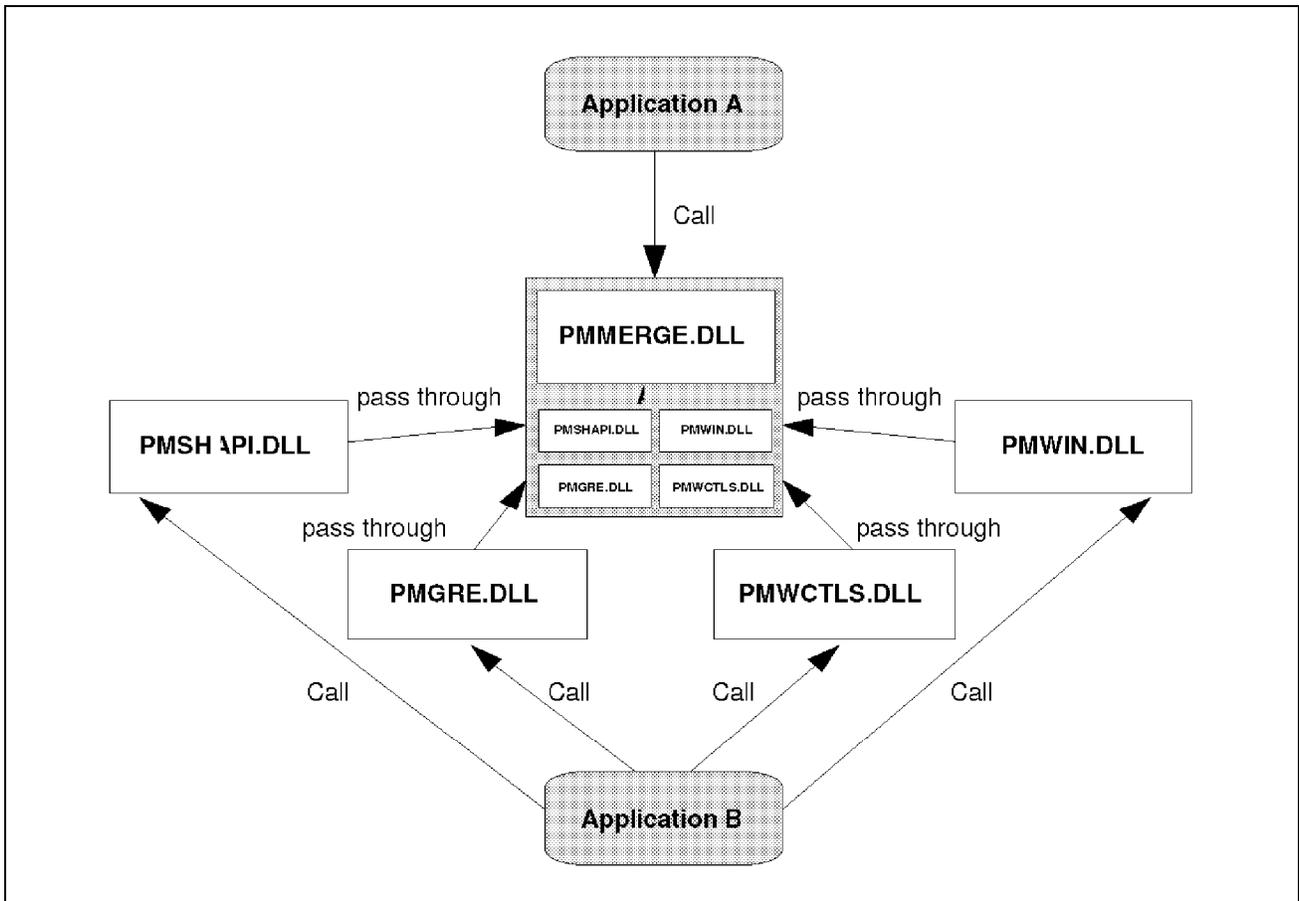


Figure 22. Example of Combined DLLs

If you look in the \OS2\DLL directory, you can see the following two DLLs:

- PMMERGE.DLL
- DOSCALL1.DLL

PMMERGE.DLL is a new DLL in OS/2 Warp Version 3. DOSCALL1 has been updated from previous versions of OS/2. Both of these DLLs are combined DLLs and contain the following system DLLs:

- PMMERGE.DLL
 - PMGRE.DLL
 - PMSHAPI.DLL
 - PMWIN.DLL
 - PMWCTLS.DLL
- DOSCALL1.DLL
 - DOSCALL1.DLL
 - VIOCALLS.DLL

- BVSCALLS.DLL
- ANSICALL.DLL
- BKSCALLS.DLL
- MKIOCALL.DLL
- BMSCALLS.DLL
- OS2CHAR.DLL
- QUECALLS.DLL
- SESMGR.DLL
- NLS.DLL
- MSG.DLL
- MOUCALLS.DLL
- KBDCALLS.DLL

You can still see the DLLs contained in the combined DLLs in the \OS2\DLL directory to maintain backward compatibility, but they are much smaller and act as post boxes to the new combined DLLs. Old OS/2 applications will still open these DLLs, but each call to a routine in those DLLs directly will be forwarded to the PMMERGE.DLL or DOSCALL1.DLL (see Figure 22 on page 92). In comparison to OS/2 2.1 the merged DLLs have become much smaller.

New applications for OS/2 Warp Version 3 should directly use PMMERGE.DLL and DOSCALL1.DLL instead of the separated ones.

6.3 Dynamic LIBPATH

In contrast to DPATH or PATH, LIBPATH is not an environment variable. It's not possible to make a dynamic change in that path. The only way to change the LIBPATH is to change the entry in the CONFIG.SYS file but in this case you have to reboot the system each time before the changes take effect.

To extend the possibilities of LIBPATH, two new environment variables have been created to allow you to set a new search path for the DLLs without rebooting the operating system:

- BeginLIBPATH
- EndLIBPATH

When the BeginLIBPATH string is set in your process, the loader will search first through this path list to find a DLL. If no matching DLL is found, the loader will scan through the default LIBPATH. If there still is no matching DLL found, the EndLIBPATH will be scanned for it.

This means that the paths are scanned in the following order:

1. BeginLIBPATH
2. LIBPATH
3. EndLIBPATH

BeginLIBPATH and EndLIBPATH seem to be natural additions to the environment area. However, they require a search through the environment space for each DLL that is currently not loaded. The environment space can be very large, so this is not an inconsequential performance impact. Since loader performance has a direct relationship to the performance of the base system, the system strings are attached to the PDA for the process that is setting them. This allows direct access to this information for the loader.

Special DOS APIs are used to set and query the values for BeginLIBPATH and EndLIBPATH, even though the SET command usually deals with environment variables. We recommend using it to support changing the LIBPATH variables from the command line, since it is more consistent. This means the SET command has to specifically detect the BeginLIBPATH and EndLIBPATH as a special case.

Note

Beware that you cannot change or query the BeginLIBPATH and/or the EndLIBPATH values with commands or functions that operate on usual environment variables (for example, the REXX function VALUE).

Consequently you cannot use the

`%BeginLIBPATH%`

and/or

`%EndLIBPATH%`

except when using the SET command.

From the user's perspective, the new functions are used as follows:

```
OS/2      Ctrl+Esc = Window List      Type HELP = help

[C:\]set BeginLIBPATH=d:\mydll\dir1;c:\mydll\dir2;d:\myapps\myappdll;
[C:\]set BeginLIBPATH
BeginLIBPATH=d:\mydll\dir1;c:\mydll\dir2;d:\myapps\myappdll;
[C:\]set BeginLIBPATH=%BeginLIBPATH%;c:\mynewdll
[C:\]set BeginLIBPATH
BeginLIBPATH=d:\mydll\dir1;c:\mydll\dir2;d:\myapps\myappdll;c:\mynewdll
[C:\]set BeginLIBPATH=
[C:\]set BeginLIBPATH
BeginLIBPATH=(null)
[C:\]_
```

Figure 23. Using BeginLIBPATH and EndLIBPATH from the Command Prompt

For example, if you want to temporarily add your TEMP directory to the PATH and LIBPATH statements, you type the following commands at the OS/2 command prompt:

```
SET PATH=%PATH%;C: TEMP;
```

```
SET ENDLIBPATH=C:\TEMP;
```

You will have to use %PATH% in the PATH statement to preserve the old path statements and add your path to the existing paths. Because the EndLIBPATH statement does not have any prior settings, you don't have to add the %EndLIBPATH%. If you did change the EndLIBPATH before and want to preserve it, you will have to add EndLIBPATH similar to the PATH statement. If the LIBPATH had to be before the current paths, then use BeginLIBPATH similar to how we described EndLIBPATH.

Note

The BeginLIBPATH, EndLIBPATH and path changes that are made in an OS/2 Command session will apply and be active only for that session.

When a new process is started, there is a need for it to be able to inherit the parent's settings of BeginLIBPATH and EndLIBPATH. Currently, the DosExecPgm does not have an interface that would allow the user to set these values to something else. This may need to be considered for a future release if there is a need for it.

6.3.1 Loader Consideration

The loader is currently designed in the way that when you request a module to be loaded but you do not specify a path, you get that DLL if found in the LIBPATH.

If you have the current directory specified in your LIBPATH, the loader does not check your current directory to see if there is a different version.

Consequently, if another process is running the same application from a current directory that had a different version of the DLL that is in your directory, you are going to use their DLL. The only way to prevent this from occurring is to specify the path to the DLL when the DosLoadModule API is called.

Note

The equivalent situation will occur for the dynamic libpath. If one process sets BeginLIBPATH to C:\PROCESS1\DLL and loads the DLL MYAPP.DLL from C:\PROCESS1\DLL and then a second process sets its BeginLIBPATH to C:\PROCESS2\DLL and asks for MYAPP.DLL for which a different version resides in C:\PROCESS2\DLL, the second process will be linked to the DLL from C:\PROCESS1\DLL.

The LIBPATH only specifies a search preference for the condition where the DLL is not currently loaded.

OS/2 guarantees that programs using a fully qualified path in the DosLoadModule call will get the DLL that they have specified.

6.3.2 LIBPATH APIs

Two new APIs have been added to the system, which have affected DOSCALL1.DLL and the kernel. To improve usability, the SET function in CMD.EXE has been modified to permit command line access to these APIs.

```

/*****
/* DosSetExtLIBPATH defines the current      */
/* path to search before or after the system */
/* LIBPATH when locating DLLs              */
/*****

PSZ    pszExtLIBPATH; /* Extended LIBPATH string */
ULONG  flags;        /* Flags indicating where */
                        /* the new path should be */
                        /* searched, before or   */
                        /* after the system      */
                        /* LIBPATH                */
APIRET rc;           /* Return Code.          */

rc = DosSetExtLIBPATH ( pszExtLIBPATH, flags);

```

Figure 24. *DosSetExtLIBPATH*

The APIs are *DosSetExtLIBPATH* for setting and *DosQueryExtLIBPATH* to query the extended LIBPATH (see Figure 24 and Figure 25).

```

/*****
/* DosQueryExtLIBPATH returns the current    */
/* path to search before or after the system */
/* LIBPATH when locating DLLs              */
/*****

PBYTE  pszExtLIBPATH; /* Pointer to buffer that */
                        /* Extended LIBPATH string*/
                        /* will be filled in.   */
ULONG  flags;        /* Flags indicating which */
                        /* extended path should be*/
                        /* returned, the path    */
                        /* searched before or     */
                        /* after the system      */
                        /* LIBPATH                */
APIRET rc;           /* Return Code.          */

rc = DosQueryExtLIBPATH ( pszExtLIBPATH, flags)

```

Figure 25. *DosQueryExtLIBPATH*

The maximum size of BeginLIBPATH and EndLIBPATH is defined as MAXTOKLEN, which is currently 1024 characters. This is the same maximum string length for an environment setting.

6.4 The File Allocation Table File System (FAT)

Few changes have been made to the FAT file system OS/2 Warp Version 3. The most significant change is the *fast format (also quick format)* which allows you a much faster format.

The maximum partition size for FAT is still 2GB and the maximum file size is still 2GB.

6.4.1 Quick Format

When formatting a device with quick format and the FAT file system, the system only writes to:

- The boot record
- The allocation table
- The directory area

The other sectors of the media are not overwritten.

Quick format has become the default for hard drives (FAT and HPFS). If you want to use the “normal” or *sector-by-sector* format, you have to specify the /L (for long) option.

For diskettes the default is the “normal” format. If you want to quick format a diskette, you have to specify the /Q (for quick) option.

Note

If fast format is used on a drive, then the user should never run CHKDSK /F:3. This command will recover all of the files that have not been overwritten and that were present on the disk prior to the fast format being run.

When fast format has been used, CHKDSK /F should be run. This issues a CHKSK /F:2 and does not recover old files.

6.4.2 DISKCACHE

The DISKCACHE statement in the CONFIG.SYS file has a new default value for the cache size. Instead of a numeric value you find a 'D' as cache size.

```
DISKCACHE=D,LW
```

The size of the default cache is calculated as follows:

- For systems with 4MB or less memory, the value "D" is set to 48KB.
- For systems above 4MB and up to 5MB, the value "D" is set to 64KB if more DASD is formatted for HPFS than for FAT. If more DASD is formatted for FAT than for HPFS, the value "D" is set to 48KB.
- For system memory above 5MB up to 6MB, the value "D" is set to 128KB.
- For system memory above 6MB up to 8MB, the value "D" is set to 512KB.
- For systems with more than 8MB of memory, the value is set to 10% of the memory size up to a limit of 4MB.

You can change the default value "D" by specifying your own numerical value up to 14400 (for 14400KB).

6.5 The High Performance File System (HPFS)

One of the significant features of OS/2 is the High Performance File System (HPFS). HPFS is an installable file system (IFS) and has been a part of OS/2 since Version 1.2. In OS/2 Warp Version 3, there are many changes made related to file system stability and performance.

6.5.1 Read Ahead Enhancements

Since OS/2 Version 2.1, when a file is loaded it is completely cached. The first file load is done fast, then the caching is done in the background. In comparison to OS/2 Version 2.0, this produced performance gain of up to 50%.

This method has been refined in OS/2 Warp Version 3. Now HPFS will also cache a whole data file.

6.5.2 Fast Format

HPFS supports the fast format of hard drives. Until OS/2 Version 2.11, the HPFS format wrote to every sector to check if the sectors are OK. This type of format is not really needed on most of today's drives, especially if the drives have formatted without error at least once. The few media errors that are found are normally relocated by the device driver and the file system never sees them.

Note

Although fast format becomes the default for HPFS, you can still use the old sector-by-sector format by using the /L option for critical hard drives or the first format of your disk.

Fast format only formats the parts of the hard disk on which the HPFS structure has been laid out. These are:

- Hot fix tables (at the beginning of the drive)
- Directory (in the middle of the drive)

The other parts are bypassed.

6.5.3 Specifications

Table 14 shows the characteristics of HPFS in OS/2 Warp Version 3.

Description	Value	Comment
max. open files	8192	This limit is due to the average length of the path names, since HPFS depends on kernel to do the file sharing.
max. entries per volume	-	There is no limitation other than the available disk space.
max. volume size	64GB	Because the 5-bit volume ID in OS/2.
max. file size	2GB	
max. cache size	2GB	
max. disks per system	24	OS/2 limit due to drive letters
max. supported disk space per system	1.5TB	24 volumes * 64GB max. volume size

6.6 Command Changes

Some of the OS/2 commands have changed in OS/2 Warp Version 3 to improve performance or add new function. Among the important changes to commands is the way the BACKUP command now operates.

6.6.1 BACKUP

An interesting change in OS/2 Warp Version 3 is that you can use the BACKUP command for files which are already in use. This means that it is always possible to back up *all* your files without rebooting from diskettes.

6.6.2 RESTORE

To restore files which are actually in use, you must still reboot from diskette or a maintenance partition.

Chapter 7. Workplace Shell

There have been many improvements and enhancements to the Workplace Shell since it was first introduced in OS/2 2.0. It is now in its third major revision. Most of these improvements focused on increasing reliability and speed. OS/2 Warp Version 3 continues this effort and adds new functionality to the Workplace Shell, while also delivering a more aesthetically pleasing user interface.

The following areas have been changed or added in the OS/2 Warp Version 3 Workplace Shell:

- Visual enhancements
- Color and Scheme palettes
- Icons
- Desktop Settings notebook
- Mouse object
- Context and pop-up menus
- LaunchPad
- Find, Include, and Sort
- Automatic migration
- Object Settings notebook
- Adding programs
- System object

7.1 Workplace Shell Visual Enhancements

One of the strengths of OS/2 is the flexibility of the user interface, the Workplace Shell. The changes detailed below should end the "plain Jane" criticisms that have been made of the default appearance of previous versions of OS/2.

7.1.1 Color Palette

In OS/2 Warp Version 3 there are two color palettes instead of the one found in previous releases of OS/2: the mixed color palette and the solid color palette.

The mixed color and the solid color palettes are used to customize the colors on your screen. The palettes are found in the System Setup folder. The mixed color palette offers the user a choice of 256 colors, and the solid color palette contains 16 colors.

The paint roller (as cursor symbol) of previous versions of OS/2 has been replaced with a dripping paint can to afford easier access to the drop target. The color of the paint dripping from the can matches the color you are going to drop.

7.1.2 Scheme Palette

The scheme palette has 28 redesigned selectable schemes, as well as more spare schemes for the user to customize. As with the color palette, the paint roller of previous versions has been replaced with a dripping paint can to afford easier access to the drop target. The color of the paint dripping from the can matches the color you are going to drop.

In the scheme palette, the settings for icon text and related controls in folders are now separate from those settings for the Desktop. This allows the user to make a scheme that they can drop onto the Desktop (by holding down the Alt key and selecting the color with the right mouse button) and have all the settings for folders and the Desktop that they have chosen. For example, they may only want to specify a bitmap and icon text background color for the Desktop, but not for any folders.

7.1.3 Bitmap Color Resolution

The Workplace Shell folders now display bitmaps in their true colors. You may notice palette shifts as you change from one window or folder to another. This is normal. A check box called *Workplace shell palette aware* has been added to the first page of the System object in the System Setup folder.

The purpose of the *Workplace shell palette aware* check box is to allow the user to select this if an improvement in the appearance of bitmaps that are displayed as the background of the Desktop or other folders is desired. When this check box is selected bitmaps, are displayed at their optimal level.

This means that the refresh rate of the screen will be decreased if this is selected to allow the system to set up the appropriate colors for the bitmaps.

7.1.4 Icons

Many changes have been made to icons in OS/2 Warp Version 3:

- 3-D icons have been added for most system objects.
- Animated folder icons show open and closed states.
- A new Settings page enables you to add animated icons to objects and folders.
- When using mini-icon view, color mini-icons are now supported. If a mini-icon does not exist for an icon, the system will reduce the size of the existing icon. This is especially useful in the Drives object tree view and the LaunchPad.
- Drag operations now show mini-icons when dragging from a mini-icon view.

7.1.5 Settings Notebooks

The settings notebooks for the Desktop and folders allow you to control many of the same attributes as the scheme palette:

- Icon text color
- Icon text background color (also known as the text slab)
- Icon text visibility state (turn text display on or off)
- Bitmap or color in a scheme or folder

The text preview area on the View settings pages in both the folder and Desktop notebooks has been enhanced to accept drops from the color or font palettes.

The Background page of the Settings notebooks for folders and the Desktop has been enhanced to include a preview area. The preview area can accept a drop from either the color palette or from a bitmap object. This also applies to Lockup page 2 in the Desktop Settings notebook.

7.1.6 System Pointer Changes

OS/2 Warp Version 3 allows you to replace system pointers both individually and in sets. Some sets and pointers are provided. The pointer can be changed from the pointer page in the settings notebook for the Mouse object in the System Setup folder.

If you choose Find from the pointers page of the Settings, you can select a hand as the pointer used by the system. Different wait icons can also be selected to replace the clock. By using the pointer template, a user may create a new pointer and drop it onto the Mouse Settings.

7.1.6.1 Comet Cursor

Part of the Mouse Settings notebook is the ability to select the Comet Cursor. The Comet Cursor was designed for notebook (laptop) users, where it is easy to lose track of where the pointer is. Selecting the Comet Cursor causes the pointer to have a tail of trailing circles when it is moved. Once enabled the Comet Cursor can be configured for:

- Trail length
- Circles size
- Activation speed

7.2 Pop-Up Menus

Several new menu choices have been added to the pop-up menu of certain objects.

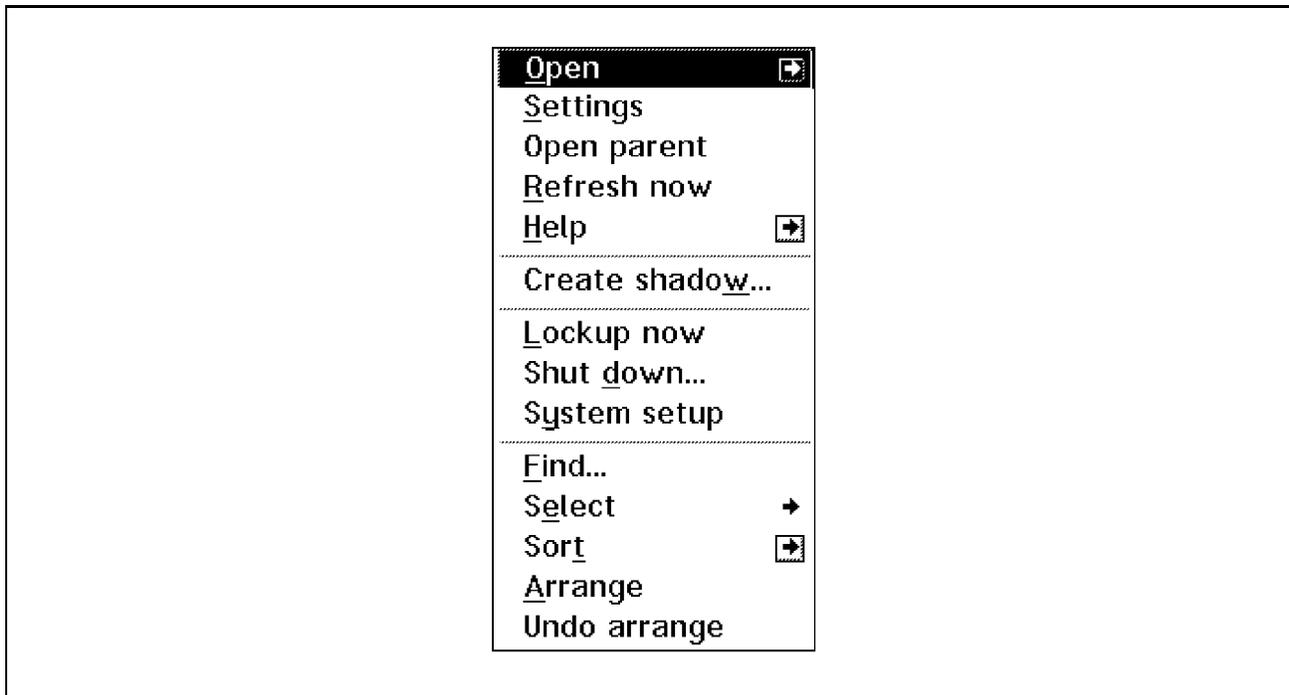


Figure 26. Desktop Pop-up Menu Example

7.2.1 Undo Arrange

The **Undo Arrange** option is displayed after the user selects the **Arrange** menu choice. It appears on folder pop-up menus as well as the Desktop pop-up menu and allows the last arrange performed to be reversed.

7.2.2 Open Parent

Open Parent is a new pop-up menu option exclusive to folders. This function allows the user to open the folder that contains the icon for the folder you are currently viewing. It also appears on the Desktop pop-up menu, and when selected, the Drives object will be opened for the boot drive.

7.2.3 Settings

The **Settings** option, which used to appear on all pop-up menus as a sub-option of the **Open** menu option, has been moved. **Settings** now appears on the primary pop-up menu immediately below the **Open** option. **Settings** opens the Settings Notebook for the selected object.

7.2.4 Pickup and Drop

Pickup and **Drop** are two new pop-up menu options for folders and objects. You can pickup and drop any objects on the Desktop except the Desktop itself. Should you wish to cancel the Pickup, there is also a **Cancel Drag** option. This option becomes visible when you select the arrow to the right of **Drop** from any object or by clicking with mouse button two on the object that you picked up. More than one object may be picked up at the same time.

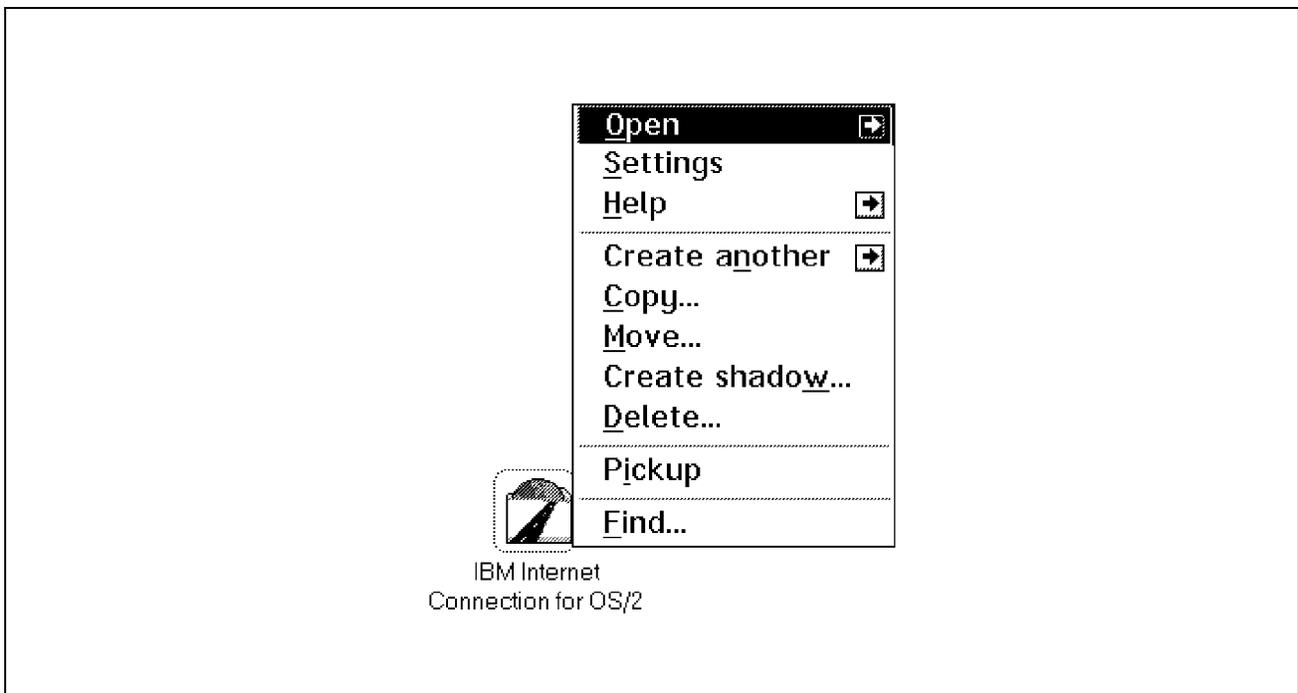


Figure 27. Pickup and Drop

Together, **Pickup** and **Drop** allow the user to drag objects without holding down the mouse button. Other system activities can also be performed while the objects are picked up and the fact that an object is being dragged is shown by a briefcase icon attached to the pointer until the **Drop** option is chosen. The Pickup or the Drop option can be initiated from either the mouse or the pop-up menu on the object. Selecting the arrow to the right of

the **Drop** option displays the choice of Drop operations that may be selected for the objects that have been picked up.

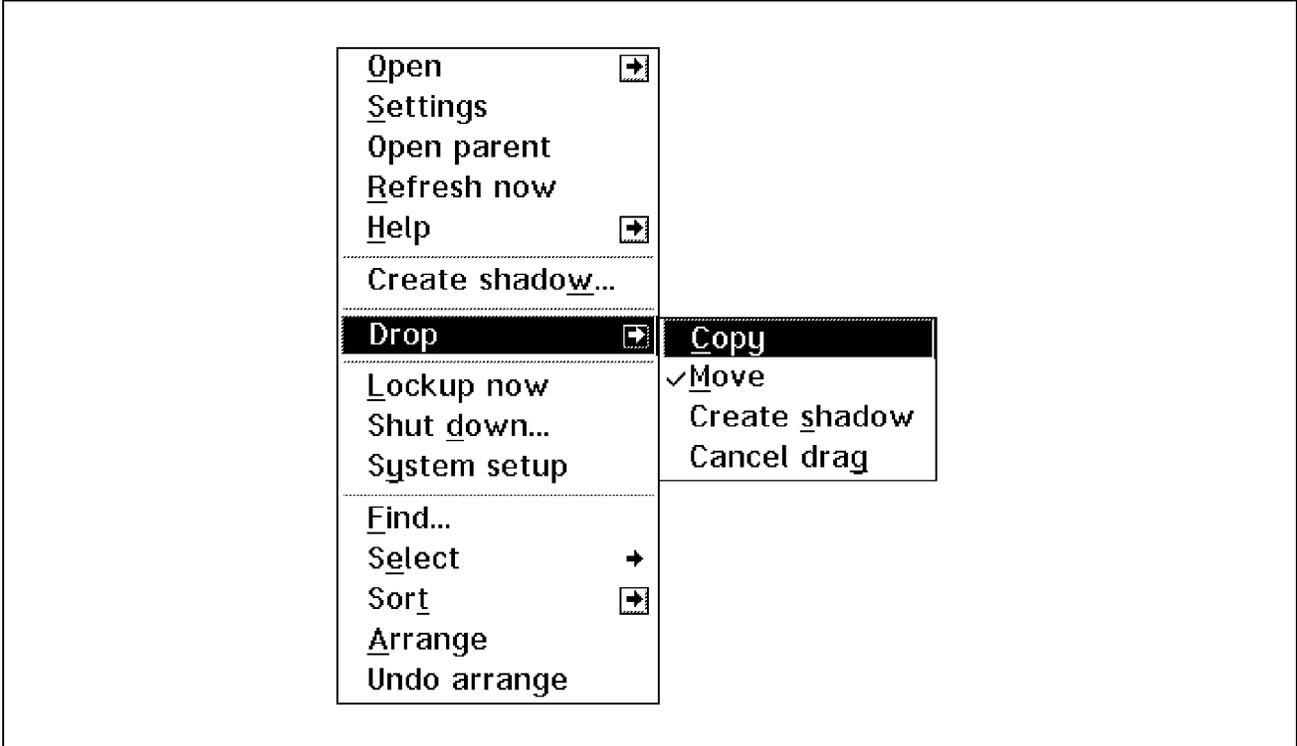


Figure 28. Drop Options on the Popup Menu

You can select Copy, Move (the default), Create shadow, or Cancel drag operations.

7.3 LaunchPad

The LaunchPad is a new object that offers you a convenient method to start frequently used objects with just one mouse-click. The LaunchPad offers the user a new way to organize the Workplace Shell.

The LaunchPad consists of:

- Action buttons
- Icons
- Drawers

The LaunchPad can be closed, then re-opened by simply double-clicking on the LaunchPad icon on the Desktop. The LaunchPad is opened at system

startup, when the LAUNCHPAD parameter is added to the AUTOSTART command in the CONFIG.SYS file:

```
SET AUTOSTART=PROGRAMS , TASKLIST , FOLDERS , LAUNCHPAD
```

If you delete the object LaunchPad from the Desktop, double click anywhere on the Desktop and the LaunchPad will be restored.

If you do not want to display the LaunchPad at all, remove the parameter LAUNCHPAD from the AUTOSTART command as shown above. The LaunchPad will not appear, even if you double click on the Desktop.

If your LaunchPad is hidden behind other windows, double-click on the background of your Desktop and the LaunchPad will be in the foreground again.

All icons on the LaunchPad or in a drawer of the LaunchPad are shadows of existing objects.

After installing OS/2 Warp Version 3, the default LaunchPad looks as shown in Figure 29:

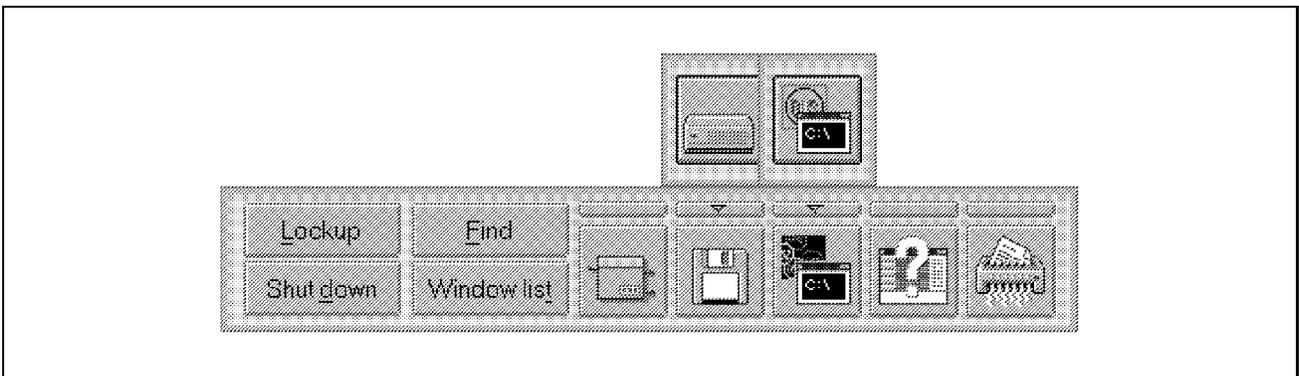


Figure 29. Default LaunchPad

The default LaunchPad, shown in Figure 29, contains the following objects:

- Action buttons
 - Lockup
 - Find
 - Shutdown
 - Window list
- Icons

- Default printer
- Drive A
- OS/2 Window
- OS/2 Tutorial
- Shredder
- Drawers
 - C-Drive (under Drive A)
 - DOS-Window (under OS/2-Window)

If no default printer was installed, the Default Printer object is not included in the LaunchPad.

7.3.1 The LaunchPad Settings

To change the settings of the LaunchPad, point with the right mouse button to an empty area of the LaunchPad and click on **Settings**. Figure 30 shows the two pages of options of the LaunchPad settings.

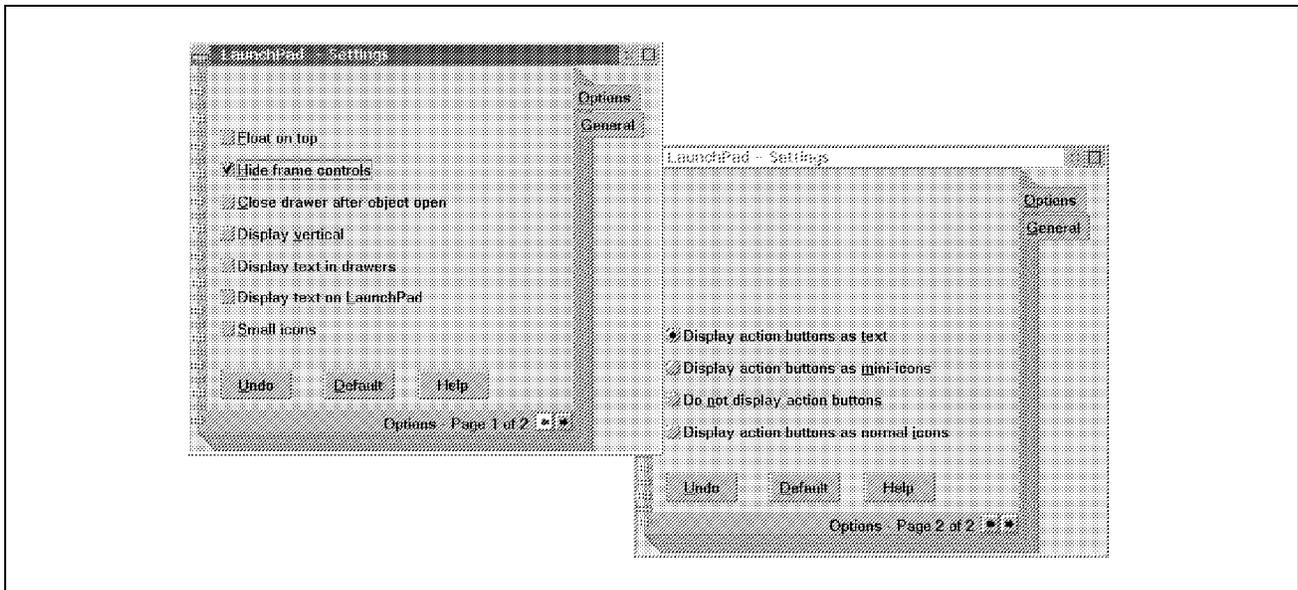


Figure 30. LaunchPad settings

You may want to modify and configure the LaunchPad settings. The LaunchPad settings are explained below, referring to Figure 31 on page 115. The options on page 1 are the following:

- **Float on top:** Keeps the LaunchPad on top of all other windows on the Desktop. If you check this option, you will have to move the LaunchPad, when it covers essential parts of your open window. In addition to that, the LaunchPad takes time to pop up again when it is overlapped by another window.
- **Hide frame controls:** This option is the only one that is checked by default. It keeps the LaunchPad small and eliminates a title bar and the pop-up menu on top of it. In Figure 31 on page 115 the LaunchPad at the bottom (LaunchPad-Communication-Palette) is what appears when this option is not checked.
- **Close drawer after object open** specifies that a drawer should be automatically closed when an object in the drawer has been opened.
- **Display vertical:** In Figure 31 on page 115 the LaunchPad on the right with the Command prompts are displayed vertically.
- **Display text in drawers** enables you to display the names of the objects in drawers. The drawers will change size to accommodate the object names.
- **Display text on LaunchPad** will place text below the icons. In Figure 31 on page 115 the LaunchPad with the Printer icons has this option checked.
- **Small icons** shrinks the size of the LaunchPad, so that it will take up less space on the Desktop. In Figure 31 on page 115 the LaunchPad on the top with the application icons has this option checked.

The options on page 2 are the following:

- **Display action buttons as text** is the default setting.
- **Display action buttons as mini icons** shrinks the size of the action buttons.
- **Do not display action buttons:** In Figure 31 on page 115 all LaunchPads have this radio button clicked on.
- **Display action buttons as normal icons** will display them in a row of four buttons besides the other icons of the LaunchPad.

There is no way of displaying only some of the four action buttons. You can either display all four action buttons or do not display them.

7.3.2 Changing Colors and Fonts of the LaunchPad

You can change the colors of the LaunchPad with the *Mixed Color Palette* or the *Solid Color Palette*, as you can with every other object on the Desktop. You can change the color of the background of the LaunchPad by dragging a color from the palette to an empty space of the LaunchPad. Dragging a color to an icon of the LaunchPad will only affect this single icon.

Changing the color of an icon will help you to distinguish between icons that are associated with the same bitmap.

If you have selected **Display text on LaunchPad**, or **Display text in drawers**, you can change the font of the text that is displayed in the LaunchPad icon. To do that, open the **Font Palette** and drag a font to an icon of the LaunchPad. The font change only applies to this single icon and does not change the size of the icon. Therefore, if you choose a larger font, beware that the text might not fit into the icon.

7.3.3 Adding Icons

Each icon on the LaunchPad is a *shadow* of an original icon, which must exist somewhere on the Desktop.

To add an icon, simply drag the original icon with the right mouse button to the LaunchPad between two existing icons. When the mouse cursor becomes a bold black line, drop the icon there. You can also drop the icon into a drawer, if you do not need it that often. A drawer on the LaunchPad is used to store objects that are similar to or related to the icons displayed on the LaunchPad. When a drawer exists, it has a little arrow indicating it contains an object. Clicking on that arrow will then open the drawer and display its contents.

7.3.4 Deleting Icons

Since each icon on the LaunchPad is a *shadow* of an original icon, deleting the icon on the LaunchPad does not affect the original icon. On the other hand, deleting the original icon will also delete the icon on the LaunchPad.

To delete an icon, simply drag it over the *Shredder*. If you do not like to use the shredder, you can move the cursor over the icon, press the right mouse button and choose **Delete** from the pop-up menu.

You cannot delete a drawer without first deleting the contents of the drawer. You have to delete each icon of the drawer, then the drawer may be deleted.

If you delete an icon from the LaunchPad and the icon has a drawer associated with it, the newest icon in the drawer takes the place of the deleted icon (which normally is the icon farthest away from the LaunchPad, if you did not intentionally create them in another order).

If you delete the last icon in the LaunchPad, the default LaunchPad will be restored.

Warning!

Do not erase the NOWHERE-directories, because all shadow objects are stored there.

7.3.5 Multiple LaunchPads

You might want to have more than one LaunchPad, using them for different purposes such as:

- Command prompts
- Printers
- Communication
- Applications

If you have multiple LaunchPads, be careful not to set more than one LaunchPad to *Float on top*. This would have an effect on system performance, as both LaunchPads try to remain on top, especially if you try to overlap them. There are two ways to copy LaunchPads in order to create multiple LaunchPads described below. You can either create copies of the LaunchPad with the mouse on the Desktop or with a REXX program.

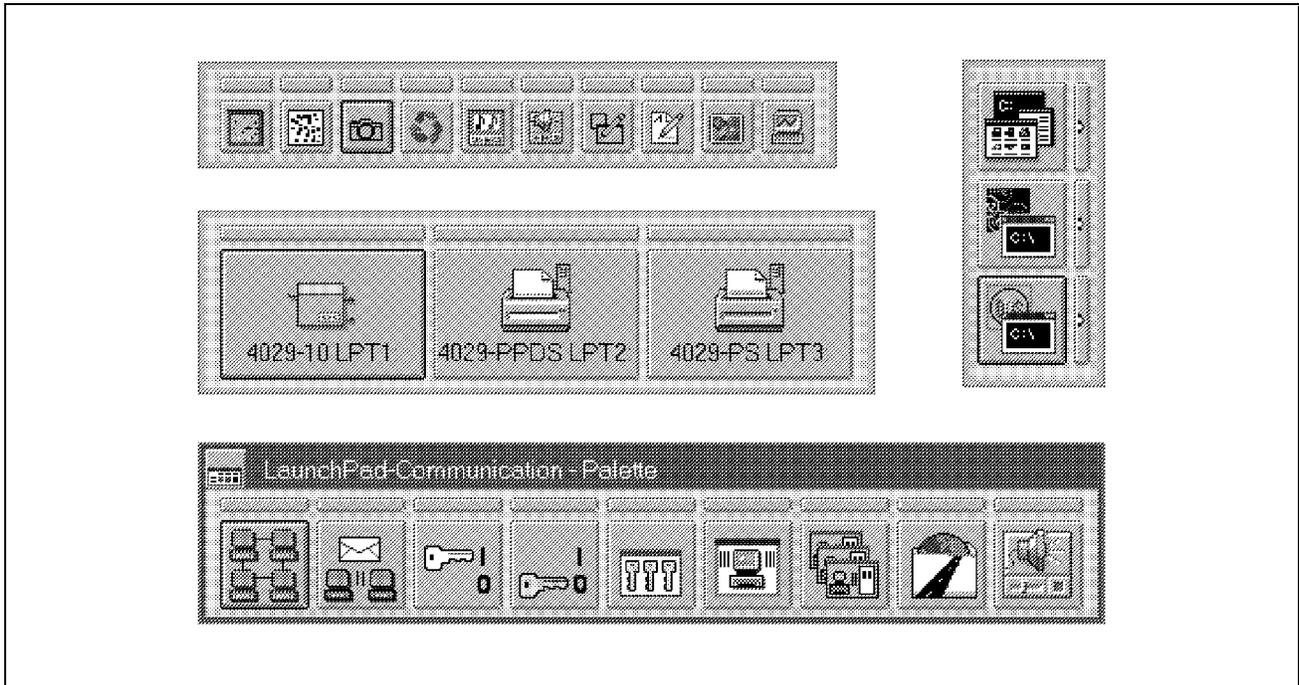


Figure 31. Modified LaunchPads

7.3.5.1 Copy LaunchPads with the Mouse

If you copy the original LaunchPad, you get an *identical copy* of it. The icons of both LaunchPads are coupled tightly. If you delete an icon in one of the LaunchPads, it will be deleted in the other one also. Only those icons that you added after copying the LaunchPad are not coupled and therefore can be deleted independently.

To get multiple, independent LaunchPads do the following steps:

1. Delete all *but one* icon from your LaunchPad. This results in getting a **template LaunchPad**. The remaining icon should be a *dummy icon*, which you do not use on your LaunchPad.
2. **Copy the template LaunchPad** to be the basis for your new LaunchPad.
3. **Add icons** to the new LaunchPad and customize it, as described above.
4. **Delete the dummy icon** from the new LaunchPad. As you do this, the reference to the dummy icon in the template LaunchPad is deleted as well. Therefore the icon of the template LaunchPad shows a green question mark. Nevertheless you can use it further on as your template LaunchPad.
5. Follow steps 2-4 for each new LaunchPad.

7.3.5.2 Copy LaunchPads with a REXX Program

If you want to create your own independent LaunchPad, which is not coupled with the existing LaunchPad, you may want to use the following REXX program. This will create a LaunchPad with the contents of the default LaunchPad.

```
/* RXLaunch.COM: Sample code using REXXUTIL function calls          */
/* for creating a second LaunchPad                                  */
/* Load REXXUTIL */
Call RxFuncAdd 'SysLoadFuncs','RexxUtil','SysLoadFuncs'
Call SysLoadFuncs

classname='WPLaunchPad'
title    ='LaunchPad2'
location ='<WP_DESKTOP>'
setup    ='OBJECTID=<LAUNCHPAD2>';
Call BldObj
Exit

/* Build Object */
BldObj:
call charout , 'Building 'title
result = SysCreateObject(classname, title, location, setup)
If result=1 then
    call charout , ' ==> Object created!'
Else
    call charout , ' ==> Could not create Object! Return code='||result
Say '';
Return;
```

7.3.6 Creating a LaunchPad with a REXX Program

If you want to *customize* a LaunchPad with a REXX program, here is an example. This program will create the IAK-LaunchPad, shown in Figure 32 on page 119, which consists of all the icons of the IBM Internet Connection for OS/2.

```

/* RXLPK.CMD: Sample code using REXXUTIL function calls          */
/* for creating a LaunchPad with IAK-Icons                       */

/* Load REXXUTIL */
Call RxFuncAdd 'SysLoadFuncs','RexxUtil','SysLoadFuncs'
Call SysLoadFuncs

/* defining the parameters for the LaunchPad */
classname='WPLaunchPad'
title    ='IAK-LaunchPad'
location ='<WP_DESKTOP>'
object   ='OBJECTID=<IAK_LAUNCHPAD>';

/* defining the icons for the LaunchPad */
icons    ='FPOBJECTS=d:\TCPIP\BIN\DIALER.EXE,' ||,
          'd:\TCPIP\BIN\EXPLORE.EXE,' ||,
          '<ULTIMAIL_CABINET>,' ||,
          '<IAK_FTP>,' ||,
          '<IAK_TELNET>,' ||,
          '<IAK_GOPHER>,' ||,
          '<IAK_NR2>,' ||,
          '<IAK>;'

/* defining the settings for the LaunchPad */
settings ='LPCLOSEDRAWER=YES;' ||, /* YES/NO          */
          'LPACTIONSTYLE=OFF;' ||, /* TEXT/OFF/MINI/NORMAL */
          'LPVERTICAL=NO;' ||, /* YES/NO          */
          'LPTEXT=NO;' ||, /* YES/NO          */
          'LPDRAWERTEXT=NO;' ||, /* YES/NO          */
          'LPHIDECTLS=NO;' ||, /* YES/NO          */
          'LPPFLOAT=NO;' ||, /* YES/NO          */
call BldObj

/* defining the contents of the 3rd drawer */
objectid='<IAK_LAUNCHPAD>'
setup    ='DRAWEROBJECTS=3,' ||,
          '<ULTIMAIL_ADDRBOOK>,' ||,
          '<ULTIMAIL_INBASKET>,' ||,
          '<ULTIMAIL_NEWLETTR>';
call ModifyObj

/* defining the contents of the 8th drawer */
objectid='<IAK_LAUNCHPAD>'
setup    ='DRAWEROBJECTS=8,' ||,
          '<IAK_UTILITIES>,' ||,
          '<IAK_HELP>';
call ModifyObj

Exit

```

```

/* Build Object */
BldObj:
call charout , 'Building 'title
result = SysCreateObject(classname,title,location,object||icons||settings)
If result=1 then
    call charout , ' ==> Object created!'
Else
    call charout , ' ==> Could not create Object! Return code='||result
Say '';
Return;

/* Modify Object */
ModifyObj:
call charout , ' Modifying 'title
result = SysSetObjectData(objectid, setup)
If result=1 then
    call charout , ' ==> Object modified!'
Else
    call charout , ' ==> Could not modify Object! Return code='||result
Say '';
Return;

```

The program first loads the REXX-Utility functions. Then the parameters for creating the LaunchPad are defined in two steps:

1. The icons that are placed on the LaunchPad are defined. You can either use the full path and file name of the program or use an object-ID (if you happen to know it).

An example of using the path and file name is:

```
d:\TCPIP\BIN\EXPLORE.EXE
```

which is the EXE file for the IBM Web Explorer.

An example of using the object-ID is:

```
<IAK_FTP>
```

which is the object-ID of the FTP icon in the IBM Internet Connection for OS/2 folder.

2. The settings of the LaunchPad are defined now. These are the settings of the "Settings" notebook. The valid parameters that you can use with each setting are shown as remarks in the program.

Now the program calls the subroutine "BldObj", which creates the LaunchPad with the parameters defined above, using the function *SysCreateObject*.

After creating the icons of the LaunchPad, you define the contents of each drawer you want to add. Drawers are numbered, beginning with "1" for the

drawer associated with the leftmost icon of the LaunchPad. The parameters for the content of the drawers are defined in the same manner as the icons of the LaunchPad.

Now the program calls the subroutine "ModifyObj", which modifies the LaunchPad, created above in sense of adding the drawers, we have defined right now. The subroutine uses the function *SysSetObjectData* for adding the drawers.

After the program was run successfully, the LaunchPad which was created should look like shown in Figure 32.

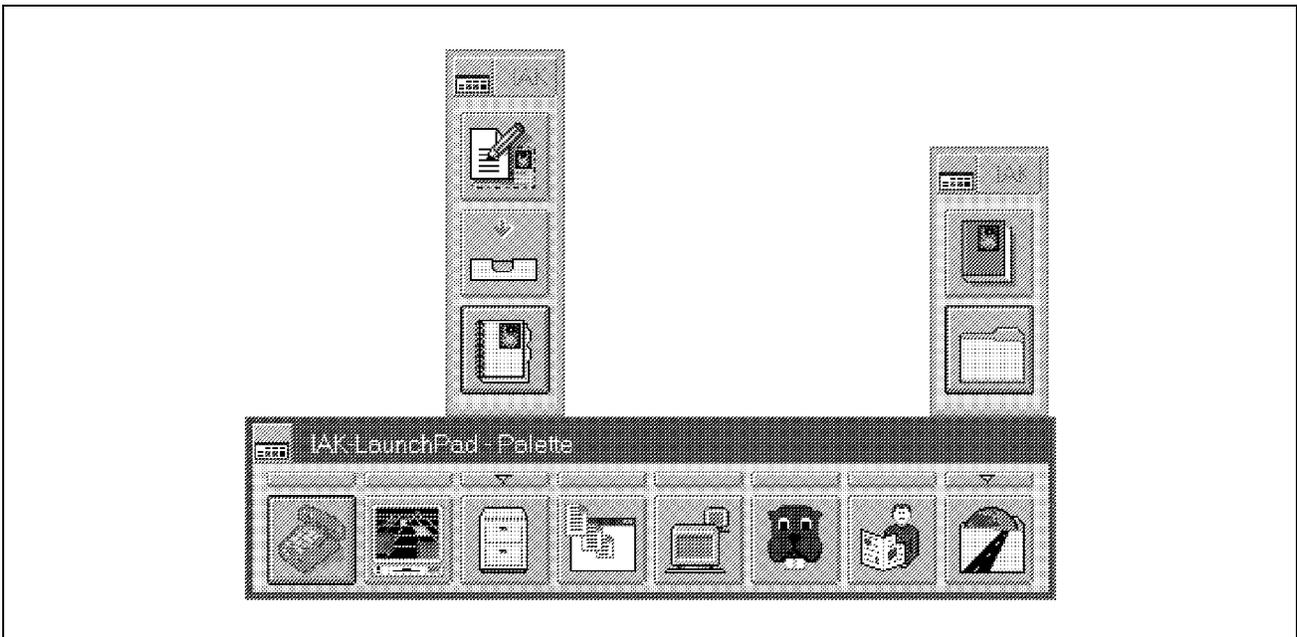


Figure 32. IAK LaunchPad

7.4 Sort, Find and Include

The Sort, Find and Include functions in OS/2 Warp Version 3 have been improved. The emphasis is on ease of use while providing additional function. The Find and Include functions have been completely rewritten in OS/2 Warp Version 3.

7.4.1 Sort

The options for sorting the contents of the Desktop or a folder have been modified to make it possible to sort by creation date *and* creation time. The Sort page of the Desktop and Folder Settings notebooks contains the amended Default Sort Attribute drop-down list.

7.4.2 Include

Include now uses only one page of the Folder Settings notebook. It allows the use of a rich set of criteria to include or exclude objects from being displayed.

OS/2 2.1 offered these inclusion criteria:

- Real name
- Size
- Last write date
- Last write time
- Last access date
- Last access time
- Creation date
- Creation time
- Flags

OS/2 Warp Version 3 adds the following criteria to those listed above:

- Object title
- Object style
- Object class
- Read only flag
- Hidden flag
- System flag
- Directory flag
- Archived flag
- Subject
- Comment

- Key phrases
- History
- Extended attribute size

These additional criteria make it possible to select objects for display in a folder on system-assigned attributes as well as on attributes that can be defined by applications, or even entered manually by the user into such fields as History, Key phrase or Comment in the Settings notebook of an object.

7.4.3 Find

The Find function has been simplified. You can now specify, on the first dialog, a file name mask and whether to search a single directory, directory tree, one disk volume or all disk volumes. If you want to search on object attributes, you have the same criteria available to the Find function as those listed above for the Include function. Using Find, it is possible, for example, to shadow all objects of a certain type or name or any other valid criteria, into one folder. It does not matter where they are located on the system. This is convenient for grouping files and other objects in a way that suits the user without requiring those objects be relocated physically.

7.5 Save Desktop Settings

The Desktop page has been added to the Desktop settings notebook in OS/2 Warp Version 3. The Desktop page allows you to save the current desktop and to indicate that subsequent changes to the Desktop are not to be saved. Selecting **Save Desktop Settings** means that the system will restart with the same Desktop as when you shut down. If this is not selected then the Desktop will look the same each time the system is shut down and restarted, even if object or folders have moved since **Save Desktop Settings** was de-selected. By disabling Desktop Save, the user can set their Desktop the way they want it and be able to keep it that way as the default at each system boot if they choose to do so. Re-enabling Desktop Save allows the Desktop setting to be updated once again.

7.6 Presentation Manager Type-Ahead

The *Input* page has been added to the System object's settings which is found in the System Setup folder. This page is used to enable or disable keyboard (and mouse) type-ahead for PM applications. When enabled, this means that any keyboard input or mouse movement is buffered until the application is ready to receive it. When this option is disabled, any keyboard or mouse input is ignored until the application is ready.

When type-ahead is enabled, PM applications will start more slowly, though the effect is minor. By default this function is disabled.

7.7 Automatic Migrate of Program Object

When entering a program name in the Program object's Settings notebook, it will be automatically migrated if that program is referenced in the migration database. All settings specified in the migration database will be automatically set for that program object. This is true whether the path and file name are entered manually, or as the result of a Find operation having been performed.

For example, if C:\WOLF1\WOLF3D.EXE is entered into the path and file name field on the Program page, the program object will immediately appear as Castle Wolfenstein. All the DOS settings specified in the DATABASE.TXT migration database for this program will also have been automatically set.

7.8 Drag from Folder

When dragging an object from a folder to another location, the folder that originally contained the object will not rise to the surface when selected with the right mouse button (assuming a right-hand mouse setup). This reduces the need to manually move all the open folders and programs in order to make room for a simple drag and drop of a file.

7.9 Folder Automatic Close

Folder Automatic Close allows users to specify whether a folder should close after an object in that folder is opened. The system default is specified on Window page 2 of 3 in the Settings notebook for the system object (in the System Setup folder). This global setting can be overridden for an individual folder by using the same function found in the Settings notebook for each

folder. It is found on the Window page, 2 of 2, in the Settings notebook for folders or the Desktop.

7.10 Setting the View

The system default for the view of an open folder can now be set on Window page 3 of 3 in the Settings notebook for the System object. The default for an individual folder continues to be set via the Menu page in the Settings notebook for that folder.

7.11 User-Defined Object Types

The user now has the ability to add new object types. These can be added to the system as a whole through the Type page of the Settings notebook of any single data object. This is useful when, for example, there is a need to associate various files to one or more program objects. The user is able to define a class of objects that form a grouping significant to the user and relevant to the user's needs.

7.12 System Object Model (SOM) II

The System Object Model is IBM's technology for packaging object-oriented class libraries. It is designed to be language neutral and to provide state-of-the-art object-oriented capability, as well as to provide support for industrial-strength class libraries. Making objects re-usable allows programmers and application developers to build on their own work and the work of others. This should reduce development time and overall cost.

The Workplace Shell was the first commercially available class library packaged with SOM when it was originally released in March 1992. Distributed System Object Model (DSOM) function has been added to OS/2 Warp Version 3. The Workplace Shell implements a DSOM server so that client applications can communicate with objects in the Workplace Shell. The Workplace Shell does not have the full DSOM functionality, but those functions that have been included can be used to receive method invocations (function calls) from other processes. Full DSOM function for use across networks and between platforms is available separately. Contact your IBM representative for details.

The files related to SOM and DSOM are in new directories:

- \OS2\ETC (the Workplace Shell class libraries).

- \OS2\ETC\DSOM (the DSOM class libraries).

7.12.1 SOM II Compatibility

Applications compiled for OS/2 with SOM v1.x class libraries should remain compatible with OS/2 Warp Version 3 and SOM II. If problems arise, it may be best to have the application recompiled using the SOM II class libraries. Applications written for SOM II may not run on OS/2 2.1 or OS/2 2.1 for Windows. For more information, obtain the OS/2 Warp Version 3 Developer's Toolkit.

Chapter 8. DOS and Windows

The concept of Virtual DOS Machine (VDM) should not be new to anyone who has used a previous version of OS/2. It simply creates an environment under OS/2 which emulates the native DOS environment and allows DOS applications to run in it.

Ever since OS/2 Version 2.0, users have been able to execute multiple DOS and Windows applications concurrently, with preemptive multitasking and full memory protection for each application. The great advantage is the capability to run multiple DOS sessions concurrently but independently. In other words, whatever you do in one DOS session will not affect the other application which is running in another DOS session.

Unfortunately, with previous versions of OS/2, the requirement for large amounts of memory became an obstacle for people to migrate from the native DOS/Windows environment to OS/2.

Taking that into consideration, when developing OS/2 Warp Version 3, the focus has been placed on how to reduce the memory requirement and at the same time improve performance. With OS/2 Warp Version 3, significant enhancements are provided in the DOS/Windows environment which makes OS/2 Warp Version 3 a better integration platform for users. The decision to migrate DOS to OS/2 is no longer subjected to the constraint of the available memory of the system or whether the old application would still run. Instead, the decision may be whether you can handle multiple applications at the same time which you were never able to do in a native DOS/Windows environment.

New features and enhancements in the DOS and Windows environment:

- Enhancement in the WIN-OS/2 architecture
- Support for various versions of Windows
- Provide support for Win32s applications
- New VAPSI device driver to support DOS/Windows ASPI applications
- Improvement in application migration
- New DOS/Windows settings
- Ability to load the DOS/Windows settings in a file
- Extended audio support

8.1 Windows Support

Unlike OS/2 Version 2.11, there is no IBM-modified version of Windows with OS/2 Warp Version 3. OS/2 Warp with WIN-OS/2 Version 3 is the release that contains the IBM-modified version of the Windows code. Please refer to the OS/2 Warp Version 3 announcement letter for availability information.

OS/2 Warp Version 3 is designed for people who do not require Windows support or have their own Windows code installed on their system. The system detects if Windows exists on the hard disk and if it is installed, OS/2 Warp Version 3 will install the Windows support. If the Windows code does not exist on the hard disk, no Windows support will be installed. You can add Windows support at any time by performing a Selective Install after Windows has been installed on the system.

8.1.1.1 Adding WIN-OS/2 Support

To add WIN-OS/2 support type `BOOT /DOS` from a command prompt to boot to native DOS if you have Dual Boot installed, or select a native DOS partition from Boot Manager.

At the DOS prompt, insert the Windows diskette into drive A: and then type `A:SETUP`. Follow the Windows instructions to complete the installation. Once complete, reboot your system to make the changes effective.

It is advisable to test Windows at this point to make sure the Windows code is properly installed, then reboot to OS/2 Warp Version 3. Once the Windows code is installed and OS/2 Warp Version 3 restarted, do a Selective Install to install Windows support under OS/2.

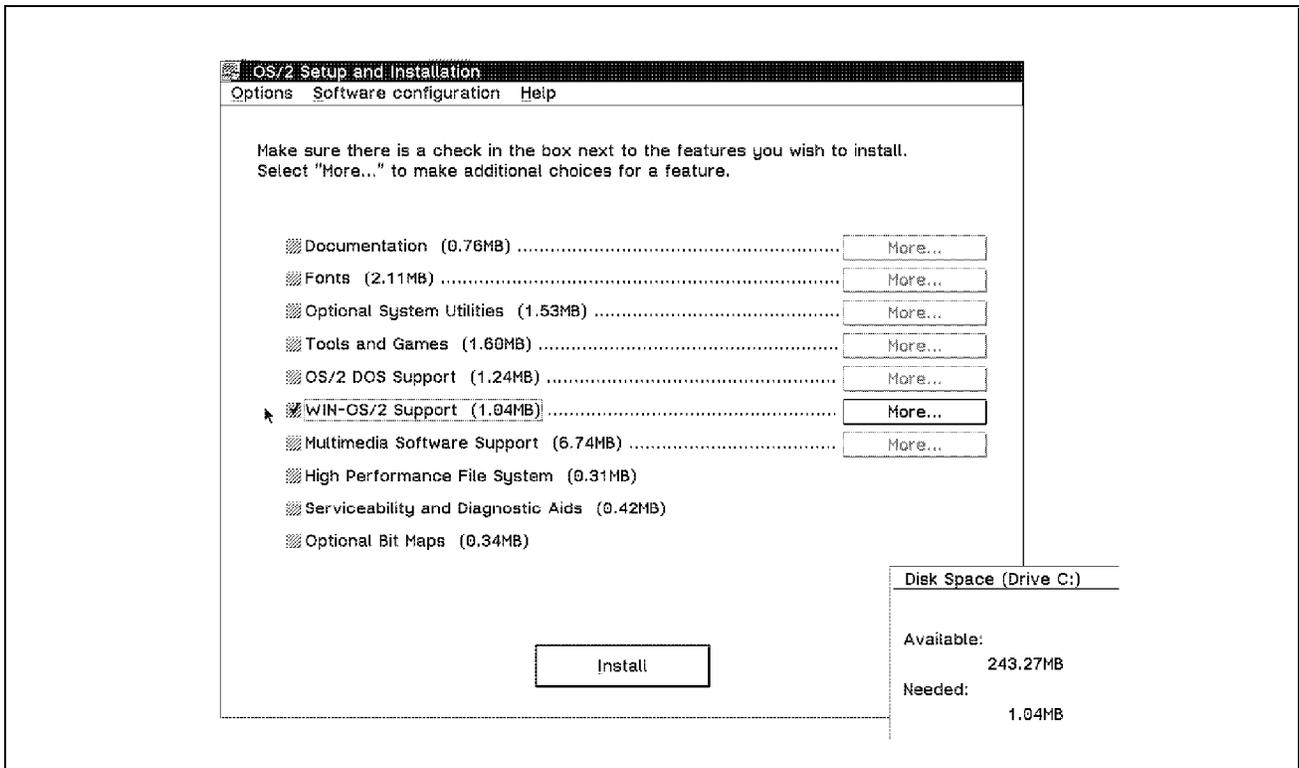


Figure 33. Selective Install to Add WIN-OS/2 Support

The steps below detail how to install WIN-OS/2 support:

1. Open **OS/2 System**.
2. Open **System Setup**.
3. Start **Selective Install**.
4. Select **OK** on the System Configuration screen.
5. Select **WIN-OS/2 Support**.
6. Select **Install**.
7. Insert diskettes as prompted.
8. Shut down the system to make the changes effective.

After you reboot, you should see two new icons within the Command Prompts folder, WIN-OS/2 Full Screen and WIN-OS/2 Windows.

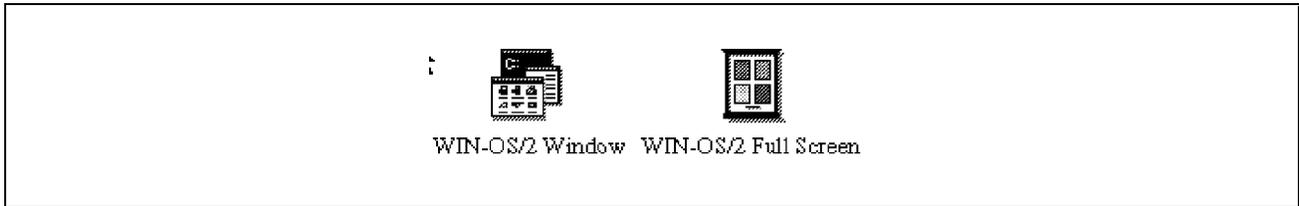


Figure 34. WIN-OS/2 Full Screen Icon and WIN-OS/2 Window Icon

Once you have the WIN-OS/2 support installed, you can run Windows applications as if running under a native DOS/Windows environment. Most initialization files and the Desktop are kept the same as in the native environment to allow easy transition from DOS to OS/2.

8.1.2 Changes in the WIN-OS/2 Architecture

The following sections describe some of the internal enhancements that were made in OS/2 Warp Version 3 to improve the performance of WIN-OS/2.

8.1.2.1 True Type Fonts Reduction

The WIN.INI file contains several fonts that are loaded at WIN-OS/2 load time. Fonts loaded, but not used, waste memory and increase load time. In OS/2 Warp Version 3, several fonts were removed from WIN.INI to improve memory usage and load speed. The user may reload the fonts if desired by changing the WIN.INI file.

The fonts that were not removed include:

- Arial
- Times New Roman
- MS Sans Serif
- MS Serif

Note

Users migrating existing files into OS/2 Warp Version 3 may see slightly different font types and size.

8.1.2.2 Write Access to LDT

WIN-OS/2 is a DPMI client. In order for WIN-OS/2 to update selector properties, that is, base address, length, etc., the WIN-OS/2 kernel issues the appropriate INT 31 call. Given the high volume of the INT 31 calls issued by the WIN-OS/2 kernel for selector management, the WIN-OS/2 kernel now provides a private interface to DPMI via VDPX to obtain a writable LDT selector. This allows the WIN-OS/2 kernel to directly modify selector properties in the LDT, rather than issue an INT 31 call.

8.1.2.3 Seamless Function Support

The seamless functions provided in PMVIOP.DLL, in previous versions of OS/2, have been extracted and a new DLL file called SEAMLESS.DLL has been created in OS/2 Warp Version 3. This reduces the size of PMVIOP.DLL and prevents unnecessary loading of seamless functions when seamless applications are not running. SEAMLESS.DLL resides in the \OS2\DLL directory.

8.1.2.4 Interrupts During Mouse Exclusion

Under seamless WIN-OS/2, the mouse is managed by PM. Each time the seamless display driver attempts a bitblt, it calls the PM display driver. In previous versions of OS/2 the exclusion code was protected with a CLI/STI pair. In OS/2 Warp Version 3, the disabling of interrupts was removed to improve performance.

8.1.2.5 WINSMSG.DLL

WINSMSG.DLL contains the functions specific to seamless WIN-OS/2. This function was integrated into the DLL in previous versions of OS/2 in such a way that a full screen WIN-OS/2 session would also load the seamless-specific portions of code. To prevent loading unnecessary seamless code in a full screen session, the seamless code was separated into a load on demand segment within WINSMSG.DLL in OS/2 Warp Version 3.

8.1.2.6 Disk Seeks

Since VDPX intercepts INT 21H calls from the WIN-OS/2 kernel, the INT 21H function 42 (disk seek) can be handled by VDPX rather than passing the interrupt to the DOS kernel. The VDHSeek function was implemented to perform the file seek in VDPX.

8.1.2.7 DPMI Memory Allocation

The WIN-OS/2 kernel's minimum memory request from DPMI was 128KB. Applications such as AmiPro which allocate and free a large number of small memory objects would cause the WIN-OS/2 kernel to allocate and free several 128KB chunks. To reduce the repetitive allocation and freeing of memory, the minimum memory request has been changed to 256KB in OS/2 Warp Version 3.

8.1.2.8 Shared Memory in WIN-OS/2

For the conversion of SEAMLESS.DLL to 32-bit, a heap was required to store link list data. Rather than create a separate heap for SEAMLESS.DLL, the heap belonging to PMGRE.DLL was used to improve performance. The link list is referenced by PMSHAPI.DLL, PMWP.DLL and SEAMLESS.DLL.

8.1.3 WIN-OS/2 Fast Loading

One of the new options in WIN-OS/2 is Fast Load. Fast Load preloads and starts a Windows virtual machine so that Windows application programs load very quickly.

The setting to enable fast loading is located in the WIN-OS/2 setup folder. This setting is used to initiate a common WIN-OS/2 session when it is set to On. All seamless WIN-OS/2 applications will be loaded in that common session and since that session is already started, the time required to load the application is reduced. These applications have to be run in the same run mode because you can only specify one mode in the WIN-OS/2 settings.

Since most Windows applications run in Enhanced mode, the Fast Load feature in OS/2 Warp Version 3 is set to default to Enhanced mode. Be aware that after adding Windows programs to the OS/2 Desktop, the WIN_RUN_MODE setting of the added programs will be set to Standard. This is due to the Migration database setting the WIN_RUN_MODE to Standard for any applications located in the database. In order for these applications to successfully use Fast Load, change either the WIN_RUN_MODE in the WIN-OS/2 Setup icon or the WIN_RUN_MODE in the seamless application.

If you are loading a Windows application in Standard mode, you will not be able to take the advantage of the Fast load setting. Only Windows applications running in common WIN_RUN_MODE will be loaded faster if the Fast Load setting is set to On.

The Fast Load setting is checked during OS/2 startup to determine if the application should be started. The application is not displayed in the OS/2 Window List. To stop the application starting a WIN-OS/2 windowed session,

you have to set the Fast Load Setting to Off. To terminate the Windows application, you have to exit from the Program Manager, and close the WIN-OS/2 session.

Note: The Fast Load setting does not affect the loadtime of applications set to run in a separate WIN-OS/2 session.

8.2 Win32s Support

You can now install OS/2 Warp Version 3 over various versions of Windows and be able to run applications for Windows 3.1, 3.11 and Windows for Workgroups Version 3.1 and 3.11. There is a limitation on the ability to access the network function of Windows for Workgroups.

Another significant feature in OS/2 Warp Version 3 is its Win32s support, which allows users to run Win32s applications in OS/2 Warp Version 3.

Win32s is a mapping layer which allows Win32 applications to make 32-bit calls to Windows 3.1 and new Win32s-specific APIs.

The figure below shows the key pieces of Win32s.

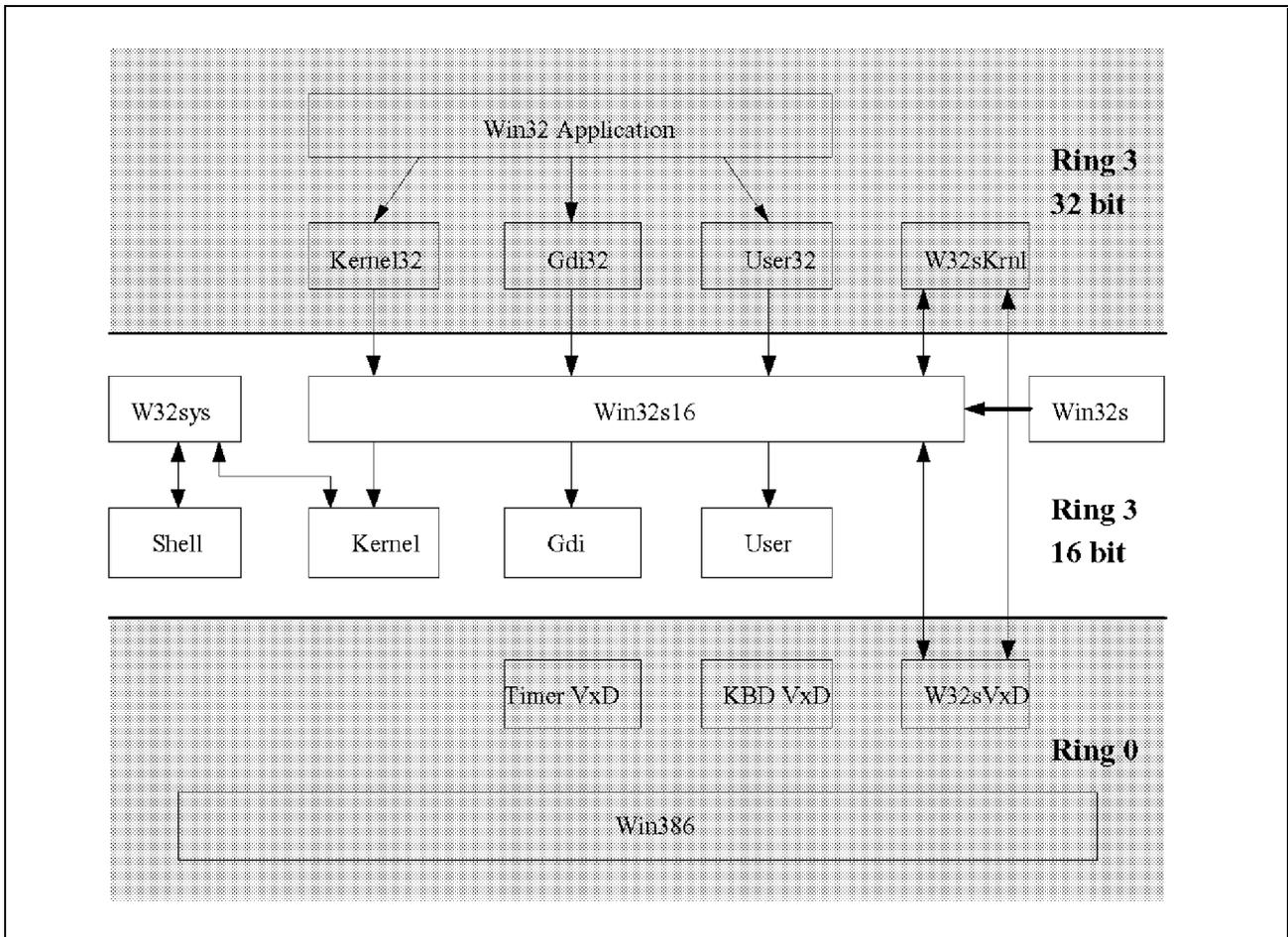


Figure 35. Win32s Components

The 32-bit Win32s application dynamically binds to Win32s versions of Win32 system DLLs such as KERNEL32.DLL, GDI32.DLL and USER32.DLL. A large percentage of the API calls are handled by the general 32/16 thunking DLL. The VxD is trusted ring 0 kernel code that handles low-level system services such as exception handling, file mapping, 32-bit executable file loading, and memory management.

The goal is to emulate Win32s such that it provides the highest level of compatibility to run existing Windows Win32s applications on OS/2. The solution is to provide the equivalent functionality of the Windows Win32s VxD (W32S.386) with an OS/2 virtual device driver.

Further information about Win32s can be found in the Win32s 1.1 Programmer's Reference.

8.2.1 Known Limitations

In the current implementation of Win32s in OS/2 Warp Version 3 there are some limitations. These limitations are listed below:

- **Multiple versions of Win32s:**

The current version of OS/2 Warp Version 3 does not support any WIN32s version that is higher than WIN32 Version 1.15.
- **Virtual Memory Range:**

Win32s allows applications to address up to 4GB range of virtual memory. However, with OS/2 Warp Version 3, the Win32s support within WIN-OS/2 offers only 512MB of virtual memory available for each VDM session.
- **Based Virtual Memory:**

Win32s allows applications to specify memory addresses where virtual memory will be allocated. Some application may take advantage of this feature, which would depend on a certain memory object to locate at a specific memory address. In OS/2 Warp Version 3, any based address (hardcoded) is likely to fail due to differences in Virtual Memory Maps between the two environments.
- **Parameters Validation:**

There is a possibility that parameter validation will behave differently under OS/2 Warp Version 3. Due to different approaches of implementing virtual memory in OS/2 Warp Version 3 to support Win32s, there is a case where a different Win32s code path is executed.
- **File Mapping per VDM session:**

File mapping is only supported per VDM session because each hAtom (a handle which refers to a given ASCII file mapped name during creation) is different between VDM sessions.

8.2.2 Procedure to Set Up Win32s Applications

To set up for Win32s applications, do the following:

1. Before you install any Win32s applications, make sure you have selected the 3.1 enhanced Compatibility mode under WIN_RUN_MODE.
2. Open the **OS/2 System Folder**.
3. Open the **Command Prompt Folder**.
4. Open **WIN-OS/2 Session**.

5. Select **Run** from the menu bar pull-down.
6. Type `A:SETUP` or `A:INSTALL` as indicated on your application diskette.
7. Select **OK**.
8. After the installation has completed, close your WIN-OS/2 session.

Note

The following steps are used to delete the files which were used in setting up the Win32s. SYS1041 indicates that no cleanup work is needed to complete the application installation.

9. Open an OS/2 window.
10. Change to the directory where you have Windows installed, usually `C:\WINDOWS`.
11. At the command prompt, type `_MSRSTRT _MSSETUP.BAT` and press Enter.

Figure 36 on page 135 is an example of what you might see during the installation of Win32s applications.

If your Win32s application does not work, check your `CONFIG.SYS` file to see if the `DEVICE=C:\OS2\MDOS\VW32S.SYS` statement exists and also that `VW32S.SYS` exists in the proper directory.

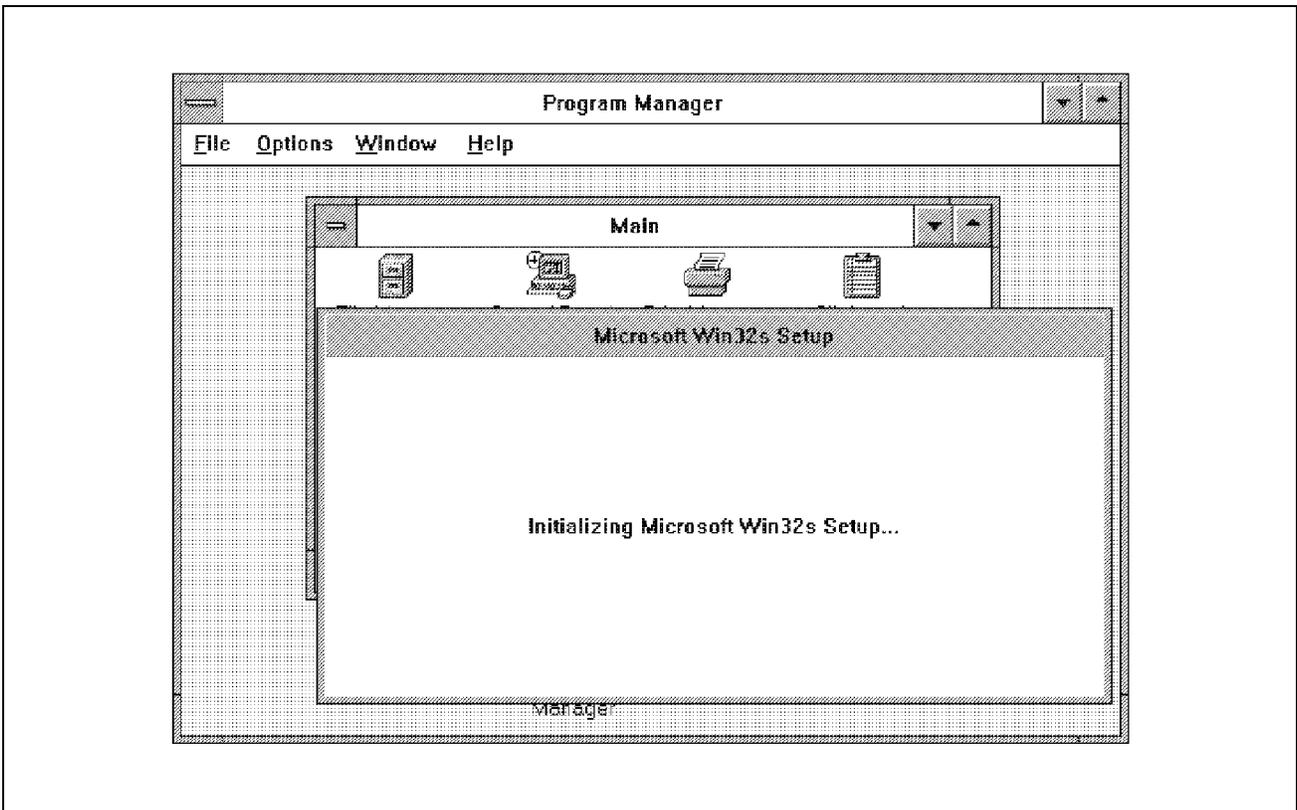


Figure 36. Setup for Microsoft Win32s Support

8.2.3 Win32s Applications

Tested applications which support Win32s include:

- APL Plus III Version 1.1
- Borland C++ Version 4.0
- DM/Redline Version 1.0
- Mathcad Version 4.0
- Mathcad Version 5.0
- PC-Express Version 4.5
- Pwave Personal Edition Version 1.0
- Sapiens Ideo Version 1.2
- Visual Slick Edit Version 1.5

8.3 ASPI Applications

VASPI.SYS is a new virtual device driver which is made available in OS/2 Warp Version 3 to extend the support for many SCSI-attached devices. You should now be able to run the DOS/Windows ASPI applications in OS/2 Warp Version 3.

8.3.1 Requirements for ASPI Applications

There are various components required to support ASPI applications in OS/2 Warp Version 3. These components are:

VASPI.SYS	This is the virtual Advanced SCSI Programming Interface device driver which enables applications running in the VDM to easily access SCSI devices, such as printers and scanners. It is located at C:\OS2\MDOS subdirectory where C: is the boot drive
OS2ASPI.DMD	This is an OS/2 Advanced SCSI Programming Interface manager which communicates with the VASPI device driver and receive requests from VASPI.SYS.
WINASPI.DLL	This is a Windows DLL which exports the Windows ASPI interface to Windows applications. It allows WIN-OS/2 applications to make requests using the ASPI for Windows convention. It is a replacement for the DLL shipped with EZ-SCSI and runs under OS/2 for Windows or DOS/Windows. It is located in C:\WINDOWS\SYSTEM subdirectory.

8.3.2 ASPI Troubleshooting

If you have problems running an ASPI application, check the following:

- Make sure you have the above files copied onto your system even though the files should be copied onto the system when a SCSI adapter is detected.
- Verify that you have the following lines in your CONFIG.SYS file:

```
BASEDEV=OS2ASPI.DMD  
DEVICE=C:\OS2\MDOS\VASPI.SYS
```
- Open the WIN-OS/2 setting and make sure 3.1 Enhanced Compatibility is selected.

- Installing EZ-SCSI in a WIN-OS/2 session replaces the WINASPI.DLL. Make sure you copy the WINASPI.DLL back afterward.

8.4 SMART Installation for DOS and Windows Applications

In OS/2 Warp Version 3, additional features have been added to enhance application migration and the user interface for migrating applications has been modified to improve the ease of use.

Here are the enhancements which are included in OS/2 Warp Version 3:

- Auto-migration with Easy Install
- A history database to distinguish between the old and new programs
- New options to add programs to the Desktop
- New default settings for manual migration
- New INSPGM32.DLL to allow one-step application migration

8.4.1 Auto-Migration with Easy Installation

Application migration is performed automatically when you choose Easy Installation with OS/2 Warp Version 3. The database DATABASE.DAT contains the titles for many commonly used applications, with their paths and program types. In OS/2 Warp Version 3, additional applications are identified in the migration database with DOS/Windows settings to optimize the system performance when running the application. With Advanced Installation, you have to explicitly ask the system to perform the migration for you. When performing CID installations, special keywords can be used to specify your own migration database.

8.4.2 History Database

A history database called DATABASE.HST is created in the \OS2\INSTALL subdirectory when migration is performed for the first time. It contains a list of all the programs that were detected during the migration process. The programs in the DATABASE.HST are not necessarily the ones that were actually migrated. Entries are made in the history database as long as the program exists when the migration is performed.

It is used to distinguish if the program is a newly added one and whether it should be preselected when you choose the **Add new programs** option.

8.4.3 Add New Programs

The **Add new programs** option can now be selected from the System Setup folder. When this option is selected, the system will search the hard drive for new programs.

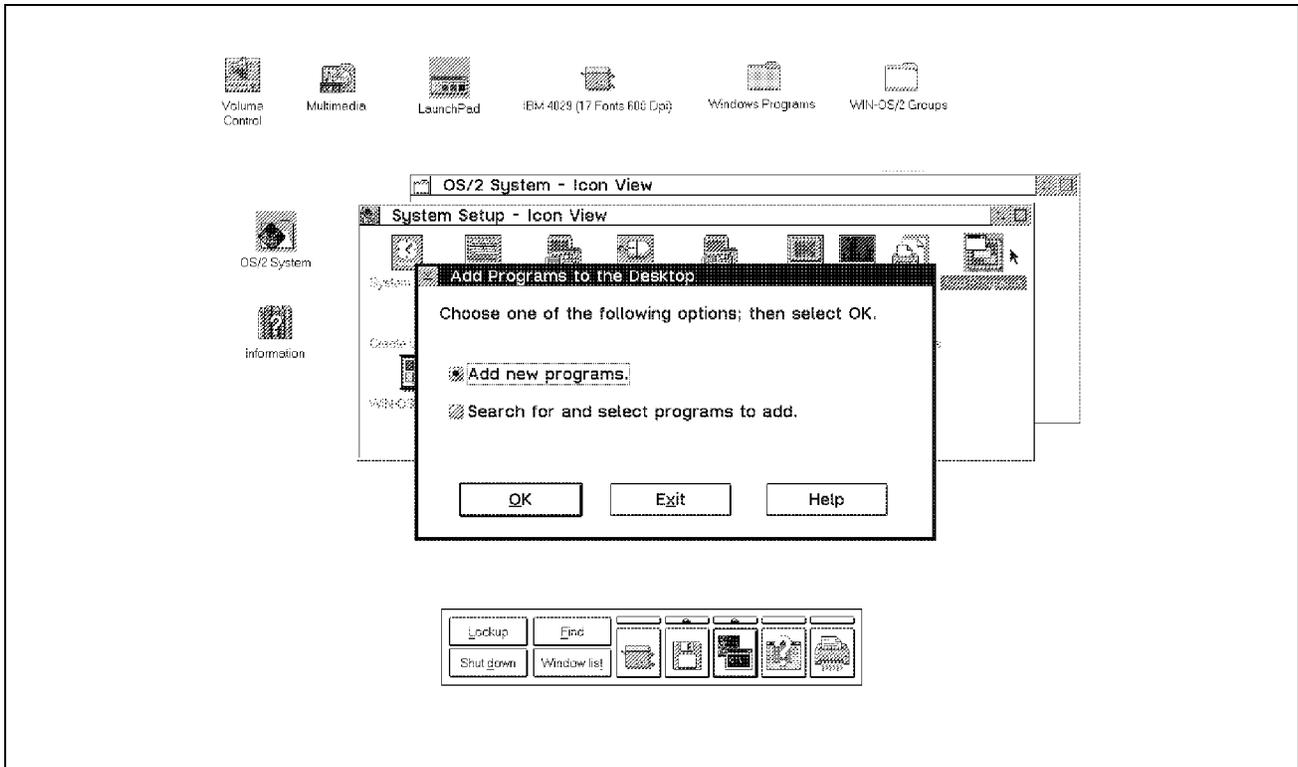


Figure 37. Add New Programs Menu

New programs are ones which do not match the entries in the migration history database, DATABASE.HST, which resides in the \OS2\INSTALL subdirectory. It will then compare the new files on the hard drive to the migration database file. Any programs that match entries in the database migration file are automatically placed in the Program Folders on the OS/2 Desktop according to the program type.

See Figure 38 on page 139 for information on adding new programs.

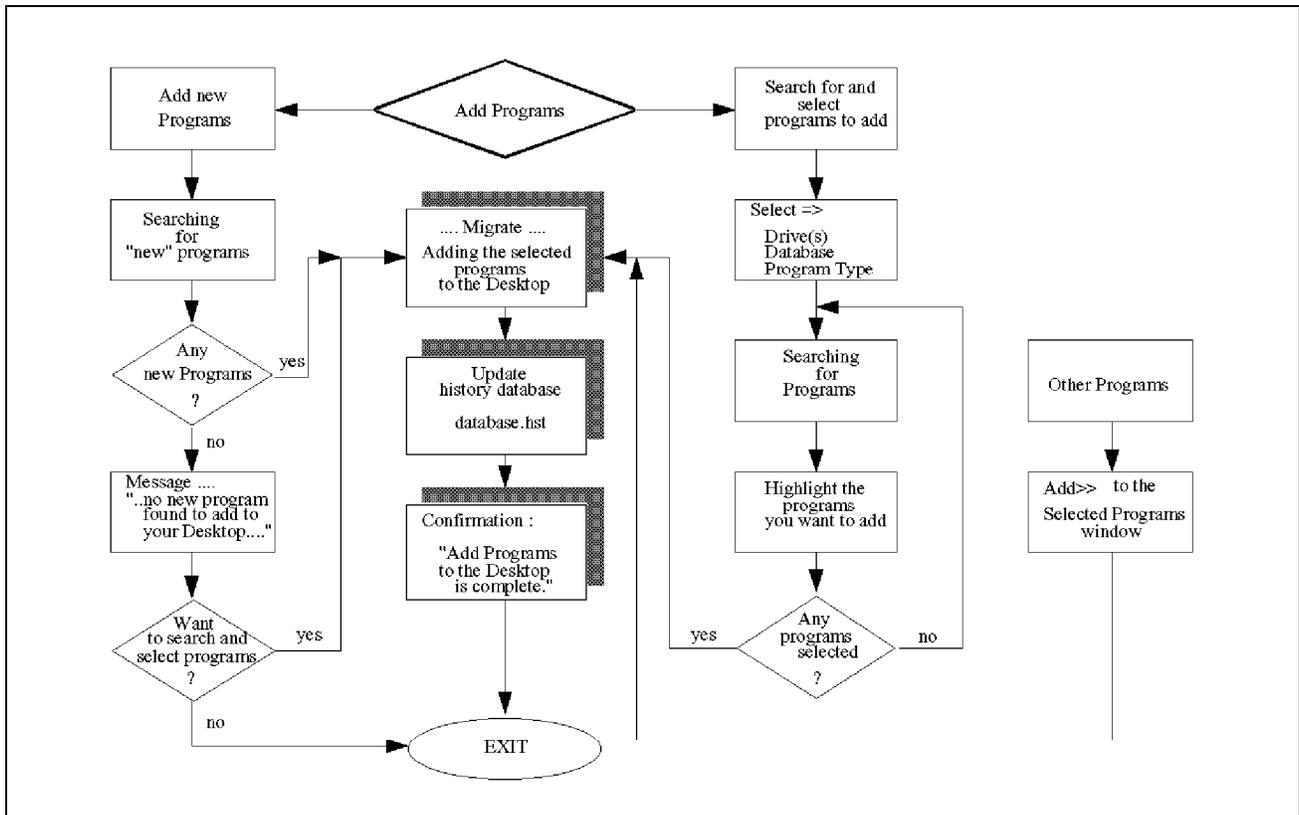


Figure 38. Application Migration

8.4.4 Manual Migration

When you choose **Search for** and **Select programs to add**, you have to specify the drives, the database, and the program type for the system to perform a search. In the Drive window, you will see all the available drives, which includes all the network drives as well. In OS/2 Warp Version 3, only local drives are preselected to reduce the searching time. In most cases, searching network drives would probably return with pages of non-desired programs which are not to be migrated and would waste the system resources. It might be more efficient to specify the program title in the *Other Programs* window.

Another enhancement is that only the new programs are highlighted and preselected for migration. You will not have to deselect each program manually and the system assumes that you are only interested in the newly added programs, which saves a lot of keystrokes. OS/2 Warp Version 3 provides you with three radio buttons in the *Select* window to help select or deselect programs from a long list.

- New** To add only the new programs listed. This option is not selectable if no new program exists on the selected drives.
- All** To add all the programs listed under the selected drives.
- None** To deselect all the program listed under the selected drives.

8.4.5 One Step Application Migration

A new DLL, INSPGM32.DLL has been written to allow you to perform one-step migration of a program. You can now simply drag and drop the program executable onto the OS/2 Desktop and the program will automatically be migrated with the defined setting. Using this method, you will not have to go through many windows to perform the migration if you only have to migrate one application.

8.5 DOS/Windows Settings Overview

DOS settings are used to modify environment settings in the DOS session and its associated Virtual Device Drivers (VDD). The DOS settings enable you to customize or fine-tune the session for the execution of the DOS/Windows applications. Some applications require different settings from those set up as the default for the session. The following section describes the DOS settings from both external and internal usage.

Currently, there is no way to modify a DOS setting across all Virtual DOS Machines (VDM) in the system. The CONFIG.SYS file does provide limited initial settings of a few DOS setting values, such as DOS=UMB. After the CONFIG.SYS file has been read at Initial Program Load (IPL) time, there is no way to modify a central VDM environment area to change DOS settings for all VDMs.

With OS/2 Warp Version 3, the layout of the DOS/Windows settings has been modified. When you click on WIN-OS/2 settings, can select the category of settings to view or change.

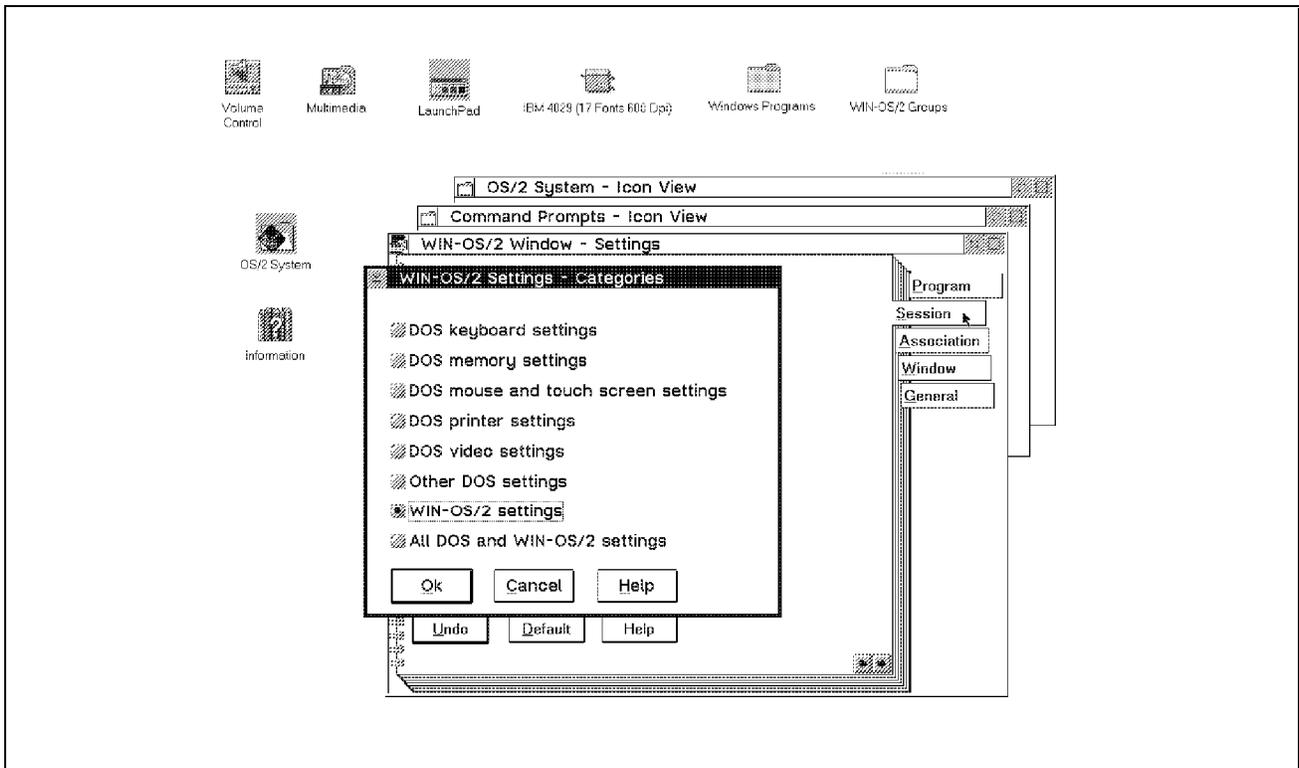


Figure 39. DOS/Windows Settings Categories

The settings categories displayed are:

- DOS Keyboard settings
- DOS Memory settings
- DOS Mouse and touch screen settings
- DOS Printer settings
- DOS Video settings
- DOS Hardware-related settings
- WIN-OS/2 settings
- All DOS and WIN-OS/2 settings

You will only see the WIN-OS/2 specific settings category if you select settings from a WIN-OS/2 session.

The last option allows you to see all the possible DOS and WIN-OS/2 settings without having to select each category in turn. This is the same screen displayed in previous versions of OS/2.

Further information regarding specific DOS and WIN-OS/2 settings may be found in Appendix D, "DOS and WIN-OS/2 Settings" on page 485.

8.5.1 Save / Load Settings From a File

In OS/2 Warp Version 3 you can load the WIN-OS/2 settings from an encoded file. This allows you to better customize your workstation and thus improve the performance of your Windows programs. With this new feature, you will not have to manually modify each WIN-OS/2 setting on each machine; that save time and it is much easier to maintain multiple systems in large organization. You can load the settings before starting a WIN-OS/2 session.

To save all the settings in an encoded file so that you can use it at a later time, follow the steps below:

1. Display the pop-up menu for the WIN-OS/2 session that you want to use.
2. Select **Settings**.
3. Select **Session**.
4. Select **WIN-OS/2 settings**.
5. Select category for the settings you wish to change.
6. Select **OK**.
7. Select the **Print** pushbutton.
8. Select **Encoded file**.
9. Type the drive, path, and file name in the entry field. The default path is C:\SPOOL\.
10. Select **OK**.

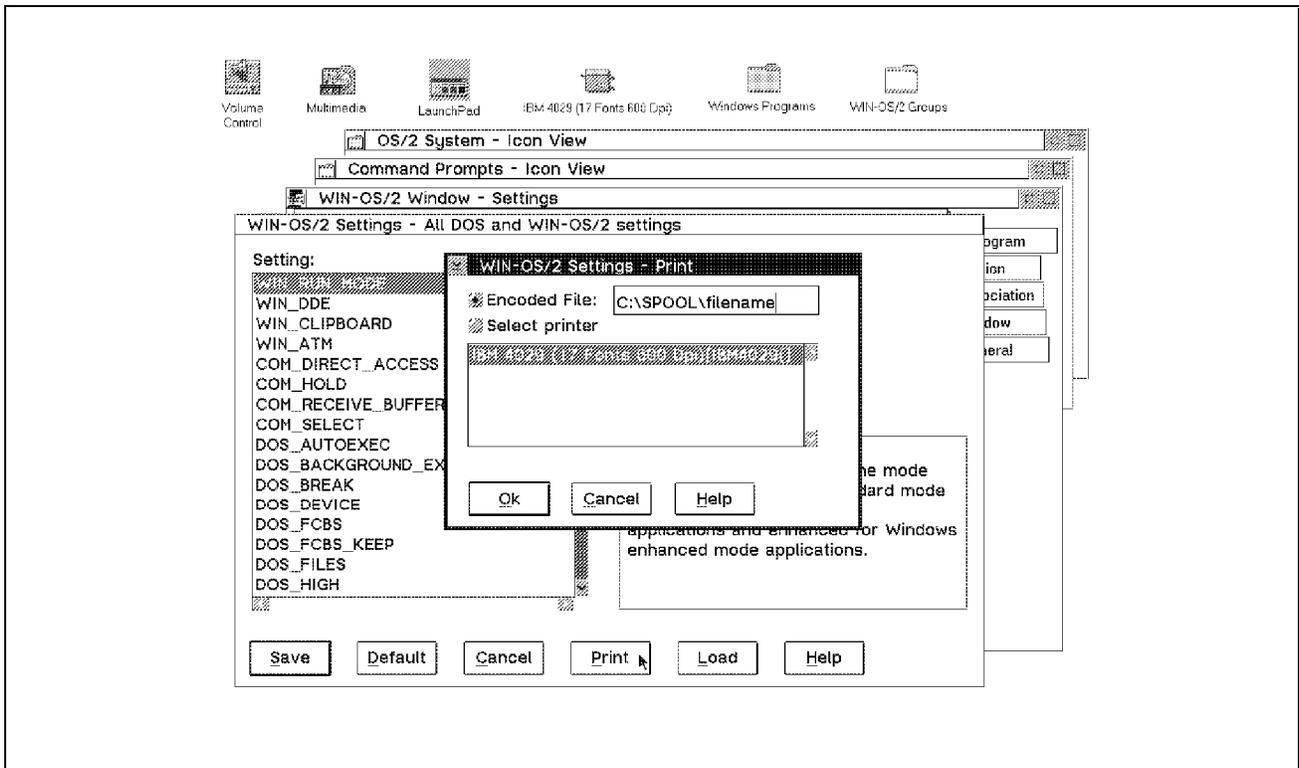


Figure 40. Save DOS/Windows Settings in an Encoded File

Once you have the settings saved in an encoded file, you can load the settings to the machine at any time. You can also load the settings to other machines which are using the same applications so that you can benefit from the customized settings to achieve better performance.

To Load the settings from an encoded file perform the following:

1. Display the pop-up menu for the WIN-OS/2 session that you want to use.
2. Select **Settings**.
3. Select **Session**.
4. Select **WIN-OS/2 settings**.
5. Select category for the settings you wish to change.
6. Select **OK**.
7. Select **Load**.
8. Type the drive, path, and file name of the file you wish to load, in Encoded File field and select Load.
9. Select **Save**.

The settings loaded from the file will now be used for this WIN-OS/2 session.

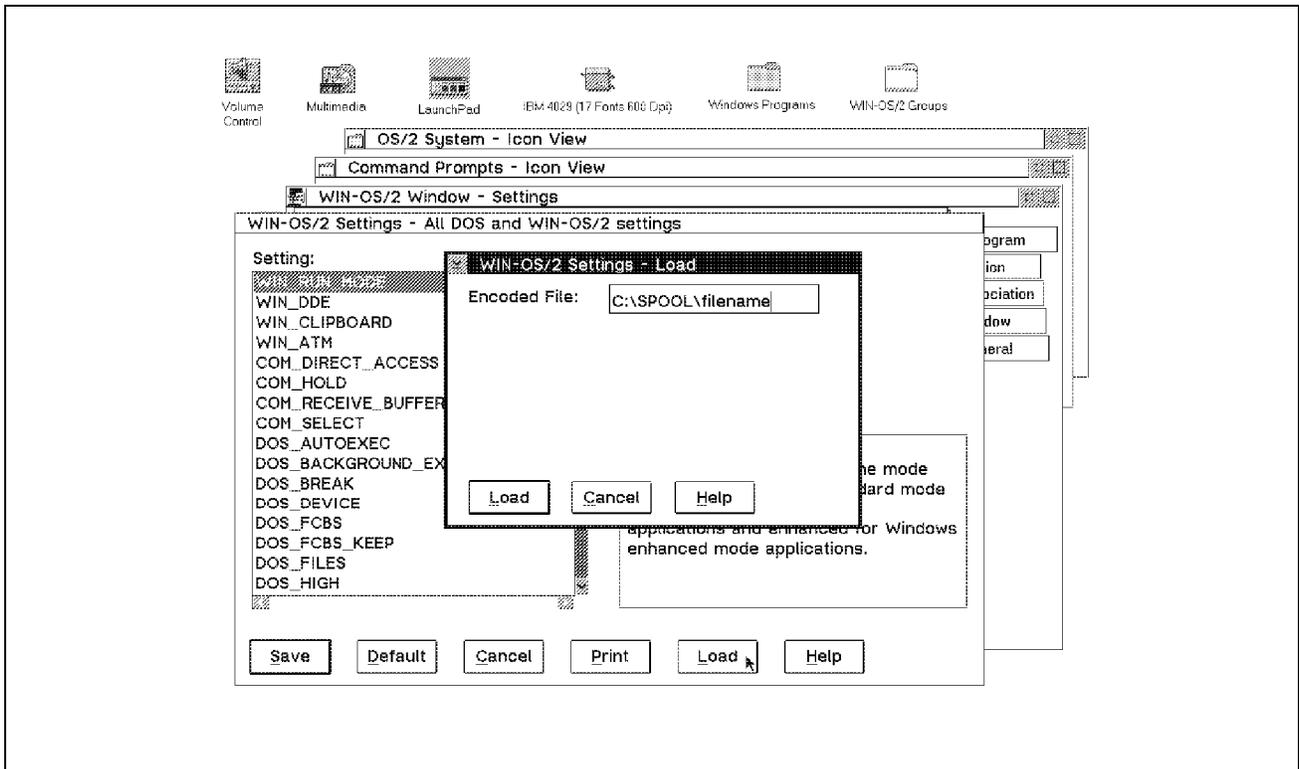


Figure 41. Load DOS/Windows Settings in an Encoded File

8.5.2 Installation of Windows Audio Support

Please refer to the following installation procedures if you have one of the audio drivers listed below:

- Crystal Semiconductor CS4231
- IBM M-Audio (ACPADD2)
- Sound Blaster (non-pro ISA or MCV)
- Sound Blaster Pro (OPL2) SBPD2
- Sound Blaster Pro (MCV or OPL3) SBP2D2
- Sound Blaster 16
- Pro Audio Spectrum 16
- Media Vision Jazz 16
- Sound Galaxy

- ESS-688
- Sound Blaster Awe 32

The drivers should have been copied to your hard drive according to the manufacturer's installation instructions.

Note

Install WIN-OS/2 multimedia sound card drivers only if the computer is not producing sounds in WIN-OS/2.

To remove previously installed drivers, do the following:

1. Open a **WIN-OS/2** session.
2. Open the **Control Panel** from the Main Group.
3. Open the **Drivers** icon.
4. Select the driver which you want to remove.
5. Click on the **Remove** pushbutton.
6. Confirm the removal by selecting **Yes**.
7. Repeat the above steps to remove all the audio drivers before you restart Windows.
8. Exit and restart the WIN-OS/2 session.

8.5.2.1 Crystal Semiconductor CS4231

The following steps are required to install the Crystal Semiconductor CS4231 audio devices on the ThinkPad 750 or 755 once the required files have been installed on your hard drive:

1. Edit C:\WINDOWS\SYSTEM.INI to add the following lines under the proper heading:

```
[driver]
Wave=CS31BAA11.DRV
Aux=CS31BA11.DRV
Mixer=CS31BA11.DRV
[386enh]
Device=vsndsys.386
```

2. Append the contents of TP750INI.ADD from the C:\OS2\DRIVERS\CS4231 directory to the end of the C:\WINDOWS\SYSTEM.INI.

```
Copy C:\WINDOWS\SYSTEM.INI+C:\OS2\DRIVERS\CS4231\TP750INI.ADD
C:\WINDOWS\SYSTEM.INI
```

3. Copy the contents of CS31BA11.INI from the C:\OS2\DRIVERS\CS4231 directory to the C:\WINDOWS\SYSTEM directory.

Copy C:\OS2\DRIVERS\CS4231\CS31BA11.INI C:\WINDOWS\SYSTEM\

4. Copy the contents of CS31BA11.DRV from the C:\OS2\DRIVERS\CS4231 directory to the C:\WINDOWS\SYSTEM directory.

Copy C:\OS2\DRIVERS\CS4231\CS31BA11.DRV C:\WINDOWS\SYSTEM\

The statements assume that both Windows and OS/2 are installed in drive C:.

8.5.2.2 IBM M-AUDIO (ACPADD2)

The following steps are required to install the IBM M-AUDIO card once the required files have been installed on your hard drive:

1. Open a **WIN-OS/2** session.
2. Open the **Control Panel** from the Main Group.
3. Open the **Drivers** icon.
4. Select **Add**.
5. Select the **Unlisted or Updated Driver** item.
6. Select **OK**.
7. Type C:\OS2\DRIVERS\ACPADD2 in the entry field of the Install Driver window assuming C: is the startup drive.
8. Select **OK**.
9. Select **IBM M-Audio** sound driver.
10. Follow the instruction to choose the appropriate input and output source.
11. Select **OK**.
12. Restart WIN-OS/2 session when prompted.

8.5.2.3 Sound Blaster (Non-Pro ISA or MCV)

The following steps are required to install the Sound Blaster (Non-Pro; ISA or MCV) Pro Audio card once the required files have been installed on your hard drive:

1. Edit C:\WINDOWS\SYSTEM.INI to add the following lines under the proper heading:

```
[sndblst.drv]
Port=NNN
Int=N
DmaChannel=N
MidiPort=NN
```

where N and N are the proper numeric values provided by the adapter manufacturer

2. Open a **WIN-OS/2** session.
3. Open the **Control Panel** from the Main Group.
4. Open the **Drivers** icon.
5. Select **Add**.
6. Select the **Unlisted or Updated Driver** item.
7. Select **OK**.
8. Type `C:\OS2\DRIVERS\SBD2` in the entry field of the Install Driver window assuming C: is the startup drive.
9. Select **OK**.
10. Select **Creative Sound Blaster 2.0 MIDI** synthesizer.
11. Select **OK**.
12. Select **New** if the Drivers Exists dialog appears.
13. Select the proper port, as indicated by the manufacturer in the Sound Blaster setup window.
14. Do **not** restart the WIN-OS/2 session when requested.
15. Select **Add** again to install the correct driver.
16. Select **Creative Sound Blaster 2.0 Wave and MIDI**.
17. Select **New** if the Drivers Exists dialog appears.
18. Restart the WIN-OS/2 session when requested.
19. Open **MIDI Mapper** icon from the WIN-OS/2 Control Panel window.
20. Select **MIDI Mapper Name SB A11 FM**.
21. Select **Close**.

8.5.2.4 Sound Blaster Pro (OPL2) SBPD2

The following steps are required to install the Sound Blaster Pro (OPL2) card once the required files have been installed on your hard drive:

1. Edit C:\WINDOWS\SYSTEM.INI to add the following lines under the proper heading:

```
[sndblst.drv]
Port=NNN
Int=N
DmaChannel=N
HDmaChannel=N
MidiPort=NNN
```

where N and NNN are the proper numeric values provided by the adapter manufacturer.

2. Open a **WIN-OS/2** session.
3. Open the **Control Panel** from the Main Group.
4. Open the **Drivers** icon.
5. Select **Add**.
6. Select the **Unlisted or Updated Driver** item.
7. Select **OK**.
8. Type C:\OS2\DRIVERS\SBP2D2 in the entry field of the Install Driver window assuming C: is the startup drive.
9. Select **OK**.
10. Select **Creative Sound Blaster FM Driver**.
11. Select **OK**.
12. Select **New** if the Drivers Exists dialog appears.
13. Do **not** restart the WIN-OS/2 session when requested.
14. Select **Add** again to install the correct driver.
15. Select **Creative Sound Blaster Pro Wave and MIDI**.
16. Select **New** if the Drivers Exists dialog appears.
17. Restart the WIN-OS/2 session when requested.
18. Open **MIDI Mapper** icon from the WIN-OS/2 Control Panel window.
19. Select **MIDI Mapper Name SBP2 A11 FM**.
20. Select **Close**.

8.5.2.5 Sound Blaster Pro (MCV OR OPL3) SBP2D2

The following steps are required to install the Sound Blaster Pro (MCV or OPL3) card once the required files have been installed on your hard drive:

1. Edit C:\WINDOWS\SYSTEM.INI to add the following lines under the proper heading:

```
[sndblst.drv]
Port=NNN
Int=N
DmaChannel=N
HDmaChannel=N
MidiPort=NNN
```

where N and NNN are the proper numeric values provided by the adapter manufacturer

2. Open a **WIN-OS/2** session.
3. Open the **Control Panel** from the Main Group.
4. Open the **Drivers** icon.
5. Select **Add**.
6. Select the **Unlisted or Updated Driver** item.
7. Select **OK**.
8. Type C:\OS2\DRIVERS\SBP2D2 in the entry field of the Install Driver window assuming C: is the startup drive.
9. Select **OK**.
10. Select **Creative Sound Blaster FM Driver**.
11. Select **OK**.
12. Select **New** if the Drivers Exists dialog appears.
13. Do **not** restart the WIN-OS/2 session when requested.
14. Select **Add** again to install the correct driver.
15. Select **Creative Sound Blaster Pro Wave and MIDI**.
16. Select **New** if the Drivers Exists dialog appears.
17. Restart the **WIN-OS/2** session when requested.
18. Open **MIDI Mapper** icon from the WIN-OS/2 Control Panel window.
19. Select **MIDI Mapper Name SBP A11 FM**.
20. Select **Close**.

8.5.2.6 Sound Blaster 16

The following steps are required to install the Sound Blaster 16 card once the required files have been installed on your hard drive.

1. Edit C:\WINDOWS\SYSTEM.INI to add the following lines under the proper heading:

```
[sndblst.drv]
Port=NNN
Int=N
DmaChannel=N
HDmaChannel=N
MidiPort=NNN
```

where N and NNN are the proper numeric values provided by the adapter manufacturer

2. Open a WIN-OS/2 session.
3. Open the **Control Panel** from the Main Group.
4. Open the **Drivers** icon.
5. Select **Add**.
6. Select the **Unlisted or Updated Driver** item.
7. Select **OK**.
8. Type C:\OS2\DRIVERS\SB16D2 in the entry field of the Install Driver window assuming C: is the startup drive.
9. Select **OK**.
10. Select **Creative Sound Blaster FM Driver**.
11. Select **OK**.
12. Select **New** if the Drivers Exists dialog appears.
13. Do **not** restart the WIN-OS/2 session when requested.
14. Select **Add**.
15. Select the **Unlisted or Updated Driver** item.
16. Select **OK**.
17. Type C:\OS2\DRIVERS\SB16D2 in the entry field of the Install Driver window assuming C: is the startup drive.
18. Select **OK**.
19. Select **Creative Sound Blaster 16 Wave and MIDI**.

20. Select **New** if the Drivers Exists dialog appears.
21. Restart the WIN-OS/2 session when requested.

8.5.2.7 Pro Audio Spectrum 16

The following steps are required to install the Pro Audio Spectrum 16 card once the required files have been installed on your hard drive:

1. Open a **WIN-OS/2** session.
2. Open the **Control Panel** from the Main Group.
3. Open the **Drivers** icon.
4. Select **Add**.
5. Select the **Unlisted or Updated Driver** item.
6. Select **OK**.
7. Type `C:\OS2\DRIVERS\MVPRODD` in the entry field of the Install Driver window assuming C: is the startup drive.
8. Select **OK**.
9. Select **Pro Audio Spectrum/CDPC Wav/MIDI/AUX** driver.
10. Select **OK**.
11. Select **New** if the Drivers Exists dialog appears.
12. Choose the settings that best suit your situation and select **OK** to each dialog.
13. Restart the WIN-OS/2 session when requested.

8.5.2.8 Media Vision Jazz 16

The following steps are required to install the Media Vision Jazz 16 card once the required files have been installed on your hard drive.

1. To enable Audio for DOS and WIN-OS/2 sessions, you must set properties for any WIN-OS/2 or DOS Sessions to the following:

```
INT_DURING_IO=ON  
HW_TIMER=ON  
VIDEO_RETRACE_EMULATION=OFF
```

2. Add the following line to the DOS_DEVICE setting:

```
C:\OS2\DRIVERS\JAZZDD\JAZZ.SYS Pnnn In Dn En Tnnn Qn
```

where:

D: the drive where OS/2 is started from

Pnnn	the letter P followed by the I/O Base Address for your Audio card
In	the letter I followed by the IRQ Level for your Audio card
Dn	the letter D followed by the 8-bit DMA Channel for your Audio card
En	the letter E followed by the 16-bit DMA Channel for your Audio card
Tnnn	is the letter T followed by the MPU-401 Base Address for your Audio card
Qn	the letter Q followed by the MPU-401 Base Address for your Audio card

3. Open a **WIN-OS/2** session.
4. Open the **Control Panel** from the Main Group.
5. Open the **Drivers** icon.
6. Select **Add**.
7. Select the **Unlisted or Updated Driver** item.
8. Select **OK**.
9. Type `C:\OS2\DRIVERS\JAZZDD` in the entry field of the Install Driver window assuming C: is the startup drive.
10. Select **OK**.
11. Select **JazzOPL2 FM Synth**.
12. Follow the installation instruction.
13. Do **not** restart the WIN-OS/2 session when requested.
14. Select **Add**.
15. Select the **Unlisted or Updated Driver** item.
16. Select **OK**.
17. Type `C:\OS2\DRIVERS\JAZZDD` in the entry field of the Install Driver window assuming C: is the startup drive.
18. Select **OK**.
19. Select **Jazz Mixer**.
20. Follow the installation instruction selecting the **New** driver.
21. Do **not** restart the WIN-OS/2 session when requested.

22. Select **Add**.
23. Select the **Unlisted or Updated Driver** item.
24. Select **OK**.
25. Type `C:\OS.\DRIVERS\JAZZDD`
in the entry field of the Install Driver window assuming C: is the startup drive.
26. Select **OK**.
27. Select **Jazz-401 Midi Interface**.
28. Follow the installation instruction selecting the **New** driver.
29. Do **not** restart the WIN-OS/2 session when requested.
30. Select **Add**.
31. Select the **Unlisted or Updated Driver** item.
32. Select **OK**.
33. Type `C:\OS2\DRIVERS\JAZZDD`
in the entry field of the Install Driver window assuming C: is the startup drive.
34. Select **OK**.
35. Select **Jazz-OPL2 FM Synth..**
36. Follow the installation instruction selecting the **New** driver.
37. Do **not** restart the WIN-OS/2 session when requested.
38. Select **Add**.
39. Select the **Unlisted or Updated Driver** item.
40. Select **OK**.
41. Type `C:\OS2\DRIVERS\JAZZDD`
in the entry field of the Install Driver window assuming C: is the startup drive.
42. Select **OK**.
43. Select **Jazz OPL3 FM Synth..**
44. Follow the installation instruction selecting the **New** driver.
45. Restart the WIN-OS/2 session when requested.

8.5.2.9 SOUND GALAXY

The following steps are required to install the Sound Galaxy card once the required files have been installed on your hard drive.

1. Open a **WIN-OS/2** session.
2. Open the **Control Panel** from the Main Group.
3. Open the **Drivers** icon.
4. Select **Add**.
5. Select the **Unlisted or Updated Driver** item.
6. Select **OK**.
7. Type `C:\OS2\DRIVERS\AZT16DD` in the entry field of the Install Driver window assuming C: is the startup drive.
8. Select **OK**.
9. Select 16-bit Audio Driver.
10. Follow the installation instruction.
11. Restart the WIN-OS/2 session when requested.
12. Open the **Control Panel** from the Main Group.
13. Open the **MIDI Mapper** icon.
14. Select **MIDI Mapper Name IBM FM SYN..**
15. Select **Close**.

8.5.2.10 ESS-688

The following steps are required to install the ESS-688 card once the required files have been installed on your hard drive.

Note

You must assure that any Windows session that uses the ESS-688 Windows Audio drivers has the WIN-OS/2 setting for WIN_RUN_MODE set to 3.1 Standard or you will not be able to start the session.

1. Edit `C:\WINDOWS\SYSTEM.INI` to add the following lines under the proper heading:

[boot]

```
attach "msmixmgr.dll" string to the end of "drivers=" entry
drivers=mmsystem.dll msmixmgr.dll
```

```
[drivers]
Wave=es688win.drv
Midi=es688win.drv
Aux=es688win.drv
Mixer=es688win.drv
Midi1=audmpio.drv
[mciseq.drv]
disablewarning=true
[386Enh]
device=es688win.386
[auddrive.drv]
AudioDrive=ES688
synth=OPL3
portchoices=220,230,240,250
irqchoices=2,5,7,10
dmachoice=0,1,3
port=220
int=7
dmachannel=1
AutoConfig=yes
VerifyInt=yes
VerifyDMA=no
```

2. Remove the following entries (if they exist) in CONTROL.INI:

```
[drivers.desc]
es688win.drv=
audmpio.drv=
```

3. Copy the C:\OS2\DRIVERS\ESS688DD files to the C:\WINDOWS\SYSTEM directory.

```
Copy C:\OS2\DRIVERS\ESS688DD\*. * C:\WINDOWS\SYSTEM\
```

8.5.2.11 Sound Blaster Awe 32

The following steps are required to install the Sound Blaster AWE 32 Audio card once the required files have been installed on your hard drive.

Note

You must assure that any Windows session that uses the Sound Blaster AWE 32 Windows Audio drivers has the WIN-OS/2 setting for WIN_RUN_MODE set to 3.1 Standard or you will not be able to start the session.

1. Edit C:\WINDOWS\SYSTEM.INI to add the following lines under the proper heading:

```
[sndblst.drv]
Port=NNN
Int=N
DmaChannel=N
MidiPort=NNN
```

where N and NNN are the proper numeric values provided by the adapter manufacturer.

2. Open a **WIN-OS/2** session.
3. Open the **Control Panel** from the Main Group.
4. Open the **Drivers** icon.
5. Select **Add**.
6. Select the **Unlisted or Updated Driver** item.
7. Select **OK**.
8. Type C:\OS2\DRIVERS\SBAWED2 in the entry field of the Install Driver window assuming C: is the startup drive.
9. Select **OK**.
10. Select **Creative Sound Blaster 16 MIDI synthesizer**.
11. Select **OK**.
12. Select **New** if the Drivers Exists dialog appears.
13. Select the proper port, as indicated by the manufacturer in the Sound Blaster setup window.
14. Do **not** restart the WIN-OS/2 session when requested.
15. Select **Add**.
16. Select the **Unlisted or Updated Driver** item.
17. Select **OK**.
18. Type C:\OS2\DRIVERS\SBAWED2 in the entry field of the Install Driver window assuming C: is the startup drive.
19. Select **OK**.
20. Select **Creative Sound Blaster 16 Wave and MIDI**.
21. Select **OK**.

22. Select **New** if the Drivers Exists dialog appears.
23. Select the proper port, as indicated by the manufacturer in the Sound Blaster setup window.
24. Do **not** restart the WIN-OS/2 session when requested.
25. Select **Add**.
26. Select the **Unlisted or Updated Driver** item.
27. Select **OK**.
28. Type `C:\OS2\DRIVERS\SBAWED2` in the entry field of the Install Driver window assuming C: is the startup drive.
29. Select **OK**.
30. Select **Creative Sound Blaster 16 Auxiliary Audio**.
31. Select **OK**.
32. Select **New** if the Drivers Exists dialog appears.
33. Select the proper port, as indicated by the manufacturer in the Sound Blaster setup window.
34. Do **not** restart the WIN-OS/2 session when requested.
35. Select **Add**.
36. Select the **Unlisted or Updated Driver** item.
37. Select **OK**.
38. Type `C:\OS2\DRIVERS\SBAWED2` in the entry field of the Install Driver window assuming C: is the startup drive.
39. Select **OK**.
40. Select **Sound Blaster AWE32 MIDI Driver**.
41. Select **OK**.
42. Select **New** if the Drivers Exists dialog appears.
43. Select the proper port, as indicated by the manufacturer in the Sound Blaster setup window.
44. Restart the WIN-OS/2 session when requested.

Chapter 9. Printing

OS/2 Warp Version 3 has powerful and varied printing capabilities. Although the concepts and procedures might seem complex at first, once you have become familiar with the OS/2 printing process you will be able to print from the Desktop, a folder, or a program with ease. You also will be able to keep track of and control your print jobs while you continue to work on another project or in another program.

9.1 OS/2 Warp Version 3 Printer Subsystem

The print subsystem consists of three elements:

- Workplace Shell
- Print spooler
- Printer driver

OS/2 Warp Version 3 controls the printing process by using six different components placed in the Workplace Shell:

- **Printer Object.** Used to coordinate the printing process.
- **The Printer Driver.** Describes the physical characteristics of a printer, plotter, or other peripheral device, and is used to convert graphics into device-specific data at the time of printing or plotting.
- **Print Job.** Represents a document or other object that has been submitted for printing.
- **Printer Port.** Is the reference to the physical printer port of the system.
- **Queue Driver.** Responsible for redirecting the print job to the print device, after it is spooled into a file.
- **Spooler.** Manages all the jobs pending on your system.

9.1.1 The Printer Object

The main function of the printer object is to enable users to access all other objects, except for the spooler object ("spool" stands for Simultaneous Print Operations On Line), which manages the queues. The printer object is similar to all other objects in the Workplace Shell with the same settings pop-up menu, with two additional features. The functions of the printer object are:

- To change the status of the printer jobs.
- To select a default printer for all the printer objects that are installed.

A printer object could represent a local or network printer, if there is a network environment. The network printer objects have a feature for managing logical addresses of remote printers. It is possible to install many different objects, one for each accessible printer. Each printer can have one or more printer drivers associated with it. You can also have more than one printer object for a single printer with each object having a different printer setup. For example, a printer can have one printer object set up for letter-size paper and another set up to print envelopes.

9.1.1.1 Creating a Printer Object

If you have printer drivers already installed on your system, you will need a printer object to use one or more of them.

There are several ways to create a printer object:

1. Creating a printer object during installation:

When installing the operating system, OS/2 Warp Version 3 asks if you want to install a printer, and then displays a box with an alphabetic list of printers supported and the names of available ports. The installation program installs the appropriate printer driver for OS/2, and WIN-OS/2 (if Windows is installed). It is possible to install additional printers at this time. Multi-driver configurations are possible for the same printer object.

2. Creating a printer object from a template:

The Templates folder contains a template named Printer. When the print template is dragged to the Desktop or to another folder, a dialog box is displayed that presents a list of printer drivers that are already installed and a list of ports to use with the new printer object (ports that are used by other printer objects are shadowed). If your printer driver is not listed, you can select the Install new printer driver push button to install a new printer driver.

3. Creating a printer object from an existing printer object:

By selecting the Create another button on the pop-up menu of a printer object, a number of choices are available, including Default and all the template options available for this object. Normally Default and Printer will be seen. Default creates another printer object with the same settings as the original printer object, but a different port. The template options enable you to create a printer object in a manner similar to dragging a template from the Templates folder. If a user had created a special template for an object, then this would be available from this pop-up.

4. Creating a printer object from a printer driver:

Open a folder containing a printer driver (floppy directory for example). If you double click on the printer driver icon, OS/2 displays a window with the different printer models (or types) supported by the printer driver. Drag one of these to the desktop or to another folder, to create the printer object. The system will automatically install the driver and assign it to the first free port.

OS/2 asks if you want to create a WIN-OS2 printer configuration. (OS/2 checks the file DRVMAP.INF to see if an equivalent WIN-OS/2 printer driver is available. This file is located in your WINDOWS\SYSTEM directory.) If yes, the installation dialog is displayed. The installation process updates the WIN.INI file when completed. If your printer is not listed in the DRVMAP.INF file, you can manually edit this file to add your driver.

If the system installs an equivalent WIN-OS/2 printer configuration, you will need the Windows diskettes.

9.2 OS/2 Warp Version 3 and OS/2 2.1 Printer Subsystem Differences

OS/2 Warp Version 3 has added new capabilities and enhancements, such as support for new printers, migration of printer drivers to 32-bit format, and new categories of printer drivers for Epson, LaserJet, PaintJet and the OMNI driver. The support of local printers by the PRINTXX.SYS base device driver is now polling-enabled, which means it can operate via polling inside of IRQ or DMA.

Figure 42 on page 162 shows the new printer subsystem in the different environments.

Laserjet		Plotter	
OS/2 2.x	OS/2 Warp	OS/2 2.x	OS/2 Warp
✓ 16 bit	✓ 16 bit - Backward compatibility	✓ 16 bit	✓ 16 bit - Backward compatibility
	✓ 32 bit	✓ 32 bit - HP-GL2, HP-GL/2 - BitBlt support for RTL, PCL	✓ 32 bit - HP-GL2, HP-GL/2 - BitBlt support for RTL, PCL
Postscript		OMNI	
OS/2 2.x	OS/2 Warp	OS/2 2.x	OS/2 Warp
✓ 16 bit - Postscript Level 1 - Backward compatibility	✓ 16 bit - Postscript Level 1 - Backward compatibility	Not available	✓ 32 bit - Support for - Epson - Deskjet - Paintjet - Backward compatibility to OS/2 2.1
✓ 32 bit - Postscript Level 1	✓ 32 bit - Postscript Level 1		

Figure 42. Printing Device Driver Differences.

Figure 43 on page 163 shows how OS/2 Warp Version 3 performs non-PM printing.

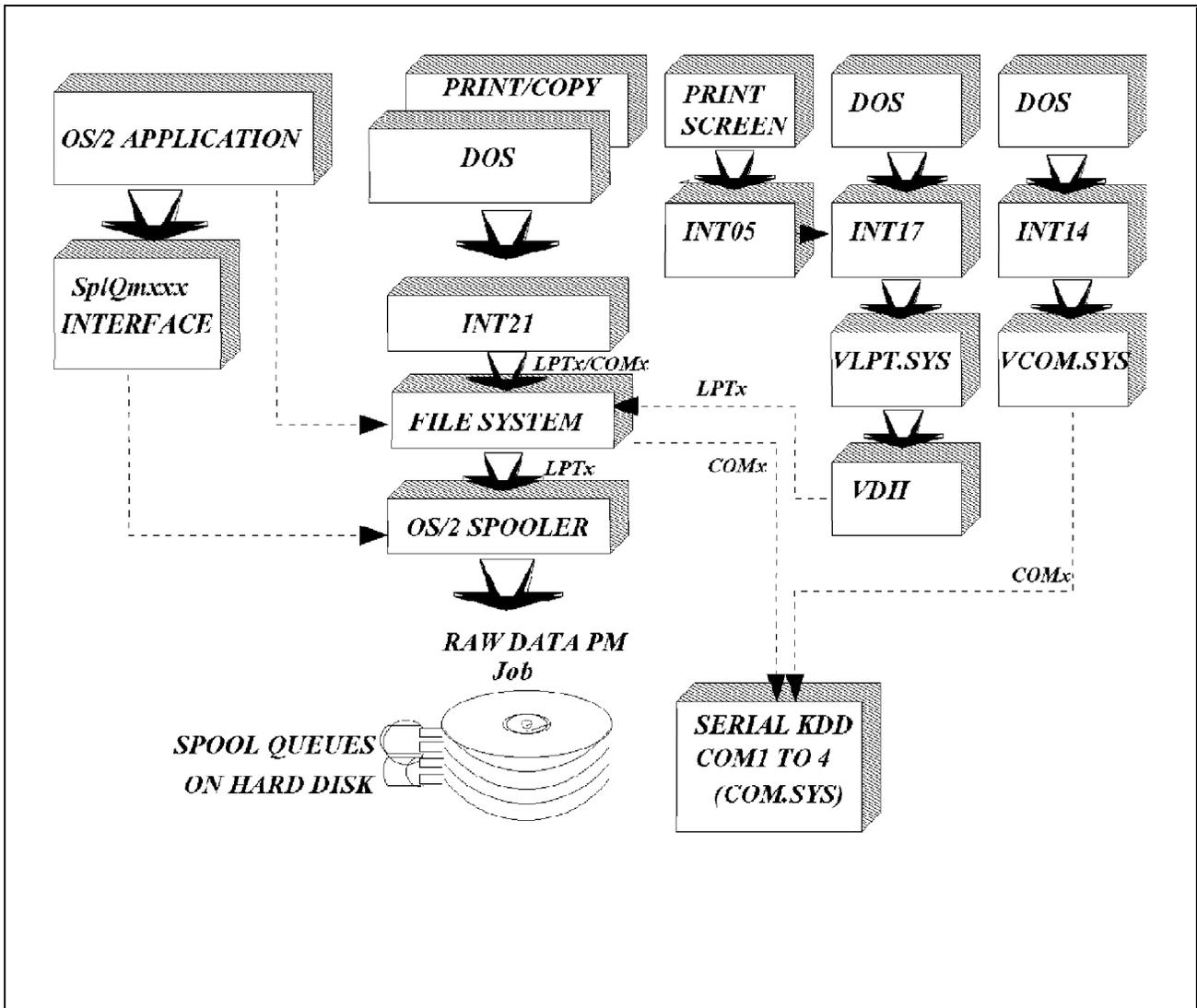


Figure 43. Non-PM Printing

Figure 44 on page 164 shows how OS/2 Warp Version 3 prints in a WIN-OS/2 environment.

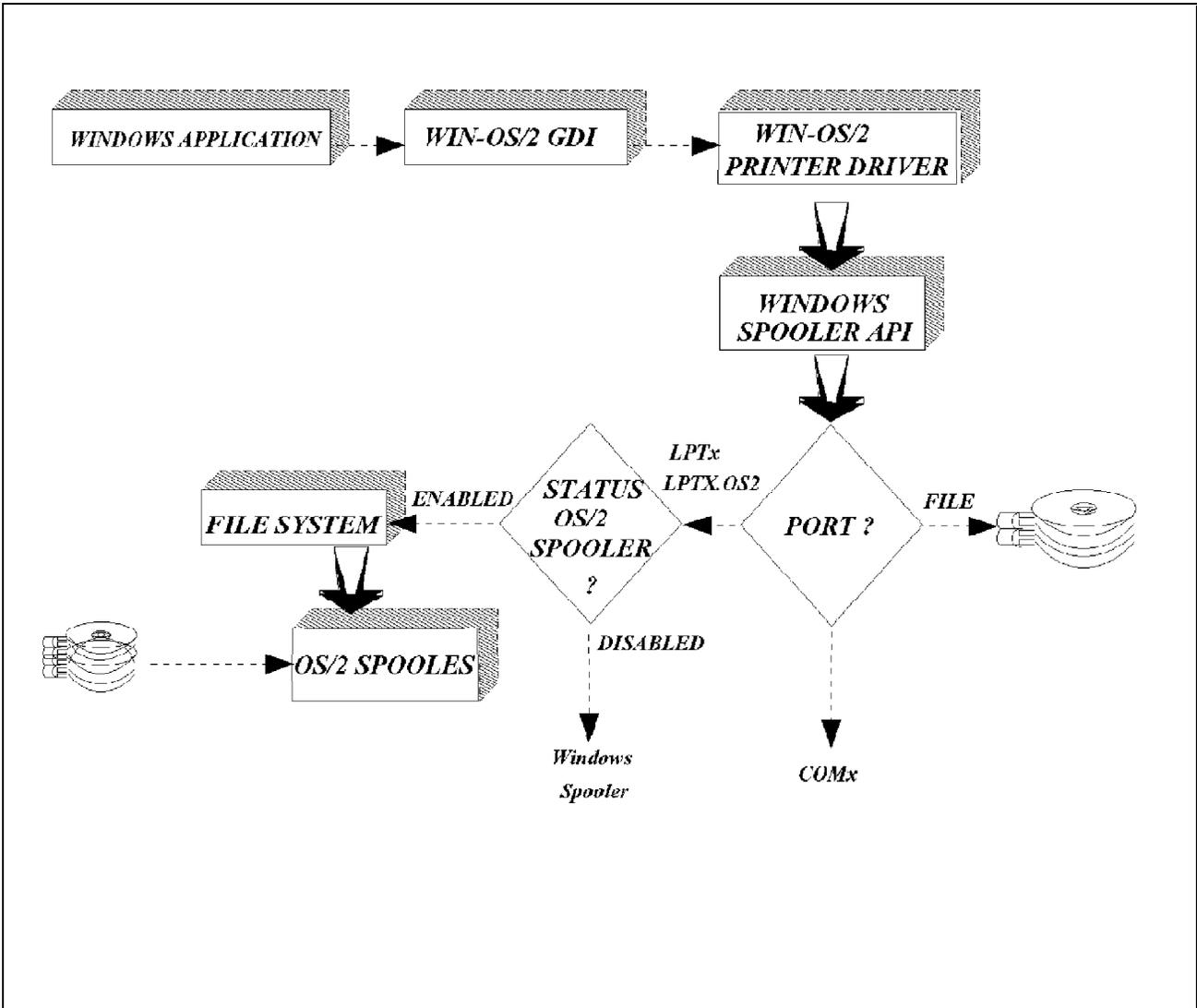


Figure 44. WIN-OS2 Printing

Figure 45 on page 165 shows how OS/2 Warp Version 3 prints in a LAN environment.

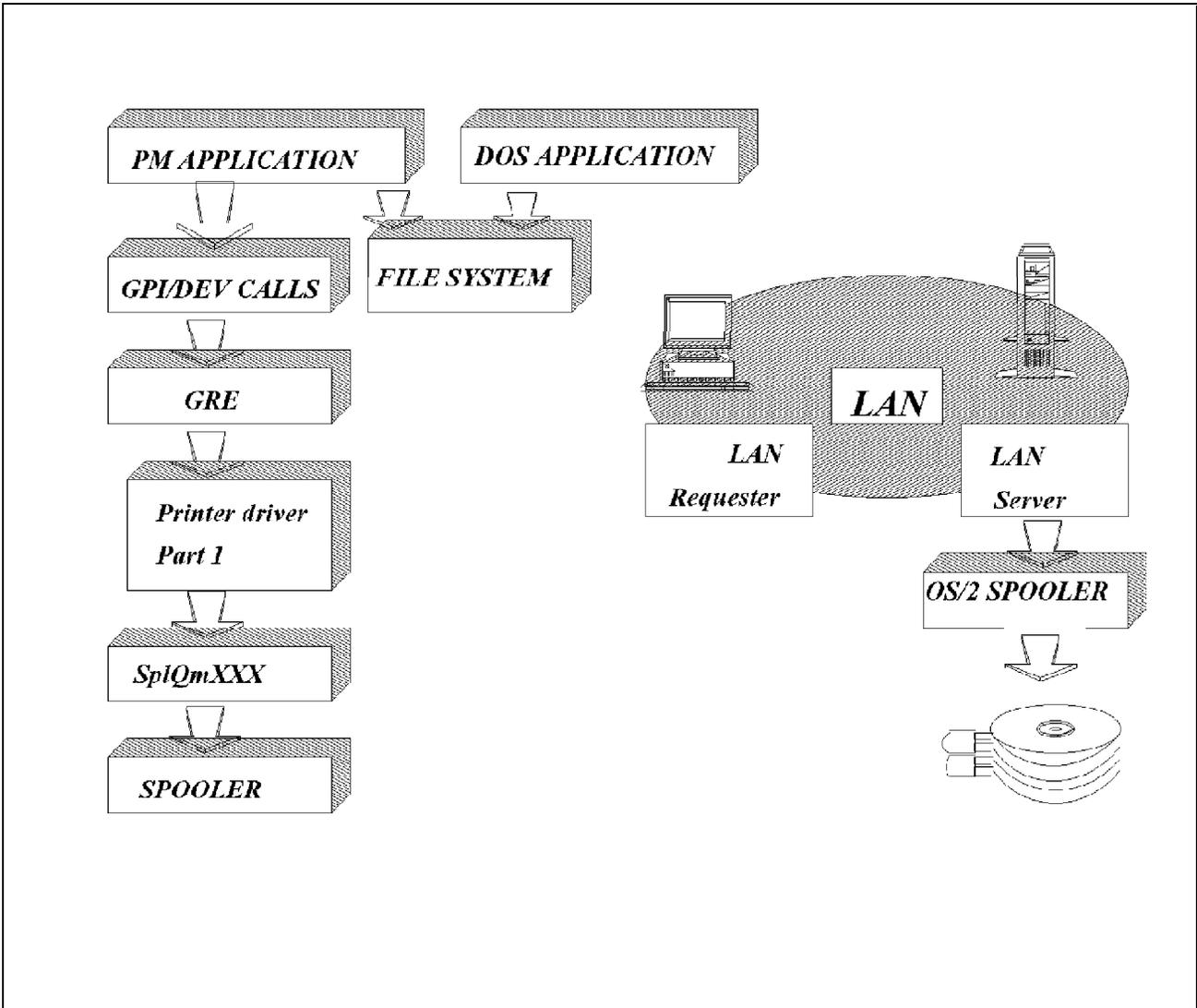


Figure 45. PM Printing in a LAN Environment

Figure 46 on page 166 shows the flow of data from a PM application sending a print job to a serial or parallel printer.

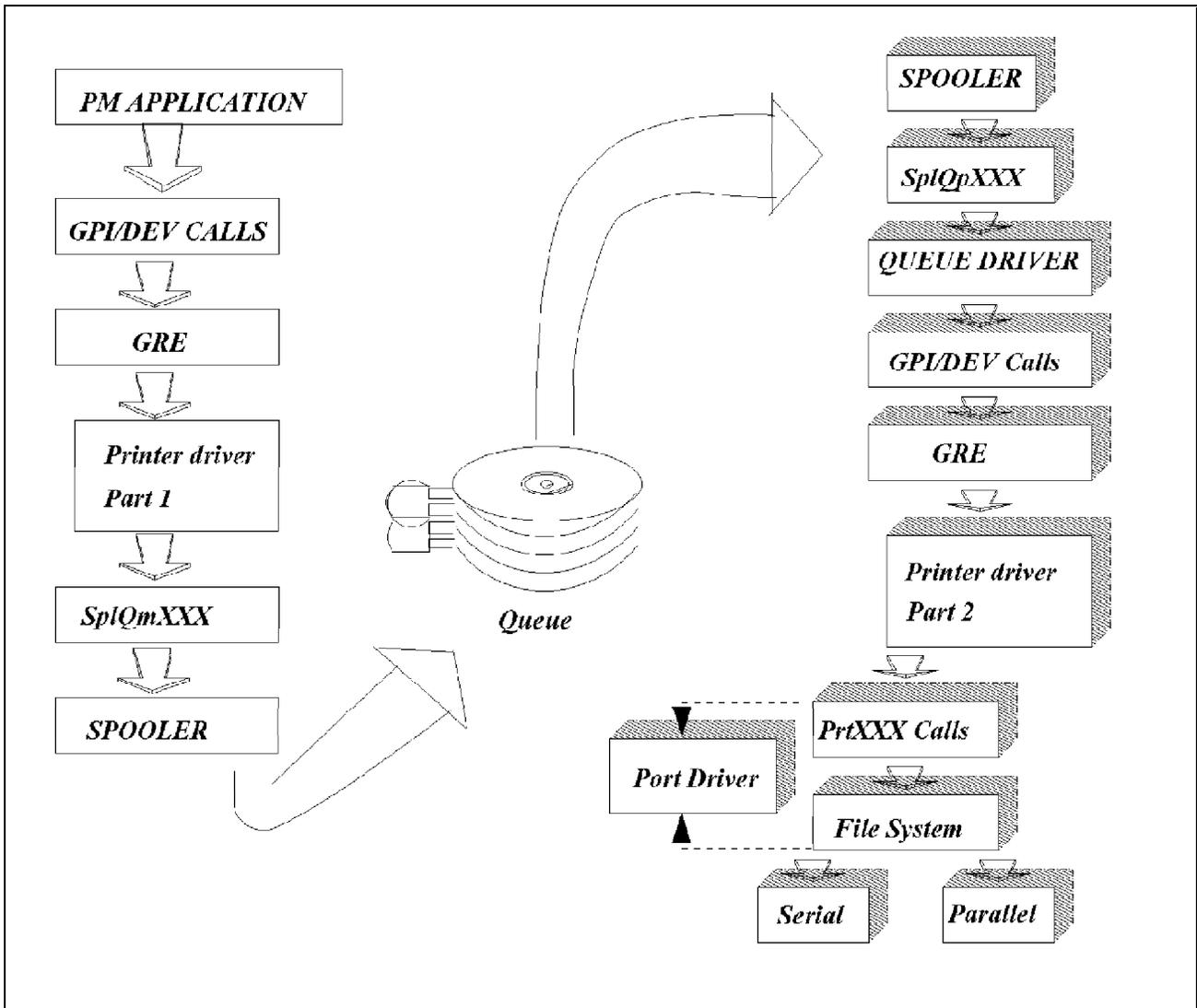


Figure 46. PM Application Printing

Figure 47 on page 167 shows the way that the OMNI driver in OS/2 Warp Version 3 is structured.

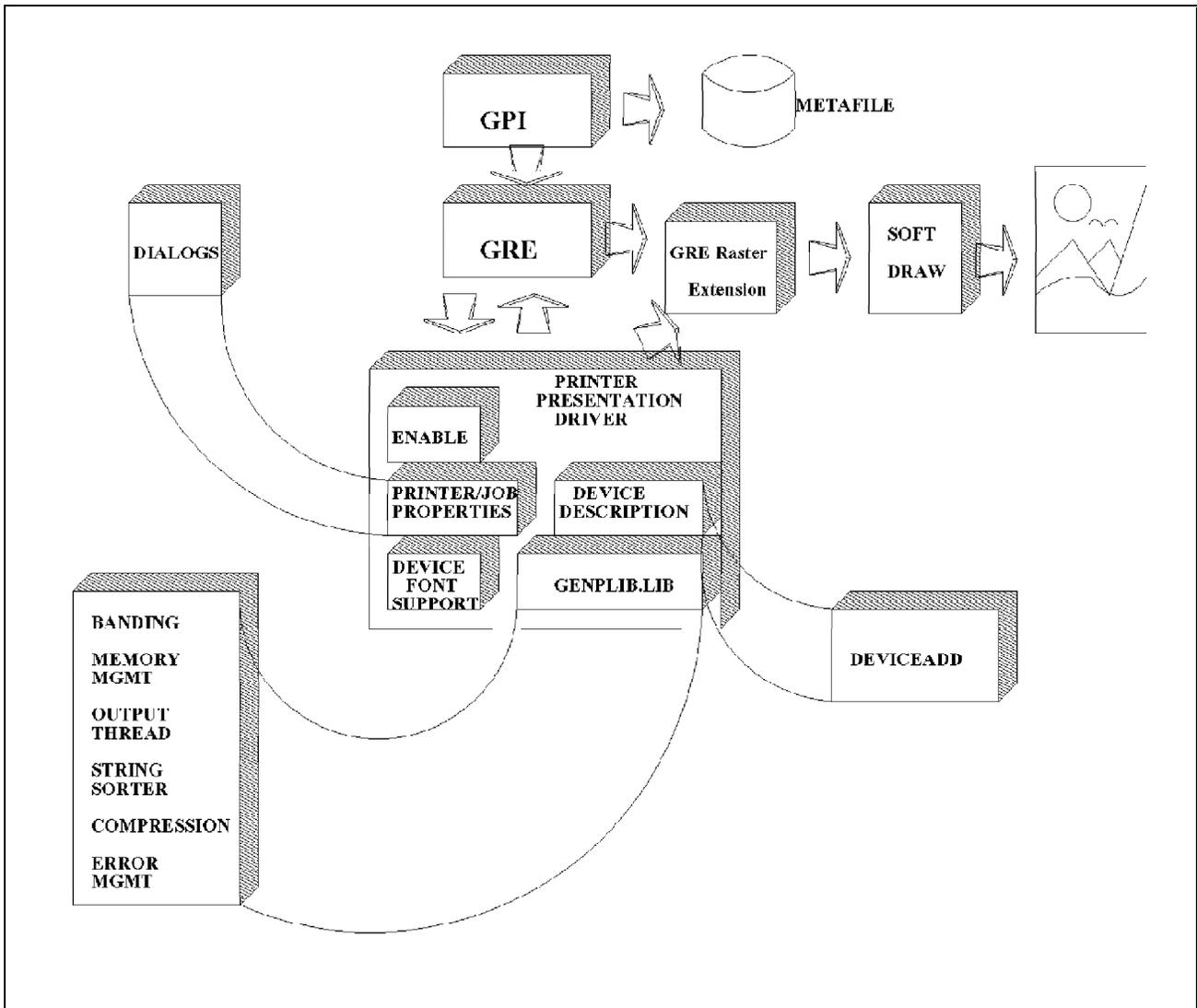


Figure 47. Structure of the OMNI Driver

OS/2 Warp Version 3 provides support for 14 different types of printer with the following devices:

1. IBMNULL
2. Epson for generic Epson-compatible printers
3. HPDIPM for HP DeskJet printers
4. IBM42xx for IBM 42xx printers
5. IBM52012 for IBM 52012 printers
6. IBM52xx for IBM 52xx printers

7. IBMPCL3 for printers that support the IBMPCL3 emulation
8. IBM4019 for IBM 4019 printers
9. IBMPCL5 for printers that support the IBMPCL5 emulation
10. LaserJet for LaserJet printers
11. PostScript for PostScript printers
12. SMGXPGET for the PaintJet printers
13. Plotters for plotter devices
14. OMNI for Epson, DeskJet and PaintJet printers

The OMNI driver is a 32-bit driver with a new user interface and new panel and job options.

All printer drivers for OS/2 Warp Version 3 are now 32-bit with the exception of Epson, DeskJet, and PaintJet. Although they have been migrated to the OMNI driver, these three are being maintained for backward compatibility. A 32-bit printer driver working with a 32-bit system, and having a 32-bit PM graphical engine, is faster and more stable.

9.3 Printer Driver Settings

OS/2 Warp Version 3 introduces a new graphical interface for some of the new printer drivers. The graphical interface is found through the printer settings and allows the user to set the physical characteristics of the printer. The interface for the OMNI driver may be found by doing the following steps:

- Select **Printer**.
- Select **Settings**.
- Select **Printer driver**.
- Select **OMNI printer driver**.
- Select **Settings**.

This will display the new notebook format for the OMNI driver printer settings. Here you will see two choices, Information and Forms.

Information provides some general information about the particular driver, such as the vendor or the level of code.

Forms will allow the user to set the tray type, the paper size, and media types. Other tabs become visible on this page to allow the user to amend the tray type or adjust the paper size to meet specific requirements.

In the PostScript printer settings, under Job Properties, select **Options**. There is a radio button that allows the user to select the type of PostScript file being sent to the printer.

The layout of the settings pages for several of the printer drivers has been changed to provide the user with an easier interface and to allow more customization of the various printer options.

9.4 Polling Enabled Printer Drivers

There are three parallel protocols that are available for the unidirectional transfer of data:

- Polling
- Character hardware interrupt-driven (programmed I/O)
- Block hardware interrupt-driven (DMA)

Previous versions of OS/2 have used programmed I/O and DMA for printing but did not support polling. Both Programmed I/O and DMA methods of printing use the hardware generated interrupt capability of the parallel port. This led to some problems with some of the less intelligent printers or slower printers and devices which do not support interrupt sharing. To correct these problems OS/2 Warp Version 3 now supports all three parallel protocols.

The purpose of adding support for polling was to:

- Free up another interrupt for use by sound cards, etc.
- Improve the performance of some printers.
- Enable poor-quality hardware (cables, adapters), which do not work with hardware interrupts, to function correctly.

The printer drivers in OS/2 Warp Version 3 are now polling-enabled. Polling is when the system uses instructions to determine whether the device is ready to receive a character and when to send the character out the parallel port. Polling has been a function of the BIOS of personal computers for many years. The BIOS parallel port functions transmit a character out

through the parallel port to check the status of the attached device, and to initialize the device attached to the port.

Setting device with polling eliminates the limitation of printing via IRQ. Polling printing has eliminated incompatibility problems of many devices set at the same IRQ, or wait state.

9.4.1 Print Using Task-Time Polling

The PRINTXX.SYS drivers include the option of using task-time polling in the routine to enhance the throughput to the parallel port over using interrupts (timer or printer driven).

The amount of performance enhancement depends on the machine and printer being used. For 486 66MHz machines and "fast" laser printers, a 5-fold increase in throughput has been observed. For 486 66MHz machines the top capacity appears to be about 70,000CPS (characters per second).

Besides enhanced performance, using the polling method frees hardware Interrupts 5 and/or 7 for use by other devices.

One disadvantage of polling is that more instructions are executed to send or receive characters. This is time that the processor could use to perform other tasks. OS/2 Warp Version 3 handles this by giving system tasks run time during a polling write request by yielding when other threads of equal or higher priority are ready to run.

9.4.2 PRINTXX.SYS Command Line Arguments

- PRINT01.SYS:

Parameters

(None) - The polling option is set by default for the PRINT01.SYS driver. Polling will be used by all devices (LPT1-LPT3).

/IRQ - Directs the driver to use the interrupt method for printing. Printing for all devices (LPT1-LPT3) will use either INT 5 or INT 7 or timer interrupts.

- PRINT02.SYS:

Parameters

(None) - The polling "option" is set by default for the PRINT02.SYS driver unless DMA is available for the device. If DMA is available then the interrupt method (that is, DMA with interrupts) will be used for that device. If a device does not have DMA support then the

polling method will be used for that device. For example, if DMA is available for LPT1 but not LPT2 then the methods used will be as follows:

LPT1 - DMA using interrupts

LPT2 - polling

Note

There is no way to force the PRINT02.SYS driver to use polling for a device that has DMA support enabled. DMA support is used by default because of the advantages that it has over polling, such as not tying up the processor. However, if polling is desired for a DMA-enabled machine, the user can simply install PRINT01.SYS.

`/IRQ` - Directs the driver to use the DMA interrupt method for printing. Printing for ALL devices (LPT1-LPT3) will use INT 7 and will use DMA if available.

The syntax for specifying the `/IRQ` argument in the CONFIG.SYS is as follows:

```
BASEDEV = PRINTXX.SYS /IRQ
```

9.4.3 Idle Task Starvation During Polling

The performance enhancement of using polling results from the elimination of an interrupt-context switch by the CPU for each byte printed. If DMA is available, however, a buffer per interrupt may be printed which increases the efficiency of the interrupt method.

The other factor that contributes to a polling performance enhancement is that threads with a lower priority than the polling loop are not given any task time.

This means that IDLE priority tasks will be starved during printing unless the print thread priority is set lower than the IDLE task by the user before calling the printer driver.

Note

Setting the thread priority before calling `DosWrite` to the printer device is effective only if the spooler is disabled.

9.4.4 Print Priority and Desktop Foreground Boost

The new 32-bit provides a multitasking environment versus foreground boost of the 16-bit spooler.

When the 16-bit spooler is enabled, the device driver is called through a spooler thread. Because this thread runs in the context of the Desktop process, giving the Desktop focus (that is, clicking the mouse in the Desktop area) invokes the automatic "foreground" priority boost.

For example, if the normal priority is 200 (indicated as 95 in the spooler Print Priority page of the Spooler Settings notebook) the foreground boost would set the priority to 300. This might result in undesirable starvation of idle tasks running in the 200-231 range.

The use of the print priority setting in the spooler has more of an impact with polling than with interrupts. The priority setting for interrupts has little effect because the print thread simply starts the printing process and blocks interrupts, then handles the actual printing. With polling, the entire printing is done in the context of the print thread dispatched by the spooler. This means a very high print priority setting would favor print performance (and likely bring any other tasks of lower priority to a halt). A lower setting would allocate time to threads that otherwise would have been starved by the print thread.

The user should be advised as to the following regarding print priority:

- Use very high print priority settings only when print performance is desired above all else (for example, with dedicated print servers, etc.).
- Try to tune the print priority to the capacity of printer to receive data. If the printer can only accept data at a slow rate, setting the print priority high will needlessly starve lower priority tasks while the driver loops waiting for the printer. If the printer is very low performance (dot matrix, small print buffer, etc.), setting the print priority to the lowest value may be adequate.

9.4.5 Job Cancel

The request packets given to the device driver can consist of write requests with print blocks (buffers) containing up to 64KB each. With polling, the driver loops in the strategy routine until an entire block is printed or a timeout occurs.

Since the thread in kernel-mode is non-preemptible, the polling loop checks the Yield flag, which is set by the timer-tick running ProcSched, at each iteration and yields if the flag is set.

If an event causes a request to kill the print thread process (such as Ctrl+C, closing the print process, or canceling the job from the spooler), the cancel event will not be detected until the device driver returns to kernel, which it does after processing each request packet.

The impacts of this are as follows:

- If the spooler is disabled and the user presses Ctrl+Break or Ctrl+C during printing, and the printer is online and functional, the print will not cancel until the current buffer (up to 64KB) has been printed. The same situation applies if the user cancels a print job with the spooler enabled.
- If the printer is offline (user turns off printer, paper jam, etc.) then the timeout interval will complete before the print process will respond to the cancel request.
- If the timeout is set to Infinite Retry and the printer is offline, the polling thread will never exit the kernel. Therefore, the process that owns the printing thread will not be stopped easily.

Note

Infinite Retry is enabled by the following:

"Set Infinite Retry" IOCTL (Category 5, Function 44H) is issued.

Registering a MONITOR to the parallel driver (this will *not* be circumvented by issuing a "Set Infinite Retry off" IOCTL).

The worst case scenario is if Infinite Retry is enabled (via the mode command or by having a print monitor installed) and the printer goes offline and cannot be recovered, while the polling driver is printing a block. In this case the only way to "kill" the print thread cleanly is to shut down OS/2 (the driver will be posted the shutdown request and exit the print thread).

9.4.5.1 Compatibility with OS/2 2.1

With the exception of the /IRQ option, the polling enabled PRINT01.SYS and PRINT02.SYS will work with OS/2 2.1. Compatibility with OS/2 2.0 has not been verified.

The /IRQ option requires special code in the kernel to enable it to be recognized by the device driver during initialization and will be effective only

for OS/2 Warp Version 3. Therefore, there is no way to force the polling-enabled driver to use interrupts if it is installed on a back-level version of OS/2. If the user experiences problems with the polling-enabled driver, then the PRINT01.SYS or PRINT02.SYS that shipped with the version of OS/2 being run should be reinstalled.

9.4.6 Using the Polling Parallel Driver

1. Always use the spooler.
2. Use as short a timeout interval as possible (default is approximately 2 minutes).
3. If using the polling driver causes a background task (such as downloading a file via a COM port) to run too slowly:

Use the spooler and lower the print priority (see the Spooler Settings notebook in System Setup) to equal to or lower than the background task's priority.

Raise the "background" task's priority, if possible.

4. If the user desires maximum print performance (possibly at the expense of other tasks), set the spooler print priority setting to its highest value. Make sure that the spooler is enabled or this will have no effect.
5. If a printer goes offline and cannot be restored to online, and the user wishes to close the session doing the print or cancel:
 - Cancel job and wait for timeout to occur .
 - Perform a shutdown.

If the user experiences problems using the polling driver that cannot be resolved, revert to using interrupts by:

- Using the /IRQ parameter (for OS/2 Warp Version 3)
- Installing the 2.1 level driver(s) (OS/2 2.1 or below)

6. If the user wishes to force polling on a DMA-enabled printer port, install PRINT01.SYS instead of PRINT02.SYS (edit the CONFIG.SYS file and replace:

```
BASEDEV=PRINT02.SYS
```

with

```
BASEDEV=PRINT01.SYS
```

9.4.7 Problems with the Polling Driver

Some printers may not work correctly when using the polling driver. Usually this is the result of "unusual" timing characteristics peculiar to the printer.

While the polling driver has been implemented to accommodate fairly wide variations in interface usage and timings, some printers may slip outside the window that the polling driver accepts. In this case, using the `/IRQ` parameter may be the user's only option.

9.5 Spooler and Port Settings

The Spooler processing is now 32-bit, it is faster and more stable. For all non-PM applications, you can select a port for the output, instead of a queue, and print directly. You can also print directly to IBMNULL from a WIN-OS/2 application. You can enable and disable the spooler and print directly without having to perform a shutdown of the system.

In OS/2 Warp Version 3 you can redirect the printer data to the physical printer, using the `spool` command. The syntax of the command is:

```
--SPOOL-----  
| -----+  
---/D:device--  
| -/O:device- |  
-/Q-----
```

`/D` specifies the input device such as LPT1 and `/O` specifies the output device such as COM1. To obtain the status of existing redirections use the following:

```
SPOOL /Q
```

The printer name is the name assigned to the printer object. The `SPOOL` command refers to this as the name of the printer queue.

Do not redirect a remote printer queue. The redirection can be done from the port setting, which is in the printer object settings. It is possible to redirect multiple queues to the same LPT port.

You can use the function `SysCreateObject` of the RexxUtil dynamic link library to create a new printer object from a printer object class. The syntax for the function is:

```
SysCreateObject(classname, title, location <,setup> <,option>)
```

where:

Classname	Name of object class.
Title	Object title.
Location	Object location. This can be specified as an object ID (for example, <WP_DESKTOP>) or a file-system path (for example, C:\BIN\MYTOOLS).
Setup	WinCreateObject setup string.
Option	Action taken if the object already exists. Valid options are Fail, Replace (delete existing object and create new object) or Update (update the settings of the existing object). Only the first letter of the option is required; the others are ignored.
Result	Return code from WinCreateObject; returns 1 (TRUE) if object was created, and 0 (FALSE) if the object not created.

Chapter 10. Multimedia in OS/2 Warp Version 3

OS/2 Warp Version 3 includes high-performance multimedia support designed to make it easy for users to transform their computers into televisions, store and view their favorite photos and host live video teleconferences with friends and colleagues.

The multimedia features that optimize the end-user experience include:

- Eastman Kodak Photo CD support
- Person to Person for OS/2
- Multimedia Viewer
- WIN/TV card support
- Additional audio device drivers
- Ultimedia Video IN for OS/2
- Industry-leading audio/video synchronization and stretching technology
- Compressed audio support
- MPEG support
- Single DIVE API
- Built-in Autodesk animation playback support

The combined multimedia capabilities makes OS/2 the ideal operating system environment for CD-ROM-based educational programs and games. OS/2 Warp Version 3 offers a compelling development environment for next-generation multimedia applications.

The multimedia features in OS/2 is a big hit in the booming home office, education and entertainment markets. OS/2 Warp Version 3 multimedia capabilities will change the way people use their computers. For example, you will be able to have your daughter's birthday pictures developed on a Kodak Photo CD and send them electronically on OS/2 to family members across the country via OS/2 Warp Version 3's Internet features.

10.1 OS/2 Warp Version 3 Optimizes the Multimedia End User Experience

IBM incorporated Kodak Photo CD technology in OS/2 to allow OS/2 users to store and view high-resolution color images and photographs developed on Kodak Photo CDs. The ability to view these images makes OS/2 an attractive program for the creation of business presentations, newsletters and other documents, as well as for commercial multimedia programs for kiosks, sales, education and training. OS/2 is the first PC operating system to be Photo CD-enabled without additional software requirements.

Person to Person, IBM's real-time conferencing software, has been integrated in the OS/2 BonusPak. Person to Person allows up to eight people to work together on a single document, sharing suggestions and writing or drawing comments on the document on their PCs. Without leaving their desks, users can achieve the same level of efficiency, personal interaction and productivity associated with traditional working sessions, saving time and reducing unnecessary business travel costs. By adding video cameras and an ActionMedia II adapter, users can host live teleconferences over existing networks.

The OS/2 BonusPak includes a multimedia viewer that will allow users to browse images, audio files, animation, and video clips. Multimedia objects are shown with "thumbnails", or miniature pictures, as if they were slides on a photographer's light table. The multimedia viewer is an extension of OS/2's Workplace Shell that gives the user freedom to display or play an object by simply double clicking on it with a mouse. The multimedia viewer allows users to view popular image formats such as GIF, TIFF, Targa and PCX. Many of the formats are found on online services such as CompuServe and on the internet.

OS/2 supports popular video overlay cards, including the WIN/TV card from Hauppauge Computer Works, Inc. that allows users to turn their computers into televisions. With the preemptive multitasking power of OS/2, a fully scalable TV screen can run in the foreground or background while users work on other applications. Device driver support for other popular video overlay adapters is also included in OS/2.

Ultimedia Video IN for OS/2, IBM's award-winning digital video technology, is also included in the OS/2 BonusPak. With Video IN, OS/2 users can use a video recorder to capture their favorite videos and images from a camcorder or other devices and incorporate them in presentations using IBM's Ultimotion and Intel's Indeo formats. Video IN for OS/2 complements the

integrated multimedia capabilities of OS/2, including its advanced synchronization and streaming capabilities and the ability to play and record Ultimotion and Indeo Audio Video Interleaved (AVI) clips. Video IN for OS/2 is particularly useful to the educational community, which can use the technology to help create a wide range of CD-ROM titles and multimedia applications that can be used as teaching tools.

New audio support has been added to OS/2 including Compaq Business Audio, Toshiba Business Audio, Analog Devices Audio, Aztech Sound Galaxy Nova 16, ESS 688 AudioDrive, Media Vision Jazz16, Creative LabsAWE 32 drivers and Crystal Semi-Conductor audio support for the IBM ThinkPad and other mobile computers. OS/2 supports more than 80 percent of the audio devices on the PC market.

10.2 OS/2 Warp Version 3 provides Multimedia Development Environment

Motion Picture Experts Group (MPEG) support has been added to Warp through Sigma Designs' ReelMagic MPEG multimedia playback adapter. The support allows multimedia developers to create OS/2 applications that offer full-motion, full-screen, full-color video and CD-quality digital stereo sound from a single-speed CD-ROM. MPEG support in OS/2 also allows users to view movies and television shows created in the emerging cross-platform VideoCD standard.

The Direct Interface Video Extensions (DIVE) API in OS/2 gives OS/2 applications direct access to the PC video hardware, enabling them to generate high-speed graphics needed for today's advanced multimedia software. The DIVE graphics interface allows powerful, high-speed games and digital video applications to use a single high-speed API for stretching, clipping and color conversion.

The built-in Autodesk animator playback support in OS/2 allows users to view video animation files developed using the Autodesk .FLI and .FLC animation file formats. These formats are recognized as the industry standard for animation on personal computers. Sound effects can be added to these files to enhance playback.

OS/2 has built-in software support for the industry-standard Interactive Multimedia Association ADPCM and Microsoft ADPCM formats. These formats reduce the amount of disk space required to store audio content and make it easier to send and receive voice files over networks. Now audio files take up to 75 percent less disk space without the need for additional

hardware device support. IBM also extended this capability in OS/2 to reduce the disk space needed for AVI files to be stored and played back in OS/2.

10.3 OS/2 Warp Version 3 Multimedia Improvements

Since most games run on DOS, gamers are faced with the limitations of the DOS environment. Common problems include lack of adequate memory, system configuration issues and the inability to run more than one application at a time reliably. OS/2 eliminates most memory problems, makes system configuration easier and allows multiple application processing in a reliable environment. OS/2 easily enables gamers to take full advantage of the memory they have by supporting most popular standards, such as EMS, XMS, DPMS, and high memory.

To boost ease-of-use, IBM has identified over 100 of the best-selling DOS, Windows, and OS/2 game titles and incorporated settings for each game into the base OS/2 operating system. Gamers no longer have to navigate system configuration and AUTOEXEC.BAT files. OS/2 automatically chooses the proper game setting. Gamers gain easy access to their favorite games with drag-and-drop speed. Should gamers wish to manually change settings, OS/2's multiple VDMs (Virtual DOS Machines) allows session configuration without having to reboot the system or maintain separate boot diskettes.

The VDM technology also takes advantage of OS/2's Crash Protection, multitasking, and memory management. Gamers can play while running print jobs, faxing documents, or accessing a communications session, without disrupting performance.

Several OS/2-specific games designed to utilize the inherent stability of the 32-bit operating system are in development, including Sim City Classic for OS/2, Sim City 2000 for OS/2, Galactic Civilizations and DOOM for OS/2. Gamers playing Sim City 2000 for OS/2 will see increased performance and smoother game play because of OS/2's multitasking capabilities. The multitasking also enables gamers to work on other projects while their simulator continues to run in the background. OS/2 is a great platform for games. One key feature for a game with complex graphics and sound is multithreading, which allows parallel running of different processes and enhances overall performance. Game developers can develop games on a GUI environment that was built on a real 32-bit multiprocessing networked operating system.

The new OS/2 combines the performance and reliability of the 32-bit OS/2 environment with mobility and productivity features, such as simplified installation, reduced memory requirements, a BonusPak of productivity applications, Internet access, LaunchPad and a more responsive user interface. The new OS/2 allows OS/2, Windows 3.1, Windows 3.11, Windows for Workgroups 3.1, and DOS applications to run on the same desktop.

10.3.1 Application Notes

1. All MPPM/2 subsystems use a "multimedia work path" to store temporary files. This directory is initially set to \MMOS2, although it can be changed using the Multimedia Setup program.

If you plan to do extensive audio file recording or editing, you may wish to change the multimedia work path to utilize a directory on a drive with plenty of extra space.

2. If you intend to use the Digital Audio application to edit large wave audio files (1 minute or more), then you might want to increase the MINFREE parameter in the SWAPPATH CONFIG.SYS statement to provide an earlier warning when the amount of swapper disk space is reaching low levels. Type `HELP SWAPPATH` at an OS/2 command line for more information about the SWAPPATH statement.
3. The MIDI and Digital Video icons in the Multimedia folder utilize the same basic media player (MPPM.EXE). This program supports command line parameters which allow you to automatically start playing a multimedia file and optionally close the program when the playback completes. The syntax to achieve this is:

```
MPPM FileName /S /SC
```

where

FileName	Is the name of the multimedia file to be played on the default device associated with that file.
/S	Specifies to begin playing the file after it is opened.
/SC	Specifies to begin playing the file and close the media player when playback completes.

4. The MIDI and Digital Video templates created in the OS/2 Templates folder cannot be used to create new files of these types. You will receive an error message if you attempt to start a file created by dragging one of these templates to another place.

10.3.2 Additional Multimedia Contents on the OS/2 CD-ROM

If you have the CD-ROM version of OS/2 Warp Version 3, then note the following additional items contained on the CD-ROM:

- Sound Samples
 - Additional sounds are located in the \MMPM2\SOUNDS directory of the CD-ROM.
- Movies
 - A wealth of digital video files have been provided on the CD. A directory tree has been created to group the clips according to certain audio and video settings.

The following subdirectories on the CD-ROM contain movie clips:

```
\MMPM2\MOVIES\ULTIMOTN\8BITAUD\STANDARD\320X240
\MMPM2\MOVIES\ULTIMOTN\8BITAUD\STANDARD\160X120
\MMPM2\MOVIES\ULTIMOTN\8BITAUD\HIGHPERF\320X240
\MMPM2\MOVIES\ULTIMOTN\16BITAUD\STANDARD\320X240
\MMPM2\MOVIES\ULTIMOTN\16BITAUD\STANDARD\160X120
\MMPM2\MOVIES\ULTIMOTN\16BITAUD\HIGHPERF\320X240
\MMPM2\MOVIES\INDEO\320X240
\MMPM2\MOVIES\INDEO\160X120
```

The subdirectory names after \MMPM2\MOVIES are composed as follows:

- ULTIMOTN or INDEO, the video clips were processed using Ultimotion or Indeo compression technologies, respectively.
- 8BITAUD vs. 16BITAUD, the sound for the video clips was recorded using either 8-bit or 16-bit PCM audio, respectively. 16-bit PCM audio results in higher quality sound, but requires higher performance system configurations. All video sound tracks were recorded using a 22 KHz sampling rate.

STANDARD vs. HIGHPERF

- STANDARD movies are recorded at a data rate that is limited to less than 150 Kbps. Movies recorded at this rate can be played directly from a standard CD-ROM drive.
- HIGHPERF movies are recorded at higher data rates that exceed 150 Kbps in order to provide higher quality images. Since their data rate exceeds 150 Kbps, these files must be played either from a double-speed (300 Kbps) CD-ROM drive or from a hard disk.

- 160X120 vs. 320X240, this indicates the normal size for the movie clips in pixels. For example, 320X240 indicates a normal video window 320 pixels wide and 240 pixels high.

Finally, after you have selected a particular directory, the file names in that directory are named as follows:

- XXXXXX05.AVI - Movie XXXXXX displays at 5 frames per second.
- XXXXXX15.AVI - Movie XXXXXX displays at 15 frames per second.
- XXXXXX24.AVI - Movie XXXXXX displays at 24 frames per second.

One other directory that you may wish to look at is the PHOTO CD directory, which contains many images that you may view with the Multimedia Viewer. The directory is named:

- MPPM2 PHOT OCD

10.3.3 Before Installation

If you installed OS/2 and would like to install the Multimedia Extension, you might need additional memory. The following table shows the memory requirements for OS/2 Warp Version 3 with Multimedia support installed:

<i>Table 15. Memory Hardware Requirements</i>	
Memory Required	MPPM Extension Installed
4MB	System sounds and low quality audio
5MB	High-quality audio (22Khz or greater, 16-bit stereo)
6MB	System sounds, low-quality audio, and video playback
8MB	System sounds, high-quality audio (22Khz or greater, 16-bit stereo) and video playback
Note: List of minimal requirements for particular working configurations.	

Notes

Some Windows Multimedia Extension programs might not work correctly after being migrated to OS/2. If this occurs, reinstall them under WIN-OS/2.

The following WIN-OS/2 and DOS Settings are recommended as a starting point for Multimedia applications:

DOS/WIN	INT_DURING_IO	ON
DOS/WIN	HW_TIMER	ON
WIN	VIDEO_SWITCH_NOTIFICATION	ON
WIN	VIDEO_8514A_XGA_IOTRAP	OFF
DOS/WIN	VIDEO_RETRACE_EMULATION	OFF
DOS	DPMI_MEMORY_LIMIT	8

Refer to 10.4, "DOS/Windows Games Specific Setting" on page 186 for more information on specific settings and problems of the Multimedia Extension, for games and applications which are running in a VDM session.

10.3.4 MCI Media Control Interface

The Media Control Interface (MCI) provides a view of the OS/2 multimedia system that is similar to that of a video and audio home entertainment system. Each component in the system is known as a media device and can be controlled by a set of textual string-oriented commands.

Media devices can be both internal and external hardware devices. Some devices are compound devices and can open files, such as waveaudio or MIDI. Other devices are controllable external devices that can be controlled directly, such as a CD-ROM device or videodisc.

The possible types of controllable device include the following:

- Videotape - A videotape player or recorder.
- Videodisc - A videodisc player.
- CDaudio - A CD-ROM device which supports standard compact disc playback.
- Waveaudio - A device which supports digital audio files ("sound board").
Sequencer - A device which supports MIDI files.
- Digitalvideo - A device which supports audio/video files, either hardware-assisted or software motion video-only.

- ReelMagic adapter - For MPEG file playback.
- Tv Tuner - An adapter for see your preferred TV program in a window.
- CD-ROM XA, CD-I, Photo CD KODAK.

If you have multiple devices of the same type, the Multimedia Setup program allows you to decide which device should be the default for that particular device type.

When support for the Multimedia Extension is installed, two REXX command files are placed in the \MMOS2 directory.:

PLAY.CMD - Allows you to play a multimedia file or device.

RECORD.CMD - Allows you to record digital audio data from a microphone to a specified file name.

The following OS/2 REXX program illustrates how to use the multimedia REXX and Media Device. The example shows commands to open, query, set and manipulate a multimedia file:

```
/* Load and Initialize Multimedia REXX Support */
call RXFUNCADD 'mciRxInit','MCI-API','mciRxInit'
call mciRxInit

/* Open the default digital audio device for exclusive use */
rc = mciRxSendString('open waveaudio alias wave wait', 'RetStr', '0', '0')

/* Check for an error, call a function to return an error string */
if rc <> 0 then
do
  MacRC = mciRxGetErrorString(rc, 'ErrStVar')
  say 'rc = ' rc ' , ErrStVar = ' ErrStVar
end

/* Load a digital audio file */
rc = mciRxSendString('load wave sample.wav wait', 'RetStr', '0', '0')

/* Obtain the ID for the device context that was just opened */
DevID = mciRxGetDeviceID(wave)

say 'DevID = ' DevID

/* Set the time format to milliseconds */
call mciRxSendString 'set wave time format ms', 'RetStr', '0', '0'

/* Determine whether the microphone connection enable */
call mciRxSendString 'connector wave query type microphone wait',
  , 'RetStr', '0', '0'

say 'connector query microphone: RetStr = ' RetStr

/* Query the length of the opened file, value is in milliseconds */
call mciRxSendString 'status wave length wait', 'RetStr', '0', '0'
```

```

say 'status wave length: RetStr =' RetStr

/* Play the multimedia file, wait for completion */
call mciRxSendString 'play wave wait', 'RetStr', '0', '0'

/* "Rewind" to the beginning of the file */
call mciRxSendString 'seek wave to start wait', 'RetStr', '0', '0'

/* Close the device context */
call mciRxSendString 'close wave', 'RetStr', '0', '0'

/* Ensure proper termination of Multimedia REXX */
call mciRxExit
exit(0)

```

10.4 DOS/Windows Games Specific Setting

OS/2 Warp Version 3 includes enhancements to assist the execution of DOS games and Windows audio drivers in VDM sessions under OS/2.

Among the biggest impacts is DOS property default changes:

```

VIDEO_RETRACE_EMULATION  Off
AUDIO_ADAPTER_SHARING    Required

```

Users of OS/2 2.1 will note that these properties had to be manually changed to support the execution of audio-enabled DOS applications. The HW_TIMER DOS and INT_DURING_IO properties default remains Off. Changing the default on this property had negative repercussions for some non-multimedia DOS applications.

OS/2 Warp Version 3 installation will auto-detect and install audio device drivers for a large set of audio adapters. In most cases, the installation program does not auto-detect IRQ or DMA assignments. When configuring DOS games and Windows audio drivers, you must insure the audio card settings are consistent across OS/2, DOS sessions and WIN-OS/2. Failure to make these consistent is the most common cause of non-functional DOS session audio.

OS/2 Warp Version 3 provides the ability to virtualize a Sound Device across an unlimited number of OS/2 applications. This ability to "context switch" across multimedia applications is inherent in the OS/2 multimedia architecture.

When assets are over-committed, MMPM/2 kicks applications off the device until enough resources are free to satisfy the current request. You can see this in action when system sounds use a device in the middle of a wave

audio playback. The in-progress operation is interrupted, the system sound plays, and the original process returns to operation exactly where it left off.

The DOS world (and the Multiple DOS session world) are less forgiving. DOS applications were not written with the idea of sharing a device and usually do not take well to having the device taken away from them.

The result of this is a set of simple, yet often misunderstood rules for sharing audio devices across OS/2, DOS session and WIN-OS/2 sessions. When a DOS session first touches an audio device, the controlling VDD communicates with the OS/2 PDD to negotiate access. The rules are:

1. No DOS session will ever hurt an OS/2 session.
2. No OS/2 session will ever hurt a DOS session.
3. No DOS session will ever hurt another DOS session (for this discussion, WIN-OS/2 sessions are DOS sessions).
4. That is, no application is allowed to corrupt the execution of any other application. All OS/2 applications are considered a single application, as they are controlled by the Multimedia Extension.

Crystal Semiconductor can share the device across OS/2 and WIN-OS/2 sessions with the use of the device being passed between device drivers on an on-demand basis. This goes a long way toward solving the problems associated with running MMPM/2 and WIN-OS/2 applications on the same machine at the same time.

For all other devices, the rules can be simplified to "once a DOS session has use of the device, no one else can use it until the using application terminates".

This can cause unexpected behavior if you load a DOS device driver in your OS/2 CONFIG.SYS file. All DOS sessions would then load the audio device driver. The first one gains ownership and prevents all other applications from using the device. Solution, only load DOS audio device drivers into sessions that will be using the device. A common approach is to make a Command Prompts entry for "DOS FullScreen/Audio" and load the DOS device driver via the DOS_DEVICE property. With this configuration and AUDIO_ADAPTER_SHARING defaulted to "required", the accessibility of audio hardware becomes more predictable.

Some DOS games require modification to additional DOS properties including specifications for DPML memory allocations. Where possible,

migrate applications. The DOS properties will be updated where the migration database knows of the individual game.

10.4.1 WIN-OS/2 Audio

Crystal Semiconductor developed Windows audio drivers that are knowledgeable of execution in WIN-OS/2 environment. They communicate through a VDD to the corresponding OS/2 audio device driver. With this knowledge, Windows and OS/2 applications can use a device on-demand. When the device is not actively moving data, it is considered "free". The WIN-OS/2 and OS/2 audio device drivers both maintain device state and restore their state each time they recover use of the audio device.

The result is system-wide audio virtualization. DOS sessions still acquire the device exclusively.

For Sound Blaster, PAS-16, Jazz-16, ESS, Aztech and other devices, the virtualization rules for WIN-OS/2 sessions are the same as those for DOS sessions. That is, there are no WIN-OS/2 knowledgeable Windows audio drivers for these devices.

WIN-OS/2 "Fast Load" can create complications for multimedia. Fast load works by starting a WIN-OS/2 session at system boot time. Windows application loaded later load more quickly as most of the code they need to execute is already "booted".

The restrictions on audio device accessibility make it necessary to disable fast load when Windows audio drivers are installed and execution of OS/2 multimedia applications is also required. Of course, this isn't a problem for CS4231 implementations, including the IBM ThinkPad 750 and 755.

10.5 Video CD - Photo CD - CD-ROM XA

OS/2 Warp Version 3 supports a lot of compact disc formats. The definition of the standard compact disc is called Red Book for the audio CD, Yellow Book for the CD-ROM, and Green Book for the CD-I (interactive). The name is derived from the color of the document's jacket.

There is a new standard introduced recently, called Orange Book for the write-once and magnetic-optical devices.

The following table is a list of the CD formats supported by OS/2 Warp Version 3 and by the Multimedia Extension.

Table 16. CD Standards

Format Name	Description	Application
CD-Audio or CD-DA	Digital audio	Consumer audio discs
CD-ROM ISO 9660	Read-Only memory	Data file, Cross Platform
CD-ROM/XA	Read-Only memory	Extended Architecture
CD-I or CD-RTOS	Interactive	Philips Interactive Motion Video
CD-I Ready	Interactive/ready	CD-Audio with some feature for CD-I player
CD-Bridge	Bridge	Allows XA track to play on CD-I player
CD-MO	Magneto-optical	Premastered area readable on any CD player
CD-WO or WORM	Write-once	May use multiple sessions to fill disc
Photo CD	Compressed images	Kodak multisession XA system

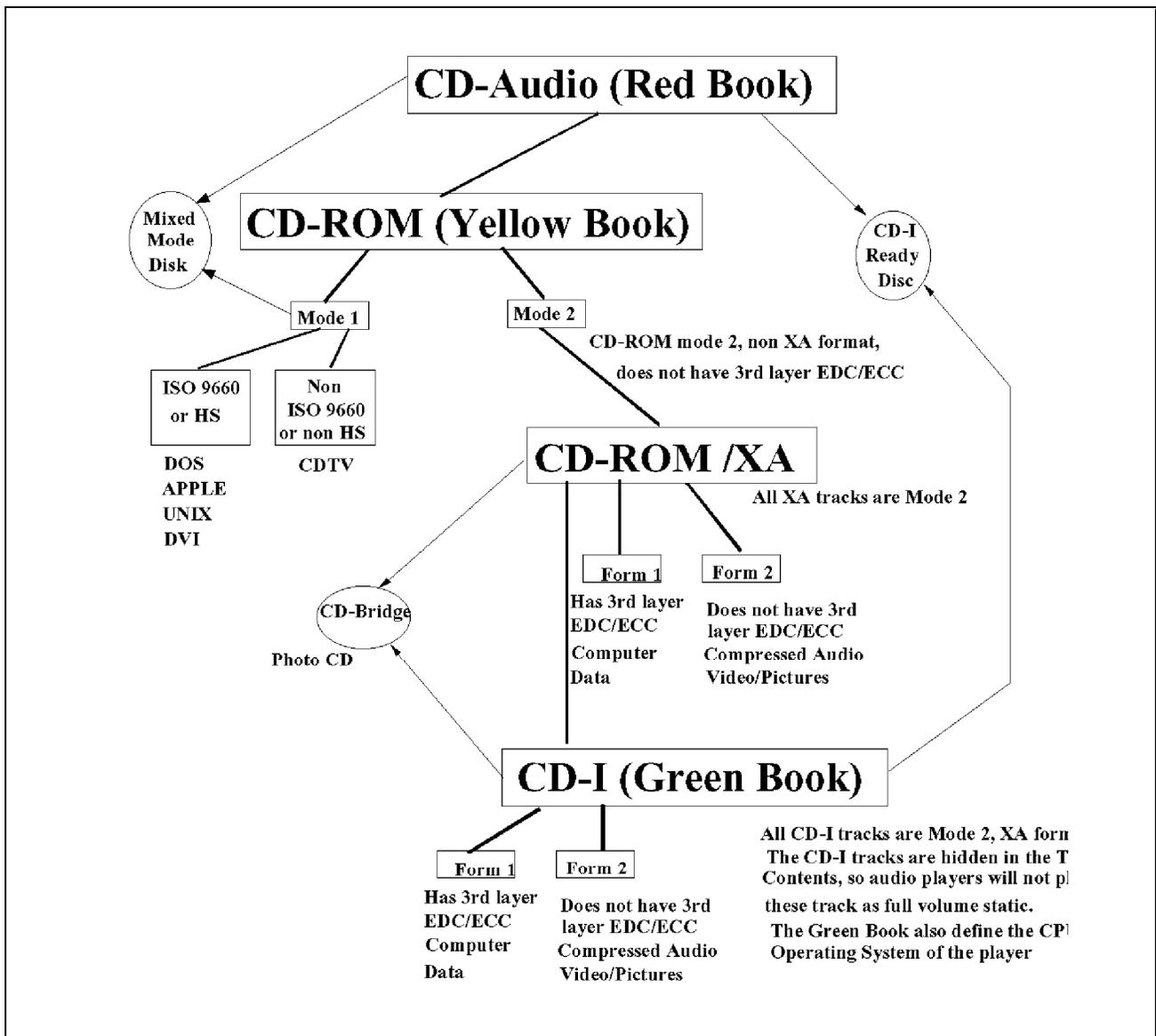


Figure 48. CD Standards

Figure 48 shows the various CD standards.

Most of the formats supported by OS/2 Warp Version 3, can support "mixed data". For example, one track can contain audio data and another track can be CD-ROM (1 or 2) CD-ROM XA or CD-I.

Note

The CD-ROM XA format uses an additional subheader that tells the reader software what type of data to expect in that sector (data, audio or picture). Additional hardware may be required to play a CD-ROM XA (this can also read the Kodak's Photo CD multisession XA disc, the yellow and red format).

10.5.1 CD-I

CD-I is a Philips's proprietary extended architecture format and is defined in the Green Book. The Green Book also defines the specifics of the operating system to support this architecture. Like the Photo CD is designed to play in domestic environments, CD-I has implemented the XA technology to prevent the use of this CD in a normal player. It may even produce physical damage from the high volume of noise! The CD-I formatted tracks are not listed in the disc's table of contents.

CD-I ready discs are Red Book audio discs with special information stored ahead of the first track. These discs are specifically designed for the Philips CD-I players, which allow the special pictures and text to be loaded into the player's memory before the audio track begins playing.

OS/2 Warp Version 3 supports only the audio track, because the other information is encoded for use only with the Philips CD-I player.

The CD-I standard exists in two different formats, one called digital CD-I and another called Video CD. There are no physical differences between them. They have only been developed for different systems. OS/2 Warp Version 3 supports the Video CD CD-I format.

10.5.2 CDROM XA

CDROM XA (eXtended Architecture) is an extension of Yellow Book CD-ROM standards. XA defines a new sector format to allow computer data (form 1), as well compressed audio data and video/image information (form 2) to be read and played back apparently simultaneously. Computer data can be mixed with audio and images. XA provides audio synchronization, similar to AVI's. Special hardware is needed for this because the audio data must be separated from the interleaved data, decompressed then output to the speakers, all while the computer data is sent elsewhere.

There are two types of XA format. The difference is the quality level of the audio playback:

- CD-ROM/XA Level B can play 37.8 kHz mono, music quality
- CD-ROM/XA Level C can play 18.9 kHz mono, voice quality

10.5.3 Kodak Photo CD

The Kodak Photo CD was brought about to provide a high standard of support for electronic photo-imaging for the consumer. Users can get their exposed 35mm rolls of color film transferred onto a Photo CD. The source images (negatives) are processed by a Kodak technician who scans each image at an imaging workstation. The images (a session) are then written onto the Photo CD write-once media, and a color index of thumbnails of all the images is also printed. The Photo CD is then returned to the user in a box with the printed index of the pictures.

The CD can be returned to have more images added. This is a multi-session disc.

Photo CD images can be viewed with the aid of the MultiMedia Viewer, which is part of the BonusPak and a CDRom-XA player connected to the system.

Information

Add to the association settings of the IB.EXE program, which may be found in the VIEWER BIN subdirectory, after you have installed the Multimedia Viewer.

Add the association *.PCD, which will allow you to double click on the PCD files and automatically load them for viewing.

10.5.3.1 Image Pac

The image file stored in the Photo CD media is called Image Pac. An Image Pac contains five different formats of the same image. The smaller-resolution Image Pac file stores without any need of compression. The larger files need to be compressed and recomposed by the MultiMedia Viewer. (In fact the IOPROC.DLL is responsible for that).

The following is a list of Image Pac file formats:

Component	Size(in pixel)	Description
Base/16	128x192	Overview pac, also thumbnails 64x96
Base/4	256x384	Quickly accessed

Base	512x768	Most useful for 640x480 multimedia
4Base	1024x1536	Compressed, base luma interpolated
16Base	2048x3072	Compressed, base luma interpolated

The MultiMedia Viewer only supports 4 of the 5 format types. This is because, while the smaller-resolution forms are stored without compression, the higher resolution large files need to be decompressed and recomposed using proprietary Kodak algorithms and driver.

10.6 TV Card Support

A new enhancement in OS/2 Warp Version 3 is the support for the TV-tuner. OS/2 provide the driver to support the Hauppaugh WIN/TV tuner adapter. The multimedia extension of OS/2 Warp Version 3 provides the support for composite video TV signal from a normal video player. The signal from the adapter can be either PAL or NTSC (this of course depends upon the adapter installed in the system). The signal is redirected to the media player by the digital video engine and has all the characteristics of a real digital video player.

10.6.1 Installation

The system does not provide an autodetect function for the TV adapter and it is necessary to add the support of WIN/TV afterwards. Installation is via the Easy Installation option or can be done using Advanced Install.

After the installation of the device driver, the support of the TV adapter is ready. In the Multimedia settings notebook are all possible settings of the TV adapter, tuning and such. The system preinstalls setting defaults for the channel and fine tuning needs.

10.6.1.1 Tuning

After the installation it is possible to configure the TV Tuner adapter and the signal that is displayed in the Digital Video window.

The system preinstalls an association with the Digital Video. The panel presents three boxes for tuning the application:

1. Alignment of the signals
2. Video setting
3. Fine tuning

10.7 Autodesk FLI/FLC Playback Support

FLI and FLC are a type of animation that were developed by Autodesk. An animation is keyframe data and scene data stored on your system. These frames are rendered and stored in a medium that makes it possible to play them back in rapid succession.

The build mechanism uses a delta encoding method to reduce the file size. When it is recalled, only the changed pixels are displayed. This scheme works very well for the FLI/FLC files, because the original program used for generating the animation is used by CAD Design and 3D Animation Works.

Most of the time, we have only a small object moving in an otherwise stationary field. The changes from frame to frame are isolated. The format can also make playback quicker by sending only the changed data to the display rather than updating the entire screen for every frame. The major difference between the MPEG format and the FLC/FLI format is that MPEG requires additional hardware to display the animation, while FLC/FLI does not.

10.7.1 Audio Support in a FLC/FLI Animation Files

The FLC/FLI animation file can not provide any audio support in the animation. These limitations do not occur with the MMPM/2 of OS/2 Warp Version 3. The digital video player supports digital source audio and video at the same time. For playing music or sound in the animation, put the file in the same directory as the animation and rename it with the same name (only the extension does not change).

For example, if you have animation called ANIMATIO.FLC and want to add to it BACH.MID from the Sound Bites Folder preinstalled on the system, you need to copy the BACH.MID file into the Animation directory and rename the file to ANIMATIO.MID. When the FLC file is opened, it will be played with the MIDI file. The same is also true for the other audio formats (.WAV).

Limitations can occur if using FLC from a CD-ROM, because the audio files need to be in the same directory as the animation file and the CD_ROM storage can only be read from, not written to.

10.8 DIVE Architecture

Direct Interface Video Extensions (DIVE) is a DLL that provides optimized blitting performance for motion video subsystems and applications that perform rapid screen updates in the OS/2 PM and full-screen environments.

Using DIVE interfaces, applications can either write directly to video memory or use the DIVE blitter to get a high level of screen update performance, image scaling, color space conversion and bank-switch display support.

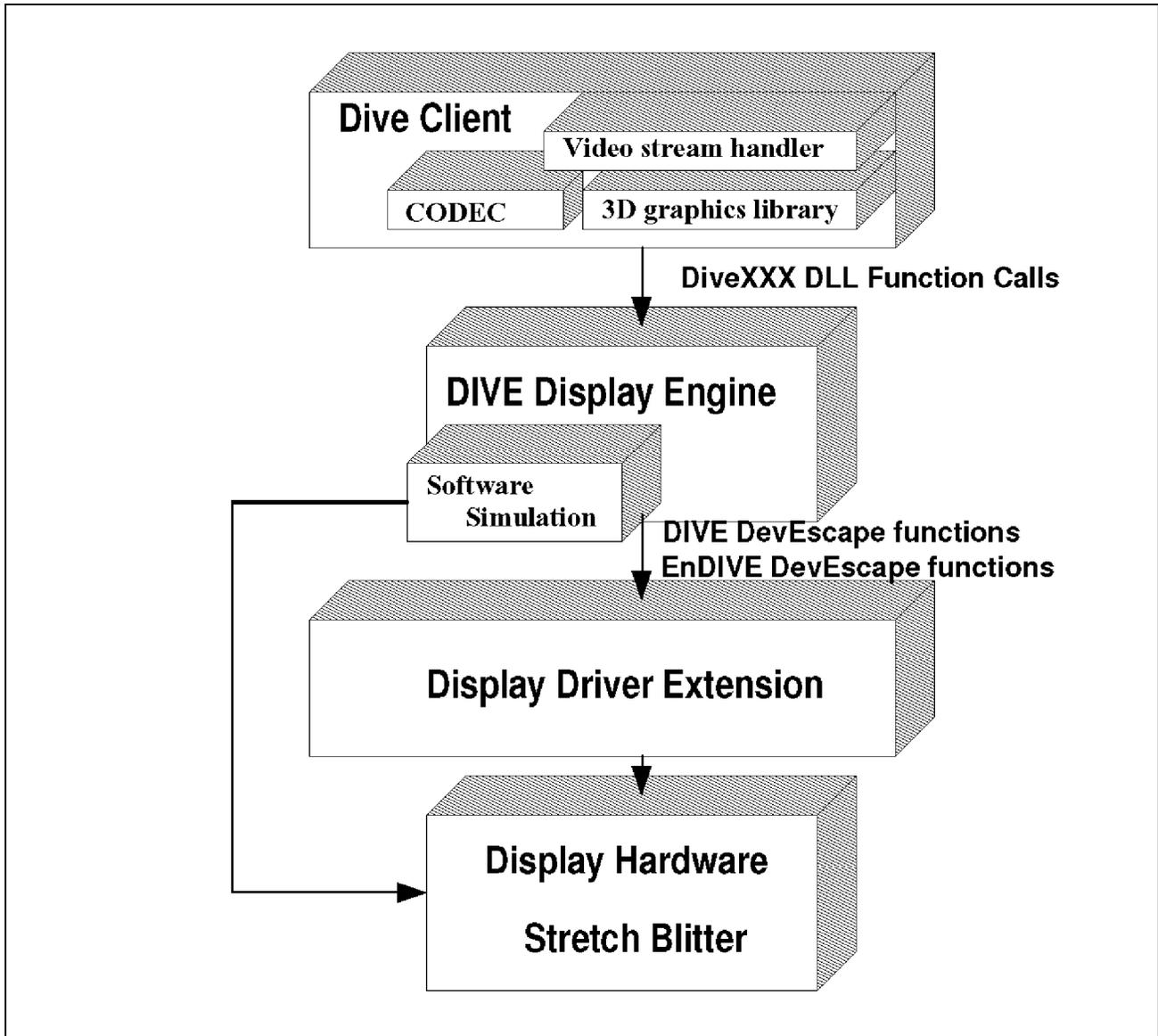


Figure 49. Dive Engine

The DIVE blitter will take advantage of acceleration hardware when present and applicable to the function being performed.

Figure 49 on page 195 shows the interfacing of DIVE DLL between the physical hardware video and the DIVE APIs.

10.8.1 Display Engine Functional Characteristics

The display engine consists of a single stand-alone DLL that exports the following functions:

- A query for display capabilities
- Open instance
- Visible region specification
- Allocation of image data buffers
- Buffer to screen/buffer to buffer transfer (blitter) setup
- 8-bit CLUT color palette simulation/specification
- Transfer buffer to image display/transfer buffer to buffer
- Utility functions useful for direct access, including window starting address calculation
- Frame buffer acquire/de-acquire
- VRAM bank selection (for bank switched displays)
- Close instance

The display engine enables subsystem components (for example, video CODECs) and applications to either directly access the video buffer or to use the display engine screen transfer functions. If direct access is used, the using component or application is responsible for writing to the frame buffer format for the current display mode and correctly clipping the output.

In addition, the component is responsible for acquiring and bank switching the display apertures. If display engine screen transfer functions are used, the display engine will handle clipping and PEL format/color space conversions and any necessary hardware serialization.

10.8.2 DIVE API for Gamers and Multimedia Developers

Entertainment, education and games software developers all have something in common: the need to utilize high-speed animated graphics.

The choice, until now, has been between the VIO APIs and the Presentation Manager. Either choice came with several disadvantages. The VIO APIs permit fast full-screen updates, but they are still 16-bit, requiring thunking if used from 32-bit applications. Also, the synchronized, device-independent, file-format independent multimedia support provided by MMPM/2 is unavailable to VIO programs. PM, on the other hand, preserves the integrity of the desktop session by denying frame buffer access to all applications. PM applications can use GpiBitBlt for animated graphics, but the performance is unacceptable for education and entertainment programs and interactive games.

In addition, many hardware manufacturers are preparing video acceleration chipsets for their upcoming models that will provide hardware support for the demanding tasks of color conversion and image scaling and clipping.

Ideally, the OS/2 games programmer needs a way to perform high-speed blitting in the context of the PM desktop that exploits the new acceleration hardware when it becomes available, but also enables high performance blitting in a software-only environment.

OS/2 Warp Version 3 provides the solution for both of these problems and enables education and entertainment programs and games in the OS/2 environment.

These programs will use high-speed graphics comparable to the hottest sellers in the DOS market, yet they will run simultaneously with other applications, sharing audio and screen resources. These programs will be built by combining the double-buffered fast-blitting techniques of the DOS games market with the message-driven, window-oriented, multithreaded high-level APIs of the Presentation Manager and MMPM/2 programming world.

These programs will benefit from new hardware improvements without any code modification. OS/2 Warp Version 3 provides relief for the PM performance and compatibility with the next generation of display hardware through a new API set called the Direct Interface Video Extension (DIVE).

DIVE will provide a new method for fast blitting of image data. DIVE will also provide support for color-depth conversion, display hardware bank-switching,

visible region clipping and stretch-blitting either to the screen or a destination image buffer. DIVE will also take advantage of stretch-blitting acceleration hardware whenever such hardware is available. DIVE will provide a pointer to the frame buffer, which is indispensable for the OS/2 game developer.

Software motion video implementation under OS/2 has attained sizable performance advantages by enabling video decompressors to directly write to video memory. While this technique provides good performance, it has the disadvantage that each decompressor must deal with the PEL format of the display in various modes, clipping the output to visible regions, and any scaling that is to be performed. Additionally, on bank-switched video displays, the decompressor must return on partial frames to enable the video stream handler to switch banks.

The purpose of this feature is to consolidate the complexities of dealing with direct video frame buffer access (sometimes referred to as "direct access" or "black hole") into a single API DLL that enables efficient transfer to video memory with clipping, scaling, and color space conversion. The optimized screen access functionality provided by DIVE may be used for motion video display, fast image updates for interactive games, and fast screen display by 3-D graphics libraries.

Chapter 11. Hardware Support and Enhancements

This chapter describes the enhancements that have been made to the hardware support in OS/2 Warp Version 3. These enhancements provide PCMCIA support, new device drivers for storage devices, scanners, CD-ROMs, printers, displays, and even a resource manager for device drivers.

11.1 PCMCIA Support

The PCMCIA Bus (PCMCIA=Personal Computer Memory Card International Association) is the first true plug-and-play architecture in the computer industry.

OS/2 2.1 conformed to the PCMCIA 2.0 standards. With OS/2 Warp Version 3 the Card Services have been provided by the operating system and COM.SYS has been made "PCMCIA-aware." The Socket Services and the Resource Client normally have to be developed by the PC manufacturer. The card drivers have to be delivered by the PCMCIA card manufacturer.

With OS/2 Warp Version 3, there is enhanced PCMCIA support. In addition to the Card Services, OS/2 now ships with a number of Socket Services to support most PCMCIA-enabled systems.

The provided Super Clients for modems, ATA drives (ATA=Advanced Technology Attach), and Static and Flash RAM Cards are generic drivers. This makes it possible to support most of these cards without the need of specific or additional drivers.

In addition, there is now a graphical user interface (GUI) called Plug and Play for PCMCIA. This WPS object allows you to visualize the PCMCIA cards inserted in sockets and display their actual status. It can launch another WPS object when a special event happens at the socket. This new feature is described in 11.2, "The Plug and Play for PCMCIA Utility" on page 209.

Similar features have already been shipped with the IBM ThinkPads. For OS/2 Warp Version 3, this code has been optimized in several ways, such as reduced memory usage.

Card Services, Resource Client, and Socket Services drivers are now BASEDEVs. In OS/2 2.1x, they were loaded via DEVICE= (SYS drivers) statements in CONFIG.SYS.

11.1.1 Types of PC Cards

PCMCIA standards describe the physical requirements, electrical specifications, and software architecture for PC cards. Three types of cards are described by the PCMCIA standards:

- Type I Card

PCMCIA type I cards are 3.3 mm thick and may be used for various types of memory enhancements, including RAM, flash memory, one time programmable (OTP) memory, and electronically erasable programmable read only memory (EEPROM).

- Type II Card

PCMCIA type II cards are 5.0 mm thick and are mainly used for I/O features such as modems, LAN adapters, and host connectivity adapters.

- Type III Card

PCMCIA type III cards are 10.5 mm thick and are mostly storage devices, such as miniature hard disk drives.

All three card types are 85.6 mm long and 54 mm wide and use the same 68-pin edge connector for attachment to the computer.

You can use PC cards with suitably equipped laptops, notebooks, palmtops, tablets, and other portable computer systems, as well as some desktop computers. PC cards are a convenient alternative to pocket adapters and docking stations.

11.1.2 Base PCMCIA Support

To use PCMCIA in general, OS/2 provides a set of device drivers. Some of them are necessary to use each kind of PCMCIA device.

PCMCIA Cards are inserted into a *socket*. The sockets are controlled by a special PCMCIA controller chip on the Host Bus Adapter (HBA).

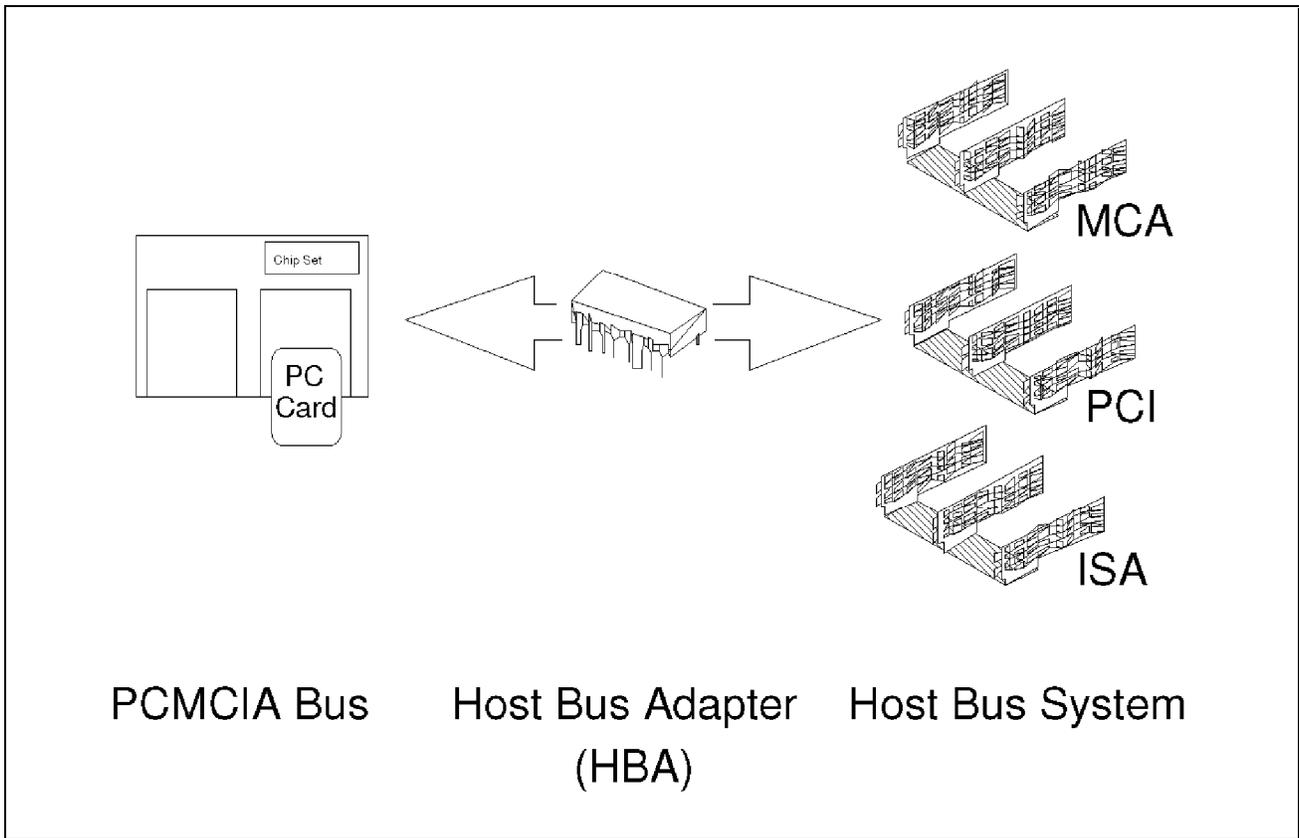


Figure 50. The Host Bus Adapter

Figure 50 shows the interface between different host bus systems and the PCMCIA bus.

Because the HBA has two interfaces - to the PCMCIA Bus and to the host bus system - the details of how to implement the HBA are not defined by PCMCIA but rather are left to the hardware developer.

The HBA must be programmed by software, because whenever a card is inserted on which an address must be mapped, the HBA is transferring the data from the host bus system to the PCMCIA bus and vice versa.

This software is called *Socket Services*. The Socket Service interface, specified by PCMCIA, provides a low-level set of common commands to handle the HBAs.

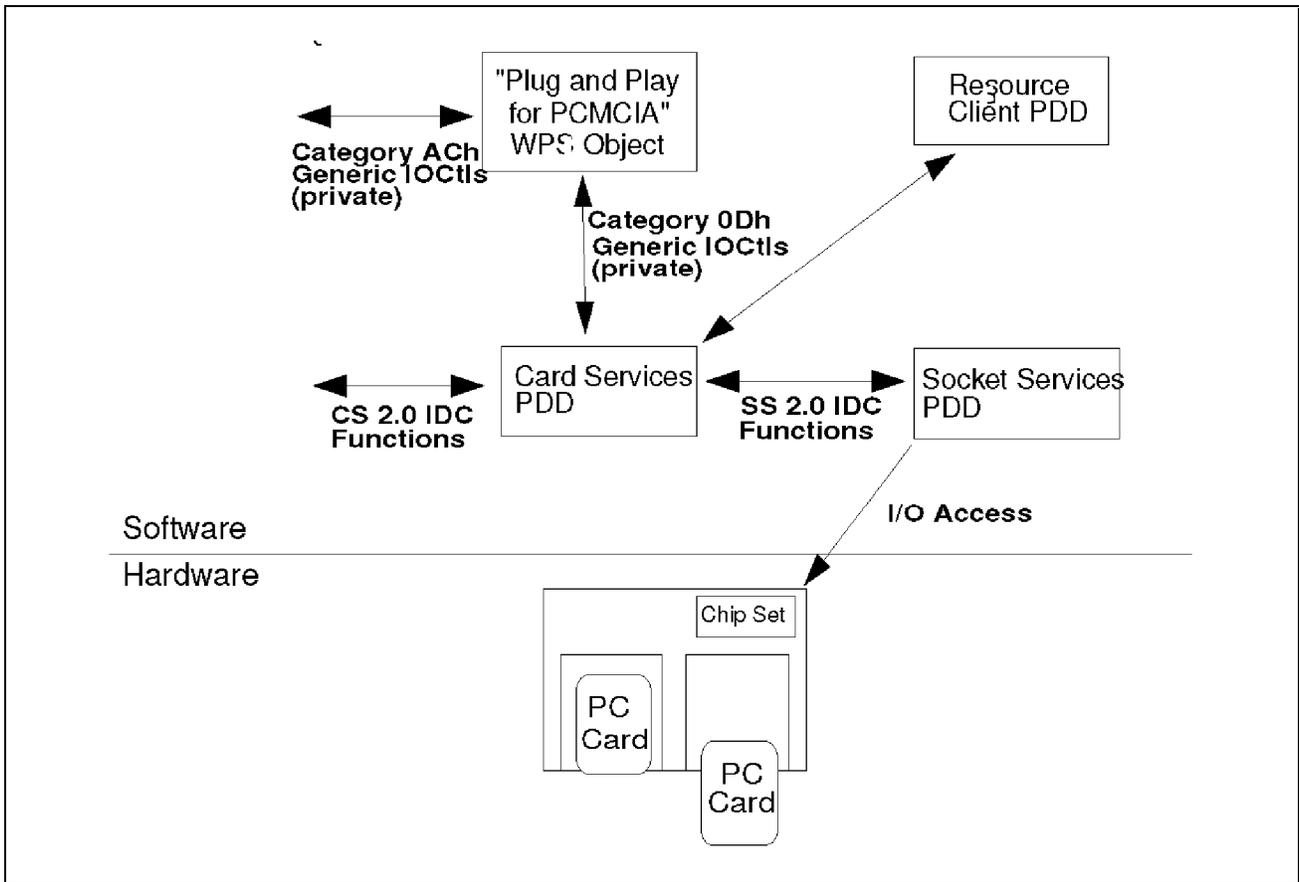


Figure 51. OS/2 Base PCMCIA Support

Even though the Socket Services are really hardware dependent, OS/2 Warp Version 3 is shipped with a variety of them which are supported by a large number of mobile systems. A list of supported systems is shown in Table 20 on page 208.

The *Card Services* control the cards. When a PCMCIA card is inserted, Card Services reads the *Card Information Structure* (CIS) to know which card is inserted and what configuration requirements (like memory) are needed for the card.

Together with the *Resource Client*, the Card Services programs the HBA via the Socket Services and configures the PCMCIA card.

Client drivers for specific PCMCIA cards register with Card Services, so they can be informed by message when the related PCMCIA card is inserted and activated.

Plug and Play for PCMCIA is a Workplace Shell object. It graphically displays the status of the inserted cards. For more information about the Plug and Play for PCMCIA, please refer to 11.2, "The Plug and Play for PCMCIA Utility" on page 209.

11.1.3 PCMCIA Modem Support

In earlier OS/2 versions it was necessary to have a modem-specific client driver if you wanted to use a PCMCIA modem card. OS/2 Warp Version 3 is shipped with the generic modem Super Client driver. It supports most PCMCIA modems.

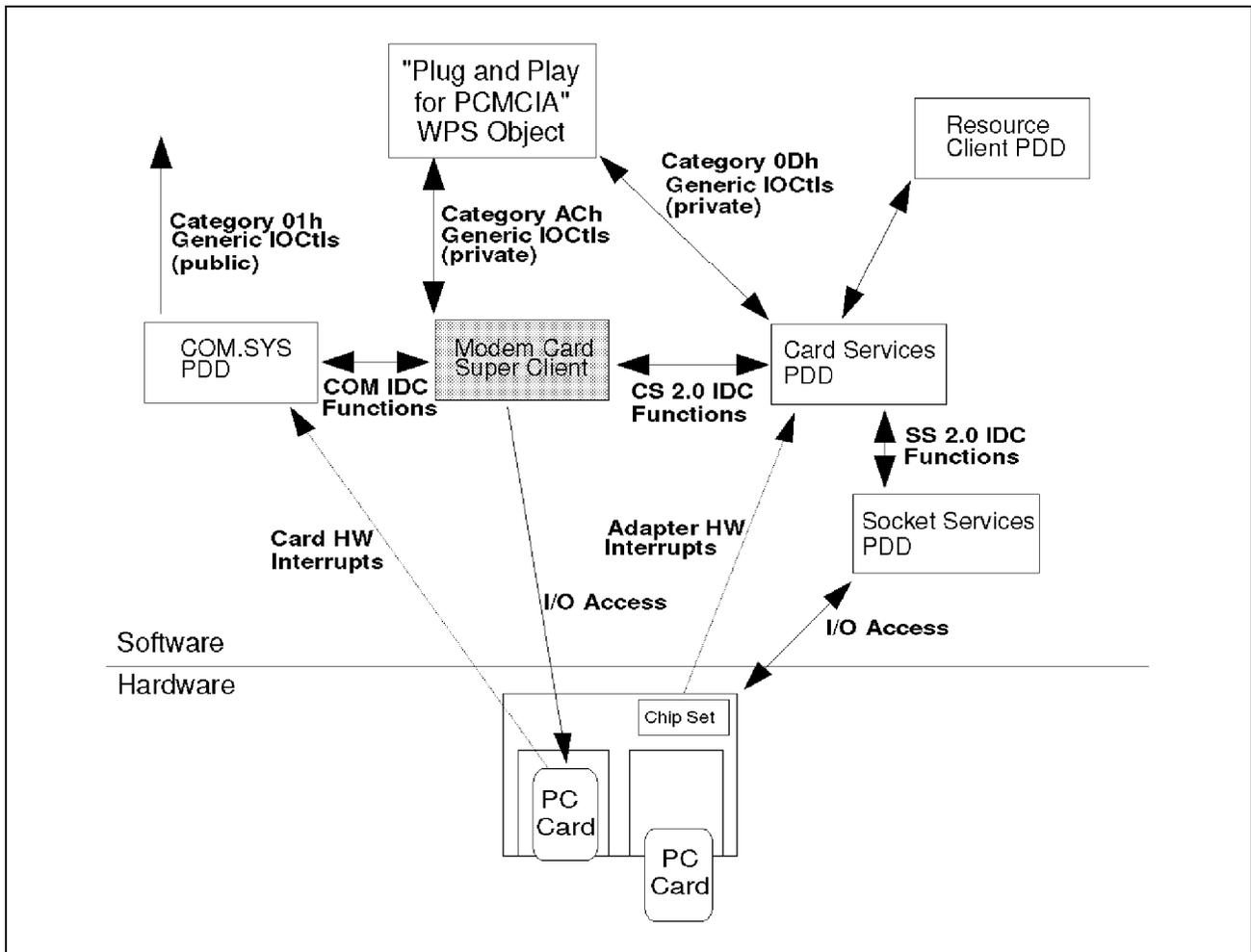


Figure 52. OS/2 PCMCIA Modem Support

From the information Super Client receives from Card Services, it recognizes the type of the modem and can configure it through Card Services.

This means that most PCMCIA modem cards are recognized and configured automatically without any additional driver.

11.1.4 PCMCIA ATA/Flash Support

OS/2 Warp Version 3 now includes support for PCMCIA hard drives (ATA=AT-Attached), flash RAM cards and static RAM cards. Both types of cards are accessed through a file system, so the OS2DASD.DMD has been modified to give the user transparent access to the PCMCIA cards.

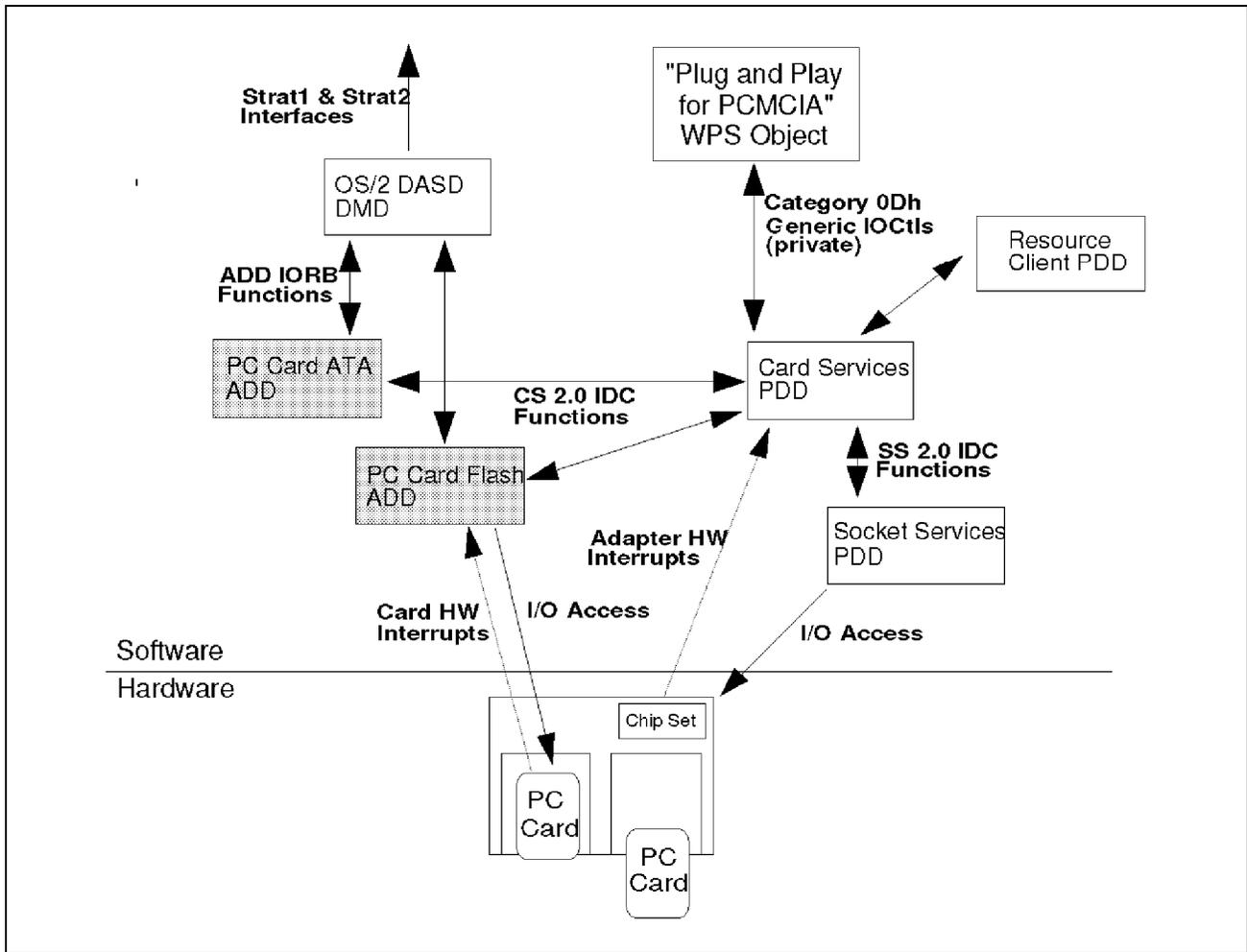


Figure 53. OS/2 PCMCIA ATA/Flash Support

During startup, the system allocates additional system drive letters for each PCMCIA socket and media type; one drive letter for each socket and media type in the following order:

1. ATA Disk Drive

2. Flash RAM Drive
3. Static RAM Drive

For example, if you have a ThinkPad 750C with two sockets, only one partition and all PCMCIA ATA/Flash Cards enabled, your drive letters will be assigned as in Table 17.

<i>Table 17. Allocated ATA/FLASH Card Drives</i>		
Assigned Drive	PCMCIA Socket	PCMCIA Card Type
D:	1	ATA Disk
E:	2	ATA Disk
F:	1	Flash RAM
G:	2	Flash RAM
H:	1	Static RAM
I:	2	Static RAM

The Static RAM types are optional and are not layered down during the install; only Flash RAM is layered down during install.

If you don't have any of those PCMCIA cards and don't want to have these drive objects, use selective install by selecting the PCMCIA icon to install these device drivers.

For the ATA drivers, this is the following entry in the CONFIG.SYS file:

```
BASEDEV=PCM2ATA.ADD
```

You can also tell the driver not to allocate drive letters for one or more PCMCIA slots by using the /I (Ignore) option. So if you want the driver to allocate only a drive letter for PCMCIA slot 1, you have to specify the /I option with the slot number:

```
BASEDEV=PCM2ATA.ADD /I:1
```

If more than one slot has to be specified, simply add the additional slot numbers behind the /I option, separated by a comma.

The corresponding drivers for the Flash and Static RAM drives in the CONFIG.SYS file are:

```
DEVICE=C:\OS2\BOOT\ICMEMMTD.SYS
DEVICE=C:\OS2\BOOT\ICMEMCDD.SYS 2,S
```

If you don't need any support for Flash and Static RAM cards and you don't want the allocated drives, you can remove these two statements from the CONFIG.SYS file.

You may also specify the number of allocated drive letters for Flash and Static RAM cards by adding the number of drives behind the ICMEMCDD.SYS driver:

```
DEVICE=C:\OS2\BOOT\ICMEMMTD.SYS  
DEVICE=C:\OS2\BOOT\ICMEMCDD.SYS 1
```

In this case there will be one drive letter for the Flash RAM card and one drive letter for the Static RAM card.

Note

If you use this option, the Flash and Static RAM cards are only supported in the first socket, not in the second one!

You also have the choice to install support only for Flash RAM cards *or* Static RAM cards by specifying a second option. The second option can have two values:

- s** Allocate only Static RAM drives
- d** Allocate Static and Flash RAM drives (dual mode)

So if you want to allocate only one drive letter for one Flash RAM card in socket 1, you have to modify your CONFIG.SYS file:

```
DEVICE=C:\OS2\BOOT\ICMEMMTD.SYS  
DEVICE=C:\OS2\BOOT\ICMEMCDD.SYS 1,D
```

Note

Flash RAM cards and Static RAM cards are accessed through the file system. But in comparison to a floppy or a hard drive, their behavior is more like a WORM (write once - read multiple).

This means that data written on the card cannot be modified. The only way to empty those cards is to reset them completely.

11.1.5 PCMCIA Device Driver List

In Table 18 the PCMCIA drivers in OS/2 Warp Version 3 are listed. Table 19 lists the hardware-specific Card Services and Socket Services.

If your machine is not listed in the table, you should use the OS/2 Card Services and Socket Services provided with your hardware or contact your hardware vendor.

Component	File Name
Card Services	PCMCIA.SYS
Modem Super Client	AUTODRV2.SYS
ATA Super Client	PCM2ATA.ADD
ICMEMCDD.SYS ICMEMMTD.SYS	
Socket Services	(see Table 19)
Resource Client	(see Table 19)
Serial/COM Driver	COM.SYS
Disk Device Manager	OS2DASD.DMD

System	Socket Services	Resource Client
Ambra SN425	IBM2AMB1.SYS	AMB2RMU1.SYS
AST PowerExec	IBMAST1.SYS	AST2RMU1.SYS
Compaq Concert	IBMCMQ1.SYS	CMQ2RMU1.SYS
CompuAdd 425TX	IBMCAD1.SYS	CAD2RMU1.SYS
IBM TP 350	IBM2SS01.SYS	ICRMU01.SYS
IBM TP 360	IBM2SS01.SYS	ICRMU01.SYS
IBM TP 500	IBM2SS01.SYS	ICRMU01.SYS
IBM TP 720	IBM2SS02.SYS	ICRMU02.SYS
IBM TP 750	IBM2SS01.SYS	ICRMU01.SYS
IBM TP 755	IBM2SS01.SYS	ICRMU01.SYS
NCR Safari	IBM2NCR1.SYS	NCR2RMU1.SYS
NEC Versa C	IBM2NEC1.SYS	NEC2RMU1.SYS

Table 19 (Page 2 of 2). PCMCIA Socket Services/Resource Client Support

System	Socket Services	Resource Client
NEC Versa E	IBM2NEC1.SYS	NEC2RMU1.SYS
Panasonic	IBM2MAT1.SYS	MAT2RMU1.SYS
Toshiba T4500	IBM2TOS1.SYS	TOS2RMU1.SYS
Toshiba T4600	IBM2TOS1.SYS	TOS2RMU1.SYS
Toshiba T4700	IBM2TOS1.SYS	TOS2RMU1.SYS
Toshiba T4800	IBM2TOS1.SYS	TOS2RMU1.SYS
Zenith 425L	IBM2ZEN1.SYS	ZEN2RMU1.SYS
Zeos	IBM2ZOS1.SYS	ZOS2RMU1.SYS

11.1.6 PCMCIA Systems and Chip Sets

Table 20. Supported PCMCIA Systems and Chip Sets

System	Chip Set
Toshiba	Toshiba
Zenith	Intel
AST	Intel
Compaq	Cirrus Logic
NCR	Intel
NEC C	Intel
NEC E	Cirrus Logic
IBM TP350&500	Intel
IBM TP360	Ricoh
IBM TP720	IBM
IBM TP750	IBM
IBM TP755	Ricoh
Ambra	Databook
CompuAdd	Databook
Panasonic	Cirrus Logic
Zeos	Intel

11.2 The Plug and Play for PCMCIA Utility

When you have installed the OS/2 Warp Version 3 PCMCIA support, there is a new Workplace Shell object in the System Setup Folder called Plug and Play for PCMCIA.

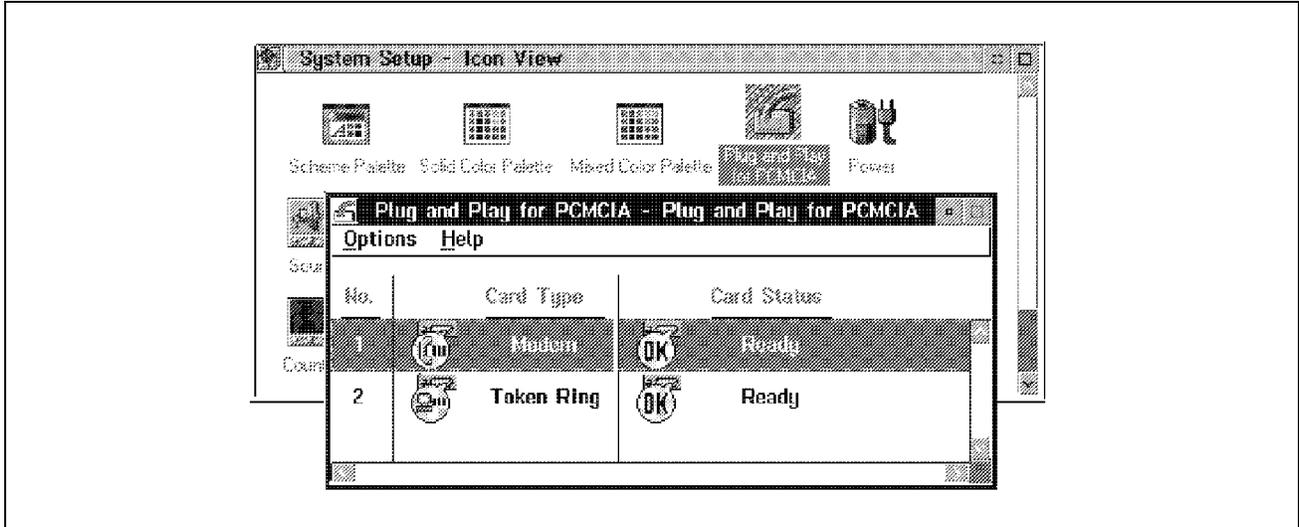


Figure 54. Plug and Play for PCMCIA

When a PCMCIA card is inserted in a socket and the Card Service has detected the type of the card, the Plug and Play for PCMCIA utility will graphically display the type and state of the card in each socket (see Figure 54).

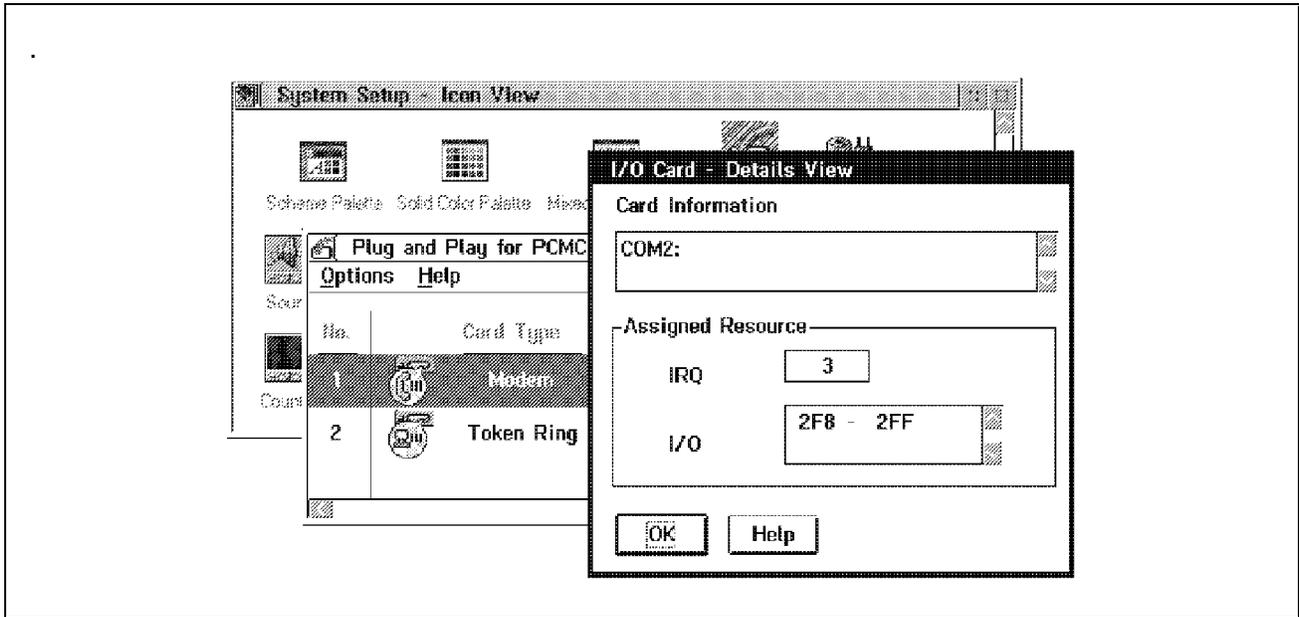


Figure 55. Plug and Play for PCMCIA - I/O Card Configuration

To get PCMCIA card configuration information, double click on the row representing the socket. In Figure 55 you can see the configuration for the PCMCIA modem in socket 1. The communication port is assigned as COM2:, the port has IRQ3, and the I/O addresses are between 2F8 and 2FF.

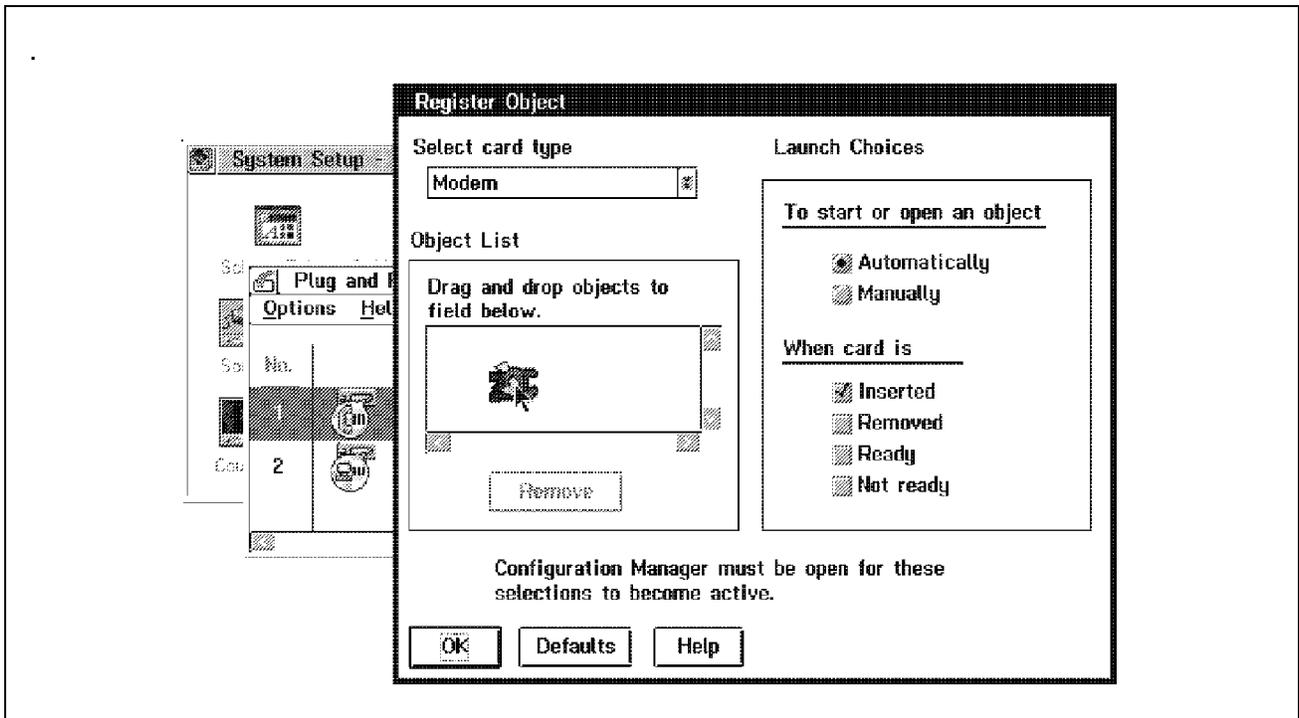


Figure 56. Plug and Play for PCMCIA - Register Object

The Plug and Play for PCMCIA utility displays the type and state of the PCMCIA cards in the sockets. In the *Register Object* dialog you can also define objects that have to be launched when a specific event is occurring to a PCMCIA card type.

An object can only be launched automatically, when the card is:

- Inserted
- Removed
- Ready
- Not Ready

The object which has to be launched is specified by dragging it to the drop area of the dialog box. When an event occurs relating to a specific card, the objects in the drop area are launched.

Figure 56 shows you an example of how to configure a terminal program (ZOC) that starts when you insert a PCMCIA modem in the socket.

11.3 Device Driver Overview

Generic operating systems can manage different hardware configurations by using a hardware-specific set of programs called Basic Input/Output System (BIOS):

The BIOS is microcode that controls basic hardware operations (for example, interactions with the hard disk, diskette driver, and keyboard).

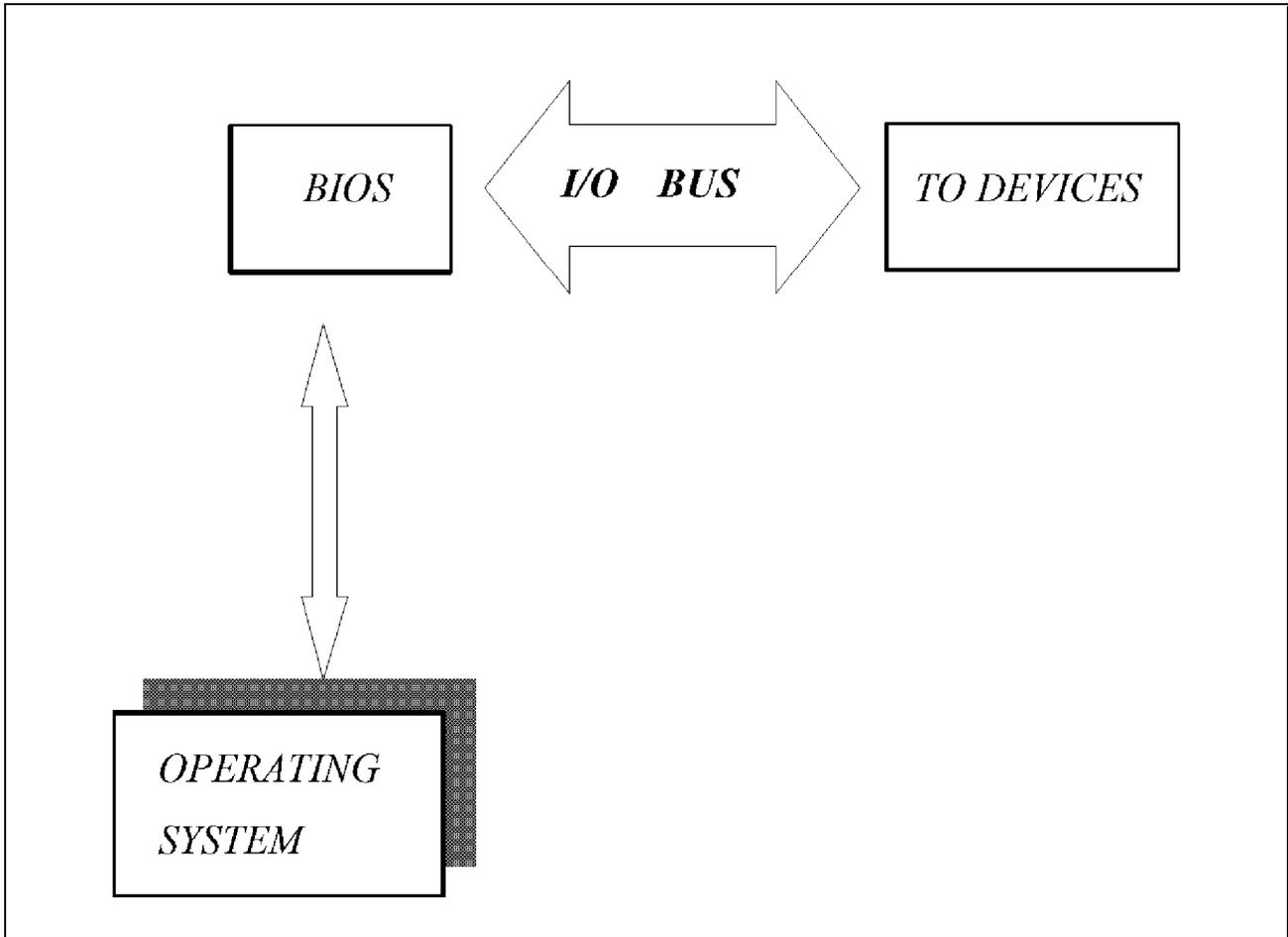


Figure 57. BIOS Layer

Figure 57 shows how the operating system can interface with devices through the BIOS. These programs allow the operating system to access specific devices such as keyboard, display and disks. The first operating systems could address most devices simply by using the programs included in BIOS.

For instance, the sequence of operations for printing a file was:

- The running program was forced to a wait-state.
- The operating system sent the first character to the printer.
- The device sent an acknowledgement to the operating system that the first character was printed.
- The operating system sent the next character, and the process repeats through to the end of the file.

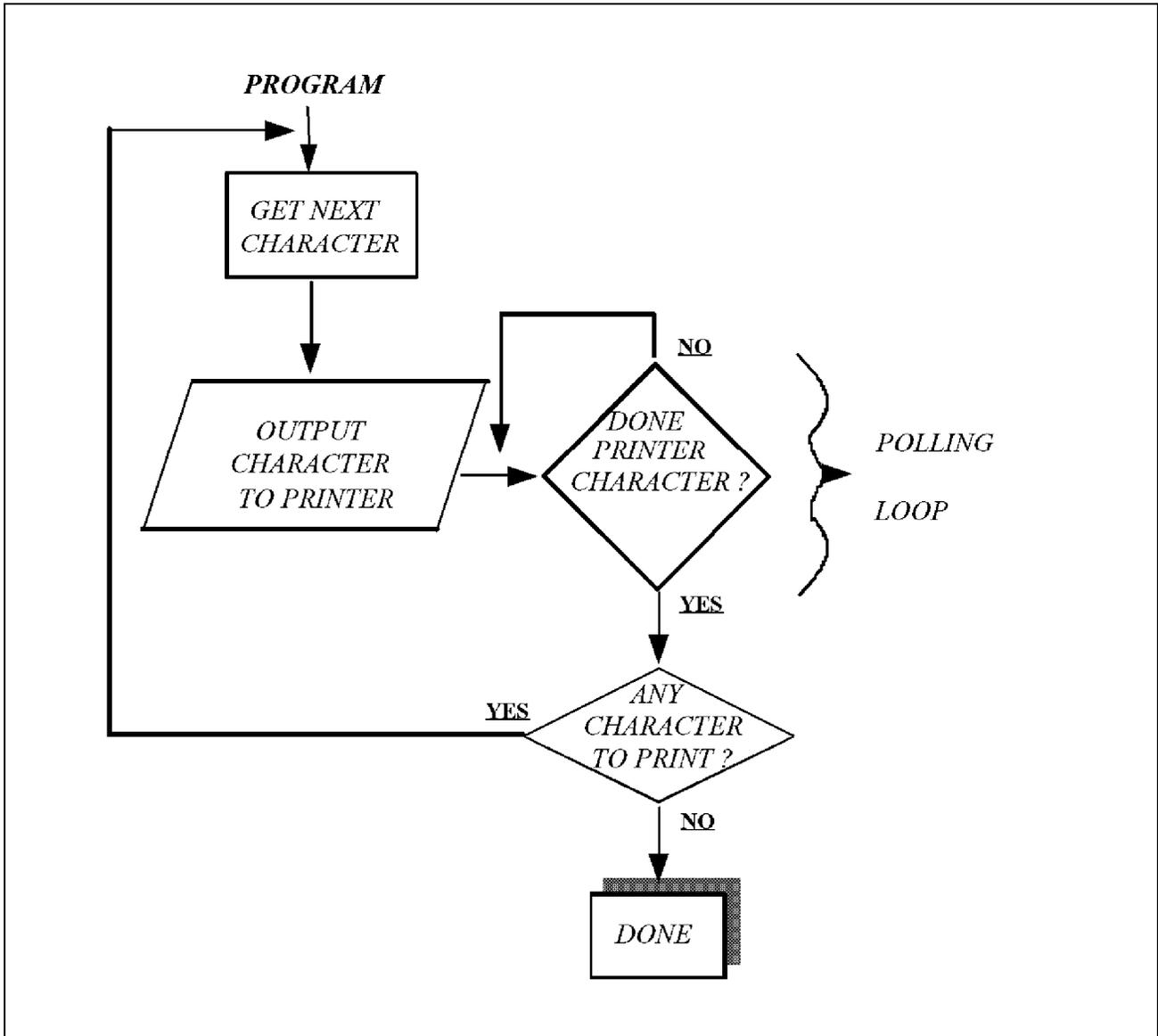


Figure 58. Printing via Program

Figure 58 shows how a program can manage the (Printer) device and lock the system until the task has completed.

Since this model, computer peripheral devices have grown in number and complexity, and BIOS alone is not enough to manage all of them. Software and hardware manufacturers had to develop interfaces between the hardware and software that could drive all the peripherals. These interfaces are the device drivers that stand idle until a program asks for I/O to a device. At this point the device driver becomes active, performs its function and then idles again.

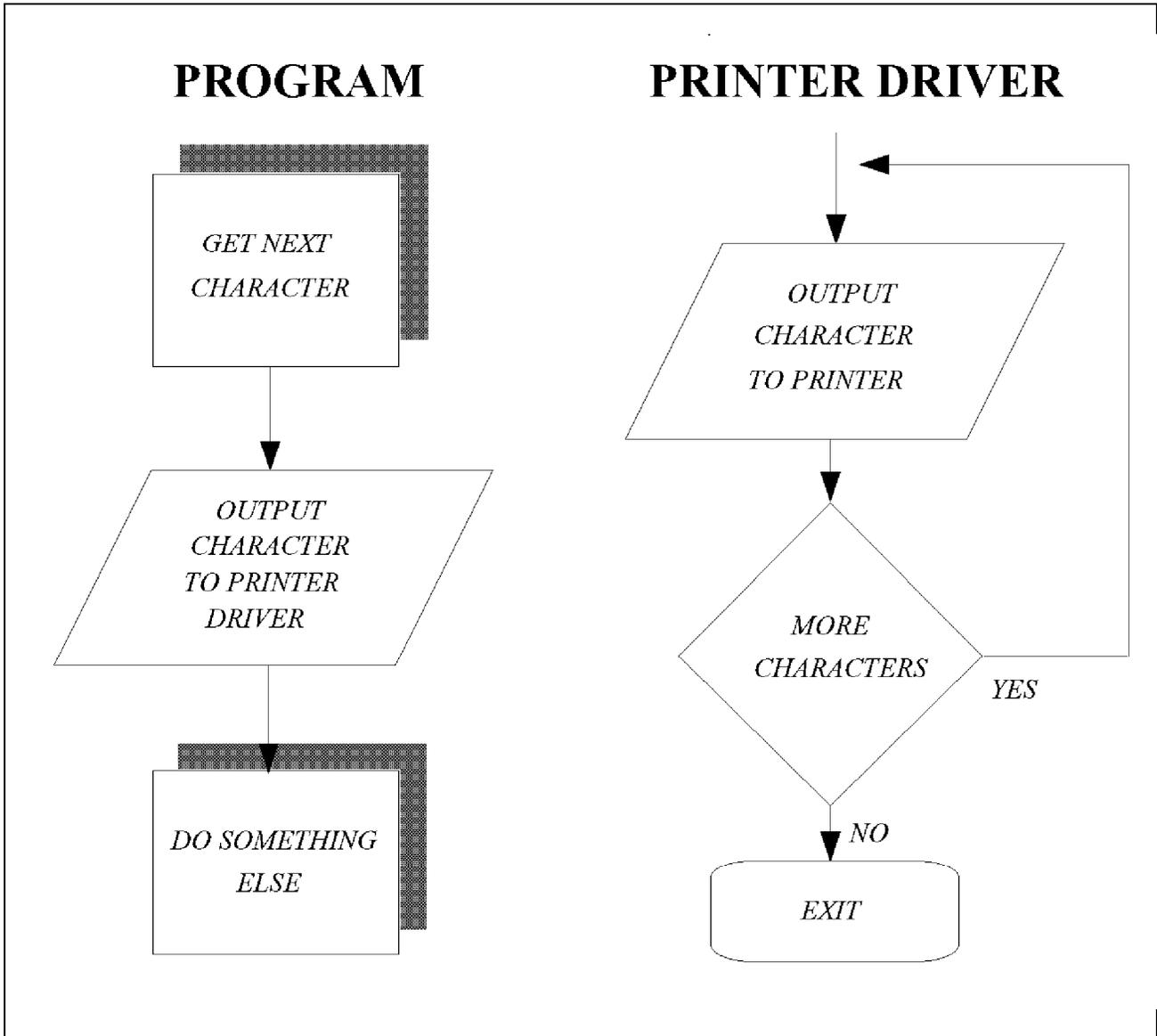


Figure 59. Printing via Device Driver

In Figure 59 you see how the program sends the instruction to the printer, managing a device driver. After the first set of instructions, the printer is

piloted by the device driver, releasing the program to do something else. Different programs can manage the same device driver.

Any program has the capability to interface with many device drivers, one for each physical device it has to address. Every device driver is specific, for the physical device it has to drive, for the bus architecture (AT BUS, MCA, VESA, PCI), and for the microprocessor mode (protected mode or real mode).

Intel Microprocessors Model 386 and higher can operate in the two modes. In real mode the processor can address up to 1MB of physical memory and does not provide any protection mechanism to prevent programs from accidentally writing into another program's memory area. In protected mode the processor can address up to 16 MB of physical memory (286) or 4GB (386 or 486). Every running application has a protected address space assigned; only the application can write into it. In a multitasking environment in protected mode, there is crash protection, which means if a running application crashes, the system can continue to run the other active applications. In protected mode the processor operates in the ring mode shown in Figure 60 on page 216.

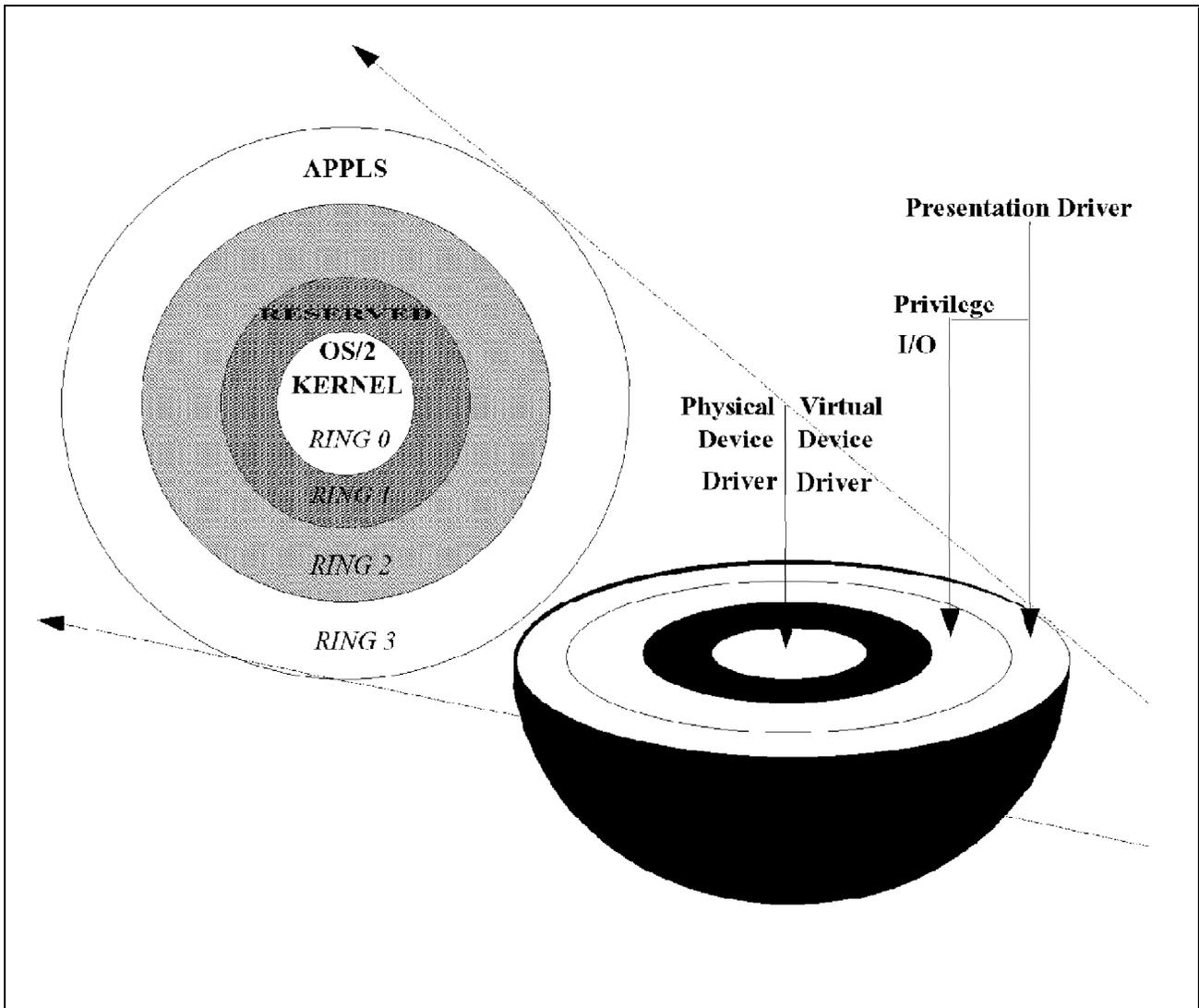


Figure 60. Ring Architecture

The use of each ring mode is as follows in OS/2 Warp Version 3:

- Ring 3 is reserved for normal applications. From ring 3 the operating system cannot be accessed directly.
- Ring 2 is reserved for I/O program (IOPL -Input/Output Privilege Level) and some 16-bit dynamic link libraries (32 bit DLLs run at ring 3).
- Ring 1 is reserved by the kernel and is not used.
- Ring 0 is the most protected area. It is used from the operating system kernel. Device drivers run in this ring.

Every program running at ring 0 has direct access to the operating system and the hardware. Some applications from Ring 3 need to write directly to an adapter or other hardware device. To do this they call for an IOPL routine at Ring 2, but must return to Ring 3 to continue running. It is possible to negate this access by modifying the status of "IOPL" in the CONFIG.SYS file.

OS/2 Warp Version 3 interfaces with devices connected to the motherboard of a personal computer through the OS/2 device drivers. There are device drivers for each adapter installed in the machine, every possible file system, and every peripheral. Each device driver allows the operating system to access new functions in addition to the functions provided by the kernel. Device drivers to be loaded by OS/2 must be listed in the CONFIG.SYS file in the BASEDEV or DEVICE statements. OS/2 device drivers can, in some cases, be shared with OS/2 Windows and Virtual DOS Machine.

An example could be the CD-ROM device driver. Once the OS/2 CD-ROM driver and CD-ROM file system driver are installed, there is no need for the installation of the DOS drivers. This improves performance, because the OS/2 device drivers are 32-bit instead of 16-bit, and there is no need for two drivers for the same device.

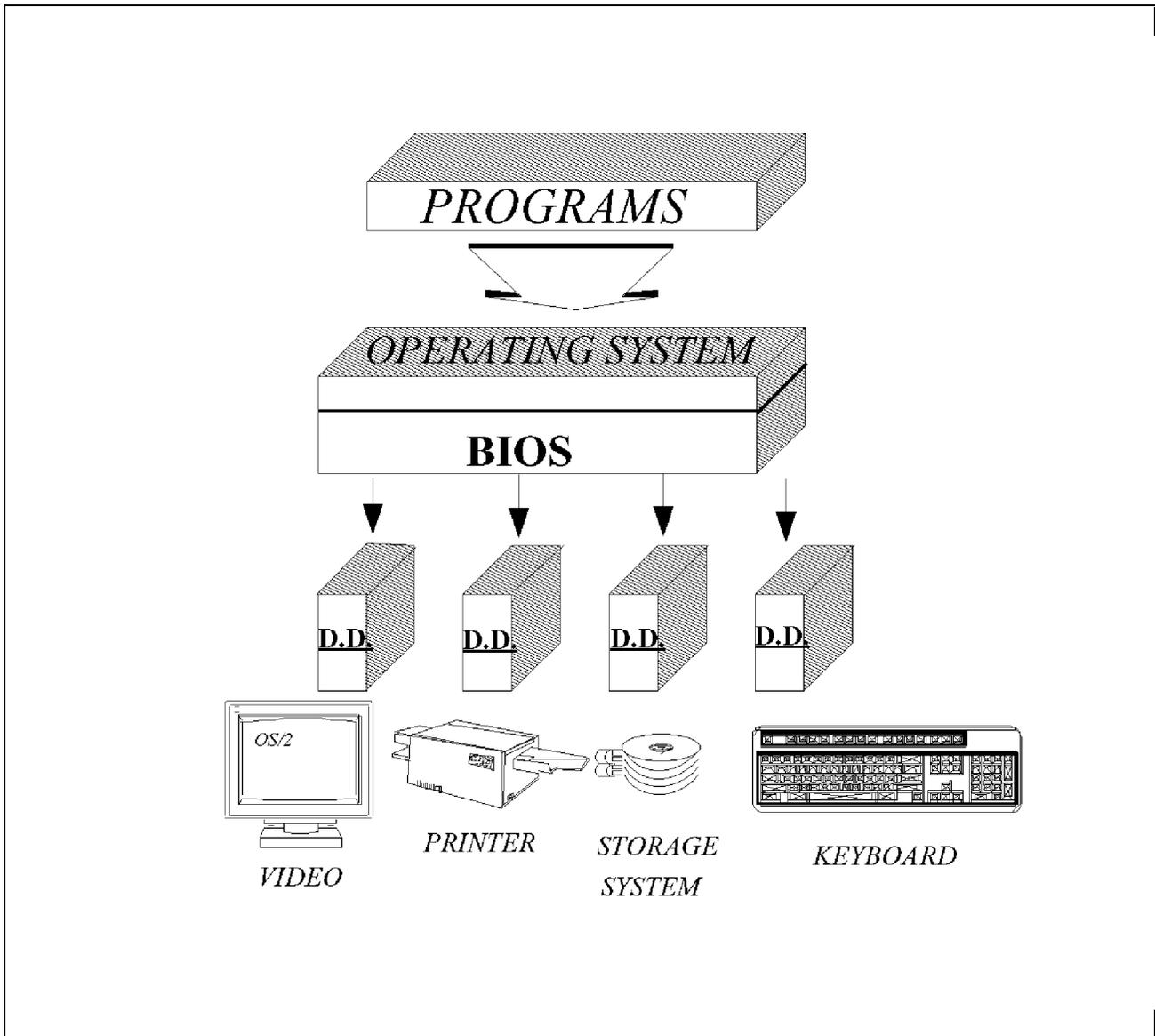


Figure 61. Interface of Device Driver

Figure 61 shows how the operating system can manage many devices at the same time.

11.3.1 Types of OS/2 Device Drivers

There are three types of device drivers used in OS/2 Warp Version 3:

- Physical device drivers
- Virtual device drivers
- Presentation drivers

11.3.1.1 Physical Device Drivers

Standard I/O devices are supported by base physical device drivers that are part of the operating system. Additional physical device drivers can be loaded to extend the control provided by the base device drivers to support other or nonstandard I/O devices. Examples of this are ANSI.SYS: and ANSI.DLL. These are loaded by DEVICE= statements in the CONFIG.SYS file. and provide additional functions to the interfaces to the screen and keyboard. Physical device drivers are initialized at Ring 3 and operate at Ring 0, the most privileged level of the operating system.

11.3.1.2 Virtual Device Drivers

The Virtual Device Driver is an installable module that virtualizes a particular piece of hardware (it operates in the ROM BIOS) in the order expected by a DOS application. The virtualization is reached by emulating I/O port and device memory operations. Virtual device drivers are 32-bit device drivers, and operate at Ring 0. To gain a certain level of hardware independence, a Virtual device driver usually communicates with a physical device driver in order to interact with hardware.

11.3.1.3 Presentation Drivers

The Presentation Manager I/O interface for output devices is a high-level interface. This interface is similar to the API call interface, which uses the program stack to communicate with, or pass parameters to, the presentation drivers. These drivers are special-purpose I/O routines operating with I/O privilege at privilege ring 2 or ring 3. Their main function is to process function calls made by the Presentation Manager interface on behalf of Presentation Manager applications. Hardcopy presentation drivers communicate with OS/2 device drivers through the file system emulation functions. Display presentation drivers interface directly with the hardware.

Presentation drivers are dynamic link library modules that are supplied as files and identified by the extension DRV. When the Presentation Manager interface is initialized, the display presentation driver is loaded and enabled automatically. Other presentation drivers (for example, the hardcopy

presentation drivers) are loaded and enabled when an application calls the DevOpenDC function to open the device.

Presentation drivers service requests only from applications running in Presentation Manager sessions in OS/2 mode. Output data and requests for information are passed to the presentation driver as function calls to the presentation driver interface. The definition of the call interface is given in terms of the codes, and data is passed to the presentation driver interface through the program stack.

Note

Header and include files are shipped with the OS/2 operating system to provide support for building presentation drivers that are written in C or assembler language. These files contain function prototypes, defined values, and data structures used by the various functions.

11.3.2 Initialization of a Device Driver

A device driver is a file that contains the code that OS/2 needs in order to recognize a device and correctly process information received from or sent to that device. A base device driver is one that is needed when OS/2 is first started.

The BASEDEV statement is used to load base device drivers. Device support for disks, diskettes, printers, and other devices connected to the workstation is loaded with the BASEDEV statement.

Unlike the DEVICE statement, the BASEDEV statement cannot contain either drive or path information because OS/2 cannot process such information at the stage of the startup sequence when BASEDEV statements are processed. The root directory of the startup partition is first searched for the specified file name, then the \OS2 directory of the startup partition. If drive or path information is included in a BASEDEV statement, an error is generated.

In addition, BASEDEV statements are not necessarily processed in the order in which they appear in your CONFIG.SYS file. The extensions of the file names specified in the BASEDEV statements are examined; the statements are then processed in the following order of file name extensions:

- .SYS
- .BID
- .VSD

- .TSD
- .ADD
- .I13
- .FLT
- .DMD

Files with other file name extensions will not be loaded.

If several BASEDEV statements load file names with the same extension, those files will be loaded in the order in which they appear in the CONFIG.SYS file.

11.4 New Device Drivers

This section describes the new device drivers and device driver improvements included in OS/2 Warp Version 3.

11.4.1 ASPI Device Driver

Advanced SCSI Programming Interface (ASPI) is a software specification developed by Adaptec that addresses the problem of SCSI software compatibility. ASPI defines a standard software interface to the SCSI bus. This interface is independent of the host bus adapter manufacturer's hardware implementation. It provides a protocol that allows multiple SCSI device drivers and programs to submit I/O requests to one adapter card, independent of the card manufacturer's implementation.

OS2ASPI.DMD provides this support in OS/2 Warp Version 3. This driver does not replace the SCSI device driver, but it enables the application to use the ASPI interface. If you have an OS/2 printer or scanner software that supports ASPI, then you will be able to use it under OS/2 Warp Version 3 using the driver (as a prerequisite your adapter must support ASPI). If your program does not use the ASPI technology, use the standard SCSI driver.

Most OS/2, and many DOS/WINDOWS, applications interface with a SCSI device using the drivers provided by the operating system that are designed specifically for the SCSI device. When an application supports ASPI, the OS2ASPI.DMD driver can be loaded to accommodate the application.

11.4.2 Storage Device Managers

OS2ASPI.DMD provides support for ASPI drives. Adaptec's ASPI (Advanced SCSI Programming Interface) allows easier access to SCSI devices.

```
--BASEDEV-----OS2ASPI.DMD-----  
- /SHARE-  
- /ALL---
```

Where:

- DEVICE Parameter

- /SHARE

This switch instructs OS2ASPI.DMD to release each target after each command, allowing multiple managers to access a target at different times. Since this requires more commands to be issued to the driver, there will be a small performance penalty when this switch is used.

When sharing devices and sending multiple concurrent requests, it is possible that the allocation and or de-allocation of the device will cause a command to be rejected. This switch is best suited for use when you have applications that require different managers but will not be used simultaneously.

- /ALL

This switch instructs OS2ASPI.DMD to allow commands to be issued to any device on the SCSI bus, even those allocated by other managers. Commands should be issued to devices under the control of other managers with extreme caution. If you are using the /ALL switch and plan to issue commands to devices that are shared with another manager, try to limit them to non-destructive commands such as Inquiry and Test Unit Ready.

11.4.3 Device Allocation

OS/2 requires a device to be allocated by a device manager, such as OS2ASPI.DMD or OS2DASD.DMD before it can be accessed. Device managers can handle this in one of two ways: either wait for a device driver to issue an allocation request (OS2SCSI.DMD does this) or permanently allocate the device during system boot (OS2DASD.DMD and OS2CDROM.DMD do this).

The ASPI specification has no concept of device allocation. OS2ASPI will not allocate a device until the first execute I/O command is issued. This allows it to scan for devices and not interfere with them until an application issues a command. However, once this allocation takes place OS2ASPI will not release the device because it does not know when the application is finished with it.

In most cases you can use OS2ASPI.DMD without any command line switches. However, in two cases you need to set switches for the OS2ASPI driver:

1. Using two applications that access the SCSI bus via different interfaces (that is, OS2ASPI and OS2SCSI) but where both applications have to access the device concurrently. The application using the OS2SCSI driver should release the device once it is finished so that the OS2ASPI driver can allocate it. However, if OS2ASPI does not release the device, the application using OS2SCSI will not be able to access the device until the system is rebooted and the device allocation information is reset. In this case the following statement should be used:

```
BASEDEV=OS2ASPI.DMD /SHARE
```

2. The second case is accessing a device that has been permanently allocated by another device manager. A typical example is a diagnostic routine that reports information about the system's configuration. If the devices are allocated to another manager, the application will not be able to access them. In this case use the following statement:

```
BASEDEV=OS2ASPI.DMD /ALL
```

11.4.4 Virtual ASPI Device Driver

The virtual ASPI device driver (VASPI) enables ASPI support for ASPI applications running in a DOS or WIN-OS/2 session of OS/2 Warp Version 3. Under DOS, users typically load an ASPI manager that routes all requests directly to the hardware. ASPI drivers (such as ASPIDISK and ASPICD) send requests to the ASPI manager which then sends the command on to the appropriate device.

Under OS/2 Warp Version 3, applications that attempt to send ASPI requests do so by routing them to a device manager (OS2ASPI.DMD) which converts them into requests recognizable to any SCSI adapter device driver (ADD).

During initialization, VASPI establishes communication with OS2ASPI.DMD. This allows VASPI to route all DOS SCSI requests to the OS2ASPI.DMD.

The following line must be added to the OS/2 CONFIG.SYS file:

```
--DEVICE----- -VASPI.SYS-----  
-drive- -path-
```

VASPI.SYS specifies the virtual device driver. The VASPI.SYS driver is dependent on OS2ASPI.DMD being in the CONFIG.SYS file.

11.4.5 Scanner Support

OS/2 Virtual ASPI support enables access to many SCSI-attached scanners from DOS and WIN-OS/2 applications, for example, the Hewlett Packard ScanJet IIp and IIcx and Microtek ScanMaker IIXE. Please refer to the latest OS/2 Hardware Compatibility List for specific information on all scanner products and models that have been found to be compatible.

Any scanning configuration having the following characteristics can potentially be supported through Virtual ASPI:

1. The scanner is SCSI attached.
2. There is an OS/2 SCSI Adapter Device Driver (.ADD) for the SCSI adapter being used.
3. The scanner is driven through a DOS or Windows ASPI driver.

These characteristics are present in many scanning environments, most notably many popular SCSI flatbed scanners capable of operating with industry-standard SCSI adapters and including Twain and ASPI support. When configured, these scanners are operable with a wide range of imaging applications running in WIN-OS/2 (or DOS) mode, for example, ZSoft PhotoFinish, Aldus PhotoStyler, Light Source Ofoto, and Calera Word Scan. Figure 62 on page 225 shows how a WIN-OS/2 application would use the VASPI interface to access a scanner.

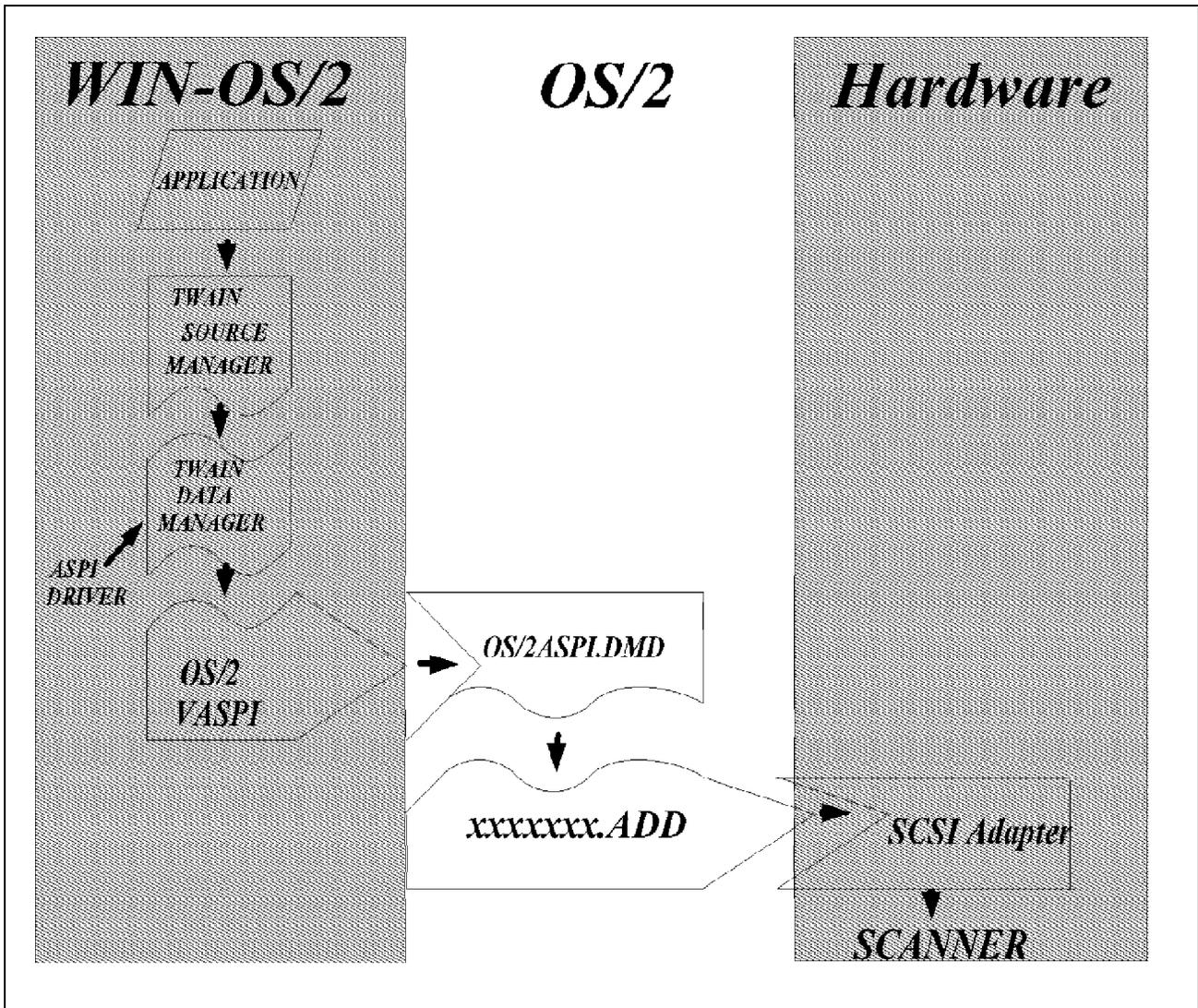


Figure 62. Scanner Access from WIN-OS/2

11.4.6 Diskette Adapter Support

IBM1FLPY now supports ISA, EISA, PCI, and non-IBM Micro Channel machines. IBM2FLPY supports IBM Micro Channel machines. IBM1FLPY and IBM2FLPY have been modified to support the XDF filter.

- XDFLOPPY.FLT

This device driver provides support for eXtended Density Format (XDF) diskettes.

BASEDEV=XDFLOPPY.FLT

This device driver is required to use the XDFCOPY command and to install this version of OS/2 using the OS/2 Installation diskettes.

11.4.7 Storage Adapter Support

- IBM1S506.ADD

This device driver provides support for MFM, RLL, ESDI, and IDE hard disk controllers on non-Micro Channel industry standard devices.

To list the fixed disk controllers detected and the Model and Types of drives attached to your computer, enter the following line in the CONFIG.SYS file:

```
ADD /V
```

The following listing is an example of the information displayed while OS/2 is booting:

```
IBM ST-506/IDE OS/2 2.x Driver (940621)
Controller: 0 Base Port: 01F0 IRQ: 00E - Status = OK
Unit 0 - Status = OK - Multiple Mode Enabled
Model = WDC AC2540H
Act Cyl : 1048 1048 I13 Cyl : 1023 1023 CMD Cyl : 0 0 ID Cyl : 1048
Head: 16 16 Head: 16 16 Head: 0 0 Head: 16
Sec : 63 63 Sec : 63 63 Sec : 0 0 Sec : 63
Controller: 1 Base Port: 0170 IRQ: 00F - Status = OK
```

To enable support for a drive on a hardcard that is installed as a second drive, the CONFIG.SYS file should contain the following line:

```
BASEDEV=IBM1S506.ADD /A:1 /IRQ:11
```

Similarly, to disable controller resets for a secondary ESDI controller:

```
BASEDEV=IBM1S506.ADD /A:1 /!R
```

To disable Set Multiple Support for IDE drives 0 and 1:

```
BASEDEV=IBM1S506.ADD /A:0 /U:0 /!SMS /U:1 /!SMS
```

11.4.8 ATAPI Support

The generic class of devices covered here are ATAPI (IDE) CDROM drives. ATAPI (ATA Packet Interface), is the specification that allows SCSI commands to be "packetized" and transmitted on the IDE channel. The version of the ATAPI spec that is supported is Version 1.2.

The IDE driver, IBM1S506.ADD, was made aware of ATAPI devices. This driver will claim all ATAPI devices and mark them as generic ATAPI devices. The IBMIDECD.FLT filter loads afterwards and scans all loaded drivers for generic ATAPI devices. If it locates one, it will determine if that device is a CD-ROM, and then it claims the device. This filter is somewhat different from other filters in that, instead of intercepting a command, modifying it and then passing it on to the driver, this filter talks straight to the hardware. Because of this and the fact that we can not share interrupts on ISA systems, the filter will suspend and resume the IBM1S506 driver. When the suspend is initiated, the filter passes its IRQ handler routine address so that the IBM1S506 interrupt routine can notify the filter routine while the IBM1S506 is suspended.

- DELIVERY.SYS (related driver) NEW F/W SCSI IBM

This device driver provides support for the MOVE MODE function on IBM SCSI-2 FAST/WIDE adapters.

This device driver is only needed if you have the IBM SCSI-2 FAST/WIDE adapter and it should be automatically installed.

- Adaptec Device Drivers

The AHA152X.ADD device driver supports:

- Adaptec AHA-1510/1522 ISA SCSI host adapters
- Adaptec AIC-6350/6360 System Board controllers.

The AHA154X.ADD device driver supports:

- Adaptec AHA-1540/1542 ISA SCSI host adapters.

The AHA164X.ADD device driver supports:

- Micro Channel SCSI host adapters.

The AHA174X.ADD device driver supports:

- Adaptec AHA-1740/1744 EISA SCSI host adapters.

The AIC7770.ADD device driver supports:

- Adaptec AHA-2840OVL/2842VL ISA SCSI host adapter

- Adaptec AHA-2740/2742 EISA SCSI host adapters, and
- Adaptec AIC-7770 system board controller.

The AIC7870.ADD device driver supports:

- Adaptec AHA-2940 PCI SCSI host adapter and
- Adaptec AIC-7870 system board controller.

- DPT Device Drivers

This adapter driver supports all bus master type BusLogic SCSI Host Adapter products. The BTSCSI.ADD device driver supports the following BusLogic host adapters:

- BT-445S - ISA-VL SCSI Host Adapters
- BT-542B, BT-542S - ISA SCSI Host Adapters
- BT-640A, BT-646S - Micro Channel SCSI Host Adapters
- BT-742A, BT-747S - EISA SCSI Host Adapters
- BT-946 - PCI SCSI Host Adapters

11.4.9 CD-ROM Device Support

The filter device driver **IBMIDECD.FLT** provides support for Enhanced IDE CD-ROM drives following the ATAPI Industry Specification 1.2.

This includes the following CD-ROM drives:

- Sony CDU55E
- Philips LMSCM207
- Mistsumi FX001DE

Detection for this device is in the IBM1S506.ADD device driver. The detection is automatic through the Enhanced IDE controller.

```
--BASEDEV-----IBMIDECD.FLT-----
                        -/V-
```

The following drivers for device support must be in the CONFIG.SYS:

```
IBM1S506.ADD
OS2CDROM.DMD
```

Other device drivers have been provided in OS/2 Warp Version 3 to support CD-ROM devices. These are:

- MITFX001.ADD
- SBCD2.ADD
- SONY31A.ADD
- LMS205.ADD
- LMS206.ADD

The difference between the LMS CM205, CM225, and the CM205MS, CM225MS cannot be detected. If your Philips LMS205 drive supports multi-session photo CD, then use the Selective Install option to install the CD-ROM and choose the Philips LMS CM205MS, CM225MS which uses the LMS206.ADD device driver. The LMS205.ADD will not work with this multi-session photo CD drive.

- SONY535.ADD

It is recommended that the transfer mode be changed from its default of software polling transfer to software interrupt transfer. This will help lower the CPU utilization of CD-ROM applications and enable better performance for other tasks while the CD-ROM drive is being accessed.

11.4.10 Parallel Port Support

- PRINT01.SYS
- PRINT02.SYS

The PRINT01.SYS device driver programs the parallel port on ISA and EISA bus systems. PRINT02.SYS programs the parallel port on Micro Channel systems. The parallel port device driver services requests for PRN, LPT1, LPT2, and LPT3 devices.

```
--BASEDEV----PRINT0X.SYS-----  
- /IRQ:nnn
```

The default transmission protocol is to use the polling transmission method.

The default transmission protocol used by previous versions of OS/2 is to use the interrupt transmission method. Users can change the default transmission method by specifying the /IRQ switch.

In addition to the polling and interrupt driven methods of transmission, the PRINT02.SYS parallel port device driver supports the DMA method of

transmission. When the Micro Channel port supports the DMA method of transmission, the parallel port device driver uses this method of transmission regardless of whether polling or interrupt is specified. This is because of the improvements in performance that can be achieved using DMA transfer. In all other cases, PRINT01.SYS and PRINT02.SYS use either the default (polling) or the alternative (interrupt) method of transmission.

11.4.11 IDE CD-ROM Enhanced Support

The generic class of CD-ROMs that are covered here are ATAPI (IDE) CD-ROM drives. ATAPI (ATA Packet Interface), is the specification that allows SCSI commands to be packaged and transmitted on the IDE channel. The version of the ATAPI spec that is supported is 1.2.

The IDE hard drive driver, IBM1S506.ADD, was made aware of ATAPI devices. This driver will claim all ATAPI devices and mark them as generic ATAPI devices. (There is another spec in development for other ATAPI devices besides CD-ROM.) The IBMIDECD.FLT filter loads afterwards and scans all loaded drivers for generic ATAPI devices. If it locates one, it will determine if that device is a CD-ROM. If so, it claims the device. This filter is somewhat different from other filters in that instead of intercepting a command, modifying it, and then passing it on to the driver, this filter talks straight to the hardware. Because of this and the fact that we can not share interrupts on ISA systems, the filter will suspend and resume the IBM1S506 driver. When the suspend is initiated, the filter passes its IRQ handler routine address so that the IBM1S506 interrupt routine can notify the filter routine while the IBM1S506 is suspended.

As of Warp Beta 2 there were several IDE CD-ROM manufacturers that were shipping drives. They were:

- Mitsumi FX001DE
- Philips CM-207
- Sony CDU55-E
- Wearn's CDD-120

11.4.12 Video Support

This section describes some of the video modes supported by the display drivers shipped with OS/2 Warp Version 3.

11.4.12.1 Non-Accelerated Display Drivers

The table below shows a list of video device drivers, manufacturers, chipsets, resolution change methods, and the resolution supported by the adapters.

Video Device Driver / Manufacturer - chip set	Resolution Change Method	Resolutions (also depends on adapter)	Color
----- Video graphics adapter (VGA) IBM - VGA	NA	640x480	16
IBM VGA256c	NA	640x480	256
ATI Technologies ATI28800	Selective Install	640x480 800x600 1024x768	256 256 (1MB RAM) 256
Cirrus Logic CL-GD5422, CL-GD5424	Selective Install	640x480 800x600 1024x768	256 256 (1MB) 256
Headland Technologies HT209	Selective Install	640x480 800x600 1024x768	256 256 (1MB RAM) 256
Trident Microsystems TVGA8900 TVGA8900B, TVGA8900C	Selective Install	640x480 800x600 1024x768	256 256 (1MB) 256
Tseng Labs ET4000	Selective Install	640x480 800x600 1024x768	256 256 (1MB RAM) 256
Western Digital Imaging WD90C11, C30, C31 (C30 mode only)	Selective Install	640x480 800x600 1024x768	256 256 (1M) 256

11.4.12.2 Graphics Accelerator Drivers

The table below contains a list of video device drivers, manufacturers, chipsets, resolution change method, and the resolution supported by the adapters.

Video Device Driver / Manufacturer - chip set	Resolution Change Method	Resolutions (also depends on adapter)	Color
Display Adapter 8514/A IBM 8514	NA	1024x768	256
Extended graphics adapter (XGA) IBM XGA	System icon	640x480 800x600 1024x768 1280x1024 1360x1024	256, 64K 256, 64K 16, 256 16 16 XGA-2
S3 86C801, 86C805, 86C928 Driver name: 32 bit S3 Display Driver	System icon	640x480 800x600 1024x768 1280x1024	256, 64K 256, 64K 256, 64K 256
S3 86C864	System icon	640x480 800x600 1024x768 1280x1024	256, 64K, 16M 256, 64K 256, 64K 256
Cirrus Logic 5426,5428, 5429,5430,5434	System icon	640x480 800x600 1024x768 1280x1024	256, 64K 256, 64K 256, 64K 256, 64K
WD 90C24-90C31 Western Digital	System icon	640x480 800x600 1024x768	256, 64K 256, 64K 256
WD 90C33 Western Digital	System icon	640x480 800x600 1024x768 1280x1024	256, 64K 256, 64K 256 256
ATI Mach 32	System icon	640x480 800x600 1024x768	256, 64K, 16M 256, 64K, 16M 256, 64K

		1280x1024	256
ATI Mach 64	System icon	640x480 800x600 1024x768 1280x1024	256, 64K, 16M 256, 64K, 16M 256, 64K, 16M 256, 64K
Tseng ET4000/W32, /W32i, /W32p	System icon	640x480 800x600 1024x768 1280x1024	256, 64K, 16M 256, 64K, 16M 256, 64K 256
Weitek Power 9000	System icon	640x480 800x600 1024x768 1280x1024	256, 64K, 16M 256, 64K, 16M 256, 64K, 16M 256, 64K, 16M

11.4.12.3 Video Memory Requirements

The table below provides information to aid a user in deciding which resolution they should use when running OS/2 Warp Version 3. The amount of memory required for each resolution is provided as a guide.

Resolutions	Number of Colors	Video Memory Required
640x480	256	1MB
800x600	256	1MB
1024x768	256	1MB
1280x1024	256	2MB
1600x1200	256	4MB
640x480	64K	1MB
800x600	64K	1MB
1024x768	64K	2MB
1280x1024	64K	4MB
640x480	16M	1MB or 2MB
800x600	16M	2MB
1024x768	16M	4MB

11.4.13 Printer Drivers

OS/2 Warp Version 3 provides support for a long list of printers. Support for printers is included in the following drivers:

- HPDJPM
- IBMPCL5
- LASERJET
- PLOTTERS
- PSCRIPT
- OMNI

Full details of the actual printers supported may be found in the online documentation.

11.5 Resource Manager

OS/2 Warp Version 3 includes a Resource Manager, whose function is to provide central management of resources in order that device drivers do not load using the same resources as those already owned by another device driver. The Resource Manager uses RESOURCE.SYS during system startup to scan:

- I/O port allocation
- IRQ levels
- BIOS area memory allocation
- DMA channels
- Timers channels
- Device drivers

This enables OS/2 Warp Version 3 to discover what resources are already allocated to or required by devices. Resource Manager aware device drivers request access to a port before loading. Resource Manager scans to discover what has already been allocated and if it finds a conflict, looks for another location that the device driver can be loaded at.

There is an option to have a specific port address reserved. This is done using RESERVE.SYS. More information on RESERVE.SYS may be found in 11.5.3, "RESERVE.SYS" on page 238. If a driver is loaded at a specific address and a conflict occurs with another driver trying to load at the same

address, the conflicting device driver will not load and an error will be displayed. A utility called *RMVIEW.EXE* is used when the user wishes to discover which resources are currently in use.

A number of resource management APIs have been created in OS/2 Warp Version 3 to allow applications and device drivers to query the resources in the system or define themselves as Resource Manager aware device drivers. The OS/2 Warp Version 3 programmers tool kit will include the required libraries to support the new Resource Manager APIs.

11.5.1 RESOURCE.SYS

As mentioned earlier in the chapter RESOURCE.SYS is used to scan the resources that are allocated in the system. RESOURCE.SYS checks the following:

- **I/O port allocation**
 - Base address 0 - 0xFFFF.
 - The number of I/O ports needed.
 - Decode width. This is either 10 bits or 16 bits.
 - The sharing flags (exclusive, shared, time multiplexed).
- **IRQ levels**

Checks the IRQ channel number and the sharing flags.
- **BIOS area memory allocation**

Checks the memory attributes, such as the base physical memory (C0000 - DFFFF), the length of the memory block, and the sharing flags.
- **DMA channels**

Checks the channel number for the DMA channel and the sharing flags.
- **Timers channels**

Checks the channel number (IRQ level, DMA channel) and the sharing flags.
- **Device drivers**

Checks I/O ports, IRQ levels, and ownership of other adapters.

Note: RESOURCE.SYS allocates any BIOS ROM detected during its initialization as shared.

The ALT+F2 function provided during OS/2 Warp Version 3 startup causes the device drivers names to be displayed as the device drivers are loaded.

11.5.2 RMVIEW.EXE

RMVIEW is used to see a list of the resources that are currently in use according to the resource management database. Several types of reports are available, including the:

- Physical view
- Display view
- Logical view
- IRQ levels
- Claimed I/O ports
- DMA channels
- Memory regions
- Hardware tree

To run RMVIEW.EXE enter the following:

```
RMVIEW <parameter>
```

Issuing:

```
RMVIEW ?
```

causes the RMVIEW help text to be displayed which provides full details of the various reports that are available and the parameters that should be passed to RMVIEW. Below are some sample reports that show the sort of output that can be received from RMVIEW.

This report displays the claimed interrupt levels (IRQ) in the system:

```
RMVIEW /IRQ
```

```
RMVIEW: Physical view
```

```
IRQ Level = 1  PCI Pin = NONE  Flg = EXCLUSIVE  KBD_0 Keyboard Cor
IRQ Level = 3  PCI Pin = NONE  Flg = SHARED      SERIAL_1 Serial Co
IRQ Level = 4  PCI Pin = NONE  Flg = SHARED      SERIAL_0 Serial Co
IRQ Level = 7  PCI Pin = NONE  Flg = SHARED      PARALLEL_0 Paralle
IRQ Level = 12 PCI Pin = NONE  Flg = SHARED      AUX_0 PS/2 Auxilia
Controller
```

This report displays the hardware tree:

```
RMVIEW /HW
```

```
RMVIEW: Physical view
PDEV Physical Device Tree
CPU - 486
  X_Bus
    PIC_0
    PIC_1
    DMA_CTLR_0
    DMA_CTLR_1
    VGA
    TIMER
    BIOS_ROM
    RTC
    KBD_0 Keyboard Controller
    AUX_0 PS/2 Auxiliary Device Controller
    SERIAL_0 Serial Controller
    SERIAL_1 Serial Controller
  ISA_Bus
    PARALLEL_0 Parallel Port Adapter
    FLOPPY_0 Floppy Controller
    IDE_0 ST506/IDE Controller
```

The following shows a selection of the information provided when a report of the driver view is requested from RMVIEW:

```
RMVIEW /D
```

```
RMVIEW: Driver view
```

```
Driver: RESOURCE.SYS - IBM Resource Manager
Vendor: IBM OS/2 Version: 1.1 Date (MDY): 9/17/1994
Flag:  STATIC      Type-Subtype: SERVICE
```

```
Adapter: PDEV Physical Device Tree
Device Type: OTHER      Bus/Width: PLANAR 32 BIT
```

```
Logical Device: LDEV Logical Device Tree
Flg:  0000  Class: ROOT  Handle: 00000000
```

Driver: OS2KRNL - OS/2 Kernel Module
Vendor: IBM OS/2 Version: 1.1 Date (MDY): 9/17/1994
Flag: STATIC Type-Subtype: SERVICE

Adapter: CPU - 486
Device Type: OTHER Bus/Width: PLANAR 32 BIT

.
.
.

Driver: C:\OS2\BOOT\POINTDD.SYS - Non-Resource manager aware device
Vendor: Unknown Vendor Version: 1.1 Date (MDY): 9/17/1994
Flag: STATIC Type-Subtype: OS2 -

Driver: MOUSE.SYS - IBM Mouse Device Independent Driver
Vendor: IBM - OS/2 Version: 1.1 Date (MDY): 9/6/1994
Flag: STATIC Type-Subtype: OS2 - CHAR

Adapter: AUX_0 PS/2 Auxiliary Device Controller
Device Type: INPUT-MOUSE Bus/Width: PLANAR 8 BIT
I/O = 0X0060 Len = 1 Flg = SHARED Addr Lines = 16
I/O = 0X0064 Len = 1 Flg = SHARED Addr Lines = 16
IRQ Level = 12 PCI Pin = NONE Flg = SHARED

Device: MOUSE_0 IBM Compatible Mouse IO

11.5.3 RESERVE.SYS

RESERVE.SYS is used in conjunction with the resource manager in two separate scenarios:

1. If you are using a device driver that is not Resource Manager aware and you know the resources that the device uses, you can use RESERVE.SYS to reserve those resources so that the Resource Manager aware drivers will not have access to those resources.
2. If you have a piece of hardware that does not tolerate its resources being examined, you can reserve the resources so that the Resource Manager aware drivers do not examine the hardware.

To use RESERVE.SYS, place this statement as the first line in the CONFIG.SYS file:

```
BASEDEV=RESERVE.SYS <parameters>
```

where the parameters are as follows:

```

-----
- /IO:----- - /EXC-
- ----- - /MUL-
| - /P:-- /DW: -| - /SHA-
- /MEM:-----
- /DMA:-----
- /IRQ:-----

```

Switch	Format	Example	Description
/IO:	/IO:x,x	/IO:340,4	Reserve IO ports. First number is base port in HEX, followed by length (number of ports). In OS/2 Warp Version 3 this number is in DECIMAL. In OS/2 Warp with WIN-OS/2 and later versions this number is in HEX.
/P:	same as /IO:		
/MEM:	/MEM:x,x	/MEM:CA00,1000	Reserve Memory. First number is memory address (HEX), with the assumption that the address is XXXX:0, followed by the length (number of address) in HEX.
/DMA:	/DMA:x	/DMA:2	Reserve DMA Channel. Number is decimal.
/IRQ:	/IRQ:x	/IRQ:13	Reserve IRQ. Number is decimal.
/EXC	/EXC	/EXC	Exclusive resource attribute
/MUL	/MUL	/MUL	Multiplexed resource attribute
/SHA	/SHA	/SHA	Shared resource attribute
/DW:	/DW:x	/DW:10	Decode width of IO address. Valid numbers are 10 and 16. Only valid with /IO: switch.

Note

More than one resource attribute per resource entry is an error and is not allowed. If no attributes or decode width is set, the defaults used are Exclusive and 16.

For example, if you want to reserve IRQ 13 EXCLUSIVE, DMA 0 SHARED, MEMORY CA00:0hex for 1000 bytes shared, IO ports 340hex for 10 ports EXCLUSIVE and decode width 16, and IO ports 300hex for 64 ports, with a decode width of 10, have the following statement in your CONFIG.SYS file:

```
BASEDEV=RESERVE.SYS /IRQ:13 /DMA:0 /SHA /MEM:CA00,1000 /SHA  
/IO:340,10 /IO:300,64 /DW:10
```

11.5.4 Autodetection of Resources

The Resource Manager autodetects certain resources in the system. The figures in this section provide details of the resources that are autodetected and used in OS/2 Warp Version 3 for the various driver types. This is achieved for Resource Manager aware drivers.

AUDIO DRIVERS	Resources Detected				
	BaseIO	Range	Width	IRQ	DMA
Sound Blaster	220,240 388 (OPL-2/3)	16 4	10	5,7,10 (ISA) 3,5,7 (MCV)	1
Sound Blaster Pro	220,240 388	16 4	10	5,7,10 (ISA) 3,5,7 (MCV)	1,3
Sound Blaster 16	220,240,260,280 388 330,300	16 4	10	5,7,10	1,3,5,6,7
Sound Blaster AWE-32	220,240,260,280 388 330,300 Ex2,Ex0,Ax0	16 4	12	5,7,10	1,3,5,6,7
ESS-688	220,240 388	16 4	10	3,5,7	1,3
Media Vision Jazz16 (not RM aware)	220,210,230 240,250,260 330,300	16 2	10	3,5,7, 10,15	1,3,5,7
Media Vision PAS-16	0388 0788 0b88 0f8a 1388 1788 1b88 8388 bf8a f389 f788 220,240,260	4 4 1 4 4 3 3 1 2 2 16	16	3,5,7,10, 11,12,15	1,3,5,6,7
AD1848 (Business Aud)	530,604,E80,F40	8	16	7,10,11	1,3
CS4231 (ThinkPad) PC Co Mach 5 CS4231	530,E80,F40	8	16	7,10	1,3
IBM M-Audio/ACPA	310,318,330,338 368,710,718,730 738,768	8	16	3,4,5, 6,7	n/a
Sound Galaxy Nova 16	530,E80,F40,640 220,240	8 16	16	5,7,10	1,3
Reel Magic M-PEG					

Figure 63. Autodetection of Audio Resources

Figure 63 shows the resources allocated and used by OS/2 Warp Version 3 when the system autodetects the presence of the resource. The audio driver being used will determine what resources are allocated to the driver.

CD-ROM Drivers	Resources Detected				
	BaseIO	Range	Width	IRQ	DMA
LMS205.ADD	300-370	10	10	7,9,10,11, 12,15,3,4, 5,6	n/a
LMS206.ADD	300-370	10	10	7,9,10,11, 12,15,3,4, 5,6	n/a
SBCD2.ADD	230,250,300,340, 630		16mcv 10isa	none	n/a
MITFX001.ADD	300,320,340		10	3,5,9,10, 11,12,15	n/a
SONY31A.ADD	320,330,340,360		10	2,3,4,5,7, 10,11,12, 14,15	n/a
SONY535.ADD	300,340		10	2,3,4,5,9	n/a

Figure 64. Autodetection of CD-ROM Resources

Figure 64 shows the resources allocated and used by OS/2 Warp Version 3 when the CD-ROM drivers are used.

DASD Drivers	Resources Detected				
	BaseIO	Range	Width	IRQ	DMA
IBM1FLPY.ADD	3F0-3F5 370-375		16	6	2
IBM1S506.ADD	1F0-1F8 170-178 3F6,376		16	14,15	n/a
AHA152X.ADD (AHA6360)	340,140	32	16	9,10, 11,12	
AHA154X.ADD	330,334 230,234 130,134	4	16	9,10,11, 12,14,15	5,6,7
AHA164X.ADD	330,334,340 230,234 130,134	4	16	9,10,11, 12,14,15	5,6,7
AHA174X.ADD	0C80 2C80..FC80		16		
AIC7770.ADD	0C00 1C00..FC00		16		
AIC7870.ADD	PCI autoconfigured				
BTSCSI.ADD	330,340 230,234 130,134		16mca 10isa	9,10,11, 12,15	5,6,7
FD16-700.ADD	140-170 1800-F800	10	16mca 16>3FF 10isa	10,11,12, 3,5 14,15	n/a
FD8XX.ADD	memory mapped			3,4,5,10 11,12,14,15	n/a
FD7000EX.ADD	1000-F000	1000	16	10,12, 14,15	n/a
DPT20XX.ADD	C88-FC88 (EISA) 1F0,170,330,230 (ISA)	10	10	12,14,15 16(>CFF)	0,5,6,7
TMVISCSI.ADD	388,384,38C 288,284,28C		16	2,3,4,5,6, 7,10,11, 12,14,15	n/a

Figure 65. Autodetection of DASD Drivers

Figure 65 shows the resources allocated and used by OS/2 Warp Version 3 for the various DASD drivers. These are the resources used when the system autodetects the presence of the driver.

SYS Drivers	Resources Detected				
	BaseIO	Range	Width	IRQ	DMA
MOUSE.SYS	60,64		16	4 (serial) 12 (PDI)	n/a
PRINT01.SYS	3BC-3BF 378-37F 278-27F		10	polled,7,5	n/a
PRINT02.SYS	3BC-3BF 378-37F 278-27F		16	7,5	assigned via setup
IBMKBD.SYS	60,64		16	1	n/a
IBMIDECD.FLT	no resources assigned				n/a
COM.SYS	2F8 3F8 3220 (COM3) 3228 (COM4)		10isa 16mcv	4 3 4 4	n/a
PCMCIA.SYS			16		

Figure 66. Autodetection of SYS Drivers

Figure 66 shows the resources allocated and used by OS/2 Warp Version 3 when the system autodetects the presence of the SYS drivers listed.

If a driver is not Resource Manager aware, then no resources will be autodetected and allocated to the device.

Chapter 12. Diagnosis and Recovery

There are several new features in OS/2 Warp Version 3 that make recovery and error diagnosis simpler. Some changes are small but useful, others are very complex and give a variety of possibilities.

Improvements are in the following:

- VER command
- BLDLEVEL command
- Create utility diskettes
- Ability to display drivers as they load
- Recovery Choices menu
- Archive options
- Use of multiple configurations
- Problem determination tools

12.1 VER Command

The OS/2 Warp Version 3 command processor has been enhanced to provide a /R (for revision) option as part of the VER command. This option previously had only been available in a DOS session under OS/2. The /R option of the VER command displays the actual version of OS/2 and the revision code of the OS/2 kernel.

```
OS/2      Ctrl+Esc = Window List      Type HELP = help

[C:\]ver /r

The Operating System/2 Version is 3.00
Revision 8.162

[C:\]_
```

Figure 67. /R Option of the VER Command for OS/2 Warp Version 3

```
OS/2      Ctrl+Esc = Window List      Type HELP = help

[C:\]ver /r

The Operating System/2 Version is 3.00
Revision 8.200

[C:\]_
```

Figure 68. /R Option of the VER Command for OS/2 Warp with WIN-OS/2

12.2 BLDLEVEL Command

Another useful new command is **BLDLEVEL**. This command enables you to extract information from EXEs or DLLs.

The only parameter for this command is the path, file name, and extension of the EXE or DLL which has to be examined. Figure 69 shows you an example.

```
OS/2      Ctrl+Esc = Window List      Type HELP = help

[C:]bldlevel c:\os2\dll\ANMT.DLL
Signature:  @#IBM:8.162#@ ANMT DLL
Vendor:     IBM
Revision:   8.162
Description: ANMT DLL

[C:]_
```

Figure 69. BLDLEVEL Command

This information can only be extracted if it was set by the developer. Developers should always define this information in the EXE or DLL file. When the information is not provided by the developer, you receive an error message similar to the following:

```
Error: Could not find the signature in C:\OS2\DISKCOPY.COM
```

Note

SYSLEVEL is used to get information about whole system components (such as graphics engine). BLDLEVEL gets information about the single EXEs and DLLs.

Before the release of OS/2 Version 2.11, the differences between two EXE or DLL files were only visible by looking at the file date and file size.

12.3 Create Utility Diskettes

In the **System Setup** folder you can find the **Create Utility Diskettes** object. This program can be used to build a set of recovery diskettes to:

- Start OS/2 Warp Version 3 from diskette.
- Perform a CHKDSK if you have problems with your hard drive.
- Back up and restore OS/2 system files and directories.

The **Create Utility Diskettes** program creates a set of three 1.44MB diskettes. The actions to be performed to create the diskettes are displayed on the screen when the utility is run.

If you have a diskette drive with 2.88MB capacity you can build *one* boot diskette instead of the three 1.44MB diskettes.

Note

Be aware that both the three 1.44MB diskettes and the 2.88MB diskette are formatted during the execution of the Create Utility Diskettes program.

12.4 Hot-keys During Startup

There are three hot-key combinations that you can use during startup of OS/2 Warp Version 3 and OS/2 Warp with WIN-OS/2. Their purpose is for diagnostics and recovery. During startup you can display device drivers, display the Recovery Choices screen or influence the startup sequence.

agnostics

12.4.1 Displaying Drivers During Startup

Since OS/2 Warp Version 3 a small white bar is displayed in the upper left corner of the screen when you start up your system, just before the OS/2 logo is displayed. If you press Alt+F2 when the small white bar is displayed, the system displays the name of each device driver as it is being loaded. Figure 70 shows the inverse picture of how your screen will look like at this point.

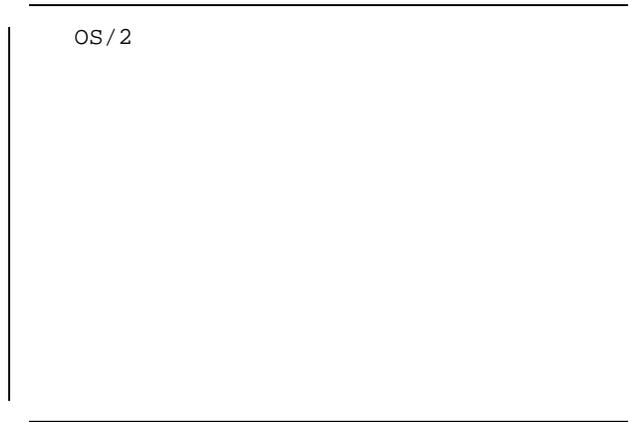


Figure 70. Small White Bar at Startup

If your system is not booting up correctly, this feature enables you to check which device driver the boot process is loading when the problem occurs. When there is a faulty device driver, the system will stop loading the devices and will display the line number in the CONFIG.SYS file where the faulty device driver is and will pause the system.

Note

If you have the Display Recovery Choices at each restart selected from the Archive option of the Desktop Settings to enable the recovery menu to be shown, ALT+F2 does not display the drivers during bootup.

12.4.2 Display Recovery Choices Screen

If you press Alt+F1 when the small white block is displayed on the screen, it will take you to the Recovery Choices screen. This screen is discussed in more detail in 12.5, "Archive and Recover System Files" on page 251.

12.4.3 Startup Sequence

It is possible to suppress automatically starting programs from the Startup folder and programs that were not closed at the last shutdown. During startup of the Workplace Shell after rebooting the operating system, press and hold **Ctrl, left Shift and F1** keys when the teal screen first appears and hold them down until the icons appear on the screen.

12.5 Archive and Recover System Files

Another recovery feature in OS/2 Warp Version 3 is the new archiving function. When you boot your system, press Alt+F1 while the small white bar is displayed on the upper left corner. OS/2 Warp Version 3 displays the Recovery Choices screen.

With this feature you are able to:

- Continue the boot process using the default CONFIG.SYS.
- Continue the boot process using the default CONFIG.SYS, and go to the command line when processing completes.
- Reset the primary video display back to VGA.
- Boot to Maintenance Desktop.
- Restore the system files as originally installed.
- Restore system files that were archived at an earlier time.
- Boot with a different CONFIG.SYS configuration.

To display this screen every time the system starts, select **Display Recovery Choices at each restart** on the Archive page of the Desktop Settings notebook (see Figure 73 on page 255). On this page you can also specify the amount of time this menu will be displayed before the system automatically starts to boot should no key be pressed.

The following example (Figure 71 on page 252) shows a screen with three generations of saved desktop.

```
RECOVERY CHOICES

Select the system configuration file to be used, or enter the option
corresponding to the archive desired.

ESC - Continue the boot process using \CONFIG.SYS without changes
C   - Go to command line, (no files replaced, use original CONFIG.SYS)
V   - Reset primary video display to VGA
M   - Restart the system from the Maintenance Desktop (Selective Install)

Choosing an archive from the list below replaces your current CONFIG.SYS,
Desktop directory, and INI files with older versions. These older versions
might be different from your current files. Your current files are saved in
\OS2\ARCHIVES\CURRENT.

1) Archive created 8-24-94  4:59:32PM
2) Archive created 8-24-94  4:55:16PM
X) Original archive from INSTALL created 11-28-94 7:39:48PM
```

Figure 71. Recovery Choices Menu

After a new installation of OS/2 Warp Version 3, you will only have a screen like the one shown in Figure 72 without any saved system files to restore.

```
RECOVERY CHOICES

Select the system configuration file to be used, or enter the option
corresponding to the archive desired.

ESC - Continue the boot process using \CONFIG.SYS without changes
C   - Go to command line, (no files replaced, use original CONFIG.SYS)
V   - Reset primary video display to VGA
M   - Restart the system from the Maintenance Desktop (Selective Install)

Choosing an archive from the list below replaces your current CONFIG.SYS,
Desktop directory, and INI files with older versions. These older versions
might be different from your current files. Your current files are saved in
\OS2\ARCHIVES\CURRENT.

X) Original archive from INSTALL created 11-28-94 7:39:48PM
```

Figure 72. Initial Recovery Choices Menu

The way to modify the menu to display different CONFIG.SYS choices is described in 12.7, “Booting with Different Configurations” on page 258.

Note

There is no way to protect the access to this screen from end users. Every user can enter this menu and perform the described functions.

12.5.1 Command Line Option

When you are in the Recovery Choices screen and select option C to start the command processor, OS/2 Warp Version 3 is booted up using the default CONFIG.SYS. The command processor is started in a full-screen session instead of the Workplace Shell.

Because your boot hard drive is already in use by the operating system, you cannot run the CHKDSK command with the **/F** option to fix disk errors. To issue CHKDSK, you must boot from diskettes or from a maintenance partition.

Using this option, some of the DLLs are not opened (such as those for the Workplace Shell) and can be replaced by a simple COPY command. This is useful when you have to apply some fixes or replacements for the DLLs.

Others, such as the DOSCALL1.DLL, are used by the base operating system and cannot be replaced using this option, because they are already opened. If you want to replace those DLLs, you have to reboot from diskettes or a maintenance partition.

You cannot use the System Editor (E.EXE) or the Enhanced Editor (EPW.EXE) to edit a file from the command prompt, because Presentation Manager is not started at this stage.

To edit a file (for example, CONFIG.SYS) from this command prompt, use the new Tiny Editor (TEDIT.EXE) which is a small full-screen editor.

After your modifications are complete, you can restart the system by pressing Ctrl+Alt+Delete or by entering EXIT at the command prompt.

12.5.2 Reset Primary Video Display Back to VGA

Whenever you are installing a video driver which is not shipped with OS/2 Warp Version 3 (such as the IBM Image Adapter/A), reset the video mode back to VGA.

With OS/2 Warp Version 3, there is now a very easy way to reset your video mode to VGA. Press "V" while you are in the Recovery Choices screen, the system begins *immediately* to install the display drivers for VGA and then boots up in VGA mode.

To reinstall your graphic adapter-specific video driver, select **Selective Install** from the System Setup folder or start **DSPINSTL.EXE** (Display Driver Install) from the command line, if the driver is not part of the OS/2 Warp Version 3 product.

1. Open the OS/2 System folder.
2. Select **System Setup**.
3. Select **Selective Install**.
4. Select the **Primary Display** icon.
5. Select the display adapter from the list.

12.5.3 Boot to Maintenance Desktop

If the Workplace Shell does not start, first try issuing CHKDSK or MAKEINI commands. If a reinstall is necessary, you can reboot your system and start the maintenance desktop from the ALT+F1 screen by selecting the "M" option.

After the Maintenance Desktop displays, you can continue the installation and you don't have to install the first seven diskettes.

From this Desktop you can perform a Selective Install to reinstall the damaged part of the system.

12.5.4 Restore Archived Configuration

Before you can restore a saved configuration and Desktop, you have to enable the archiving function to create the archives (see Figure 73 on page 255).

To create an archive of system files each time you restart your system:

1. Open the Desktop Settings notebook.

2. Select the **Archive** page.
3. Select **Create archive at each system restart**.

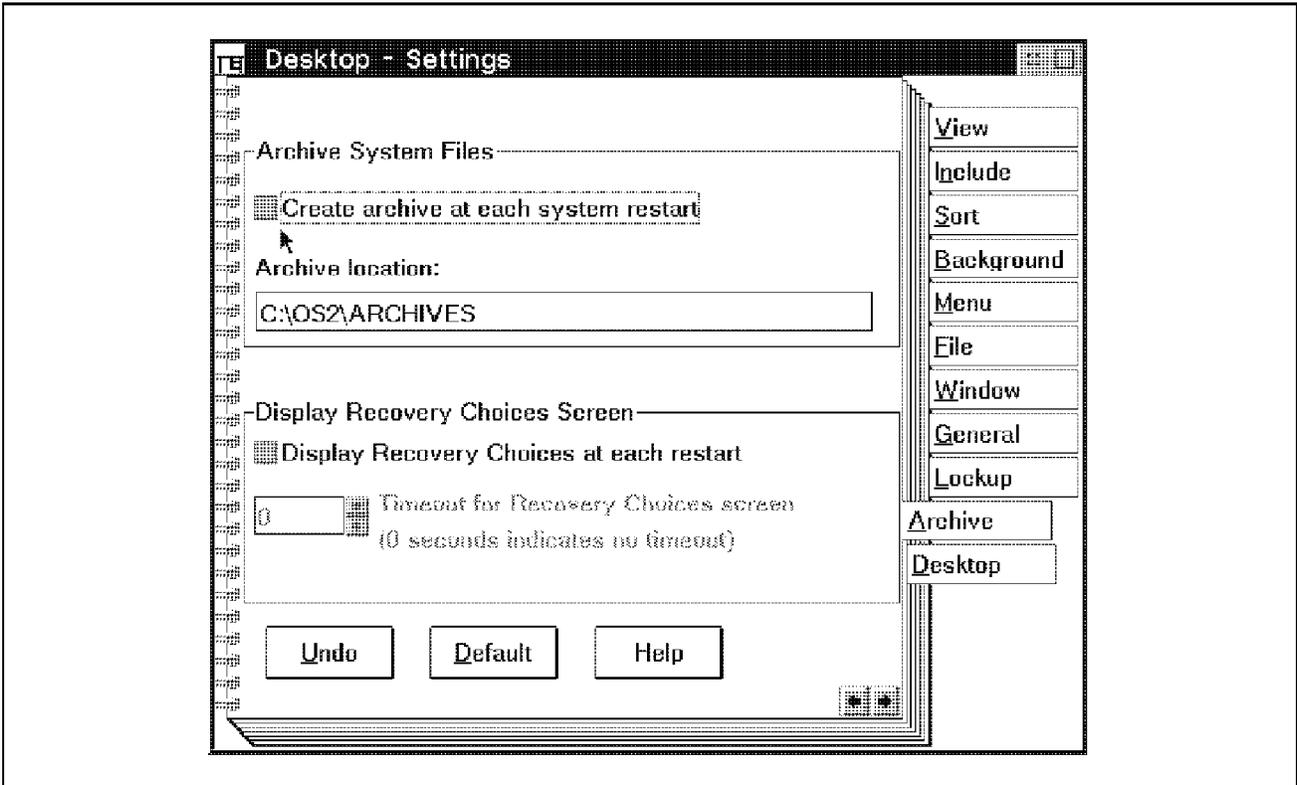


Figure 73. Automatic Archiving

When this option is selected, OS/2 Warp Version 3 creates an archive of the configuration and Desktop during each boot process. The archiving feature can store up to three configurations plus the original configuration and Desktop from the installation.

When three archives are saved, each time a new archive is saved the oldest one is deleted. The original files from installation are never deleted.

When you have archived configurations on your system, you can restore them from the Recovery Choices screen by pressing the assigned key in the menu (1, 2, 3 or X). After you have pressed one of those keys, OS/2 Warp Version 3 immediately restores the selected configuration from the archive and then boots up the Workplace Shell.

The files which are saved besides the desktop are listed in the \OS2\ARCHIVES\OS2.KEY file (see Figure 74 on page 256).

```
OS/2      Ctrl+Esc = Window List      Type HELP = help

[C:\]cd \os2\archives

[C:\os2\archives]type os2.key
KEYFILE:OS2.INI
KEYFILE:OS2SYS.INI
KEYFILE:\CONFIG.SYS
KEYFILE:\STARTUP.COMD
KEYFILE:\AUTOEXEC.BAT
KEYFILE:\OS2INIT.COMD

[C:\os2\archives]_
```

Figure 74. Key files Saved by the Archive Function

Modifying this file (adding new key files such as PROTOCOL.INI) does not affect the already stored archives because their key files, or rather the index to the key files, are binary encoded in the KEYS.\$\$\$ file, which resides in the directory of the related archive.

When you add key files to the OS2.KEY file, always remember to introduce them with the KEYFILE key word as displayed in Figure 74.

Note

If you have a configuration that you want to switch back to at a later time, you must ensure that the option to create archive at every system restart in the desktop settings (see Figure 75 on page 259), is not selected. If this option is selected the configuration will be deleted after three reboots.

Creating an archive at every system boot slows down the boot time. If you don't need the archives or you prefer faster boot time, you should deselect the archiving function.

The option to create archive at every system restart is not selected by default.

12.6 Default Location for Archives

This section describes the location of all files used during an archive/restore.

All files needed at SYSINIT time must reside in the \OS2\BOOT subdirectory because SYSINIT does not have access to the entire disk at that time.

All files for archives are stored in the \OS2\ARCHIVES subdirectory by default. This separates archives from all other parts of the system. The default location for the archive can be modified in the Desktop Settings notebook, which is shown in Figure 73 on page 255.

Archives of individual files are saved in a file with a unique file name. All pertinent information about where the archive resides and its archived unique name is stored in a KEYS.\$\$\$ file.

Table 22 (Page 1 of 2). Default Location for Archives

Directory	File Name	Description
\OS2\		
	ARCRCOV.EXE	Executable that is called by ALTF1.CMD to perform a restore at system boot time.
	ARCINST.EXE	Executable that is called by PMWP.DLL to install all archive/restore files and to create the original archive.
\OS2\BOOT\		
	ALTF1TOP.SCR	Top of Alt+F1 screen to display during SYSINIT time.
	ALTF1MID.SCR	Middle of Alt+F1 screen to display during SYSINIT time.
	ALTF1BOT.SCR	Bottom of Alt+F1 screen to display during SYSINIT time.
	CONFIG.X	CONFIG.SYS that corresponds to the original OS/2 install.
	ALTF1.CMD	Command file called by SYSINIT, when the user presses a valid key e., (that is, chooses to restore an archive).
	CONFIG.?	CONFIG.SYS file that corresponds with a configuration. When the Recovery Choices screen is displayed, press the key that corresponds to the file extension of this file to restore the configuration.

Table 22 (Page 2 of 2). Default Location for Archives

Directory	File Name	Description
	ARCHBASE.\$\$\$	Holds minimum archive information.
\OS2\ARCHIVES\		
	OS2.KEY	Default OS/2 list of KEY files. Only resides in this directory.
	ARCHIVES.\$\$\$	List of archives of this subdirectory (\01, \02, ..., \09, \0X).
\OS2\ARCHIVES\CURRENT\		
\OS2\ARCHIVES\01\		
	KEYS.\$\$\$	File that contains all key file information.
	DESKTOP	Archive of the entire desktop tree.
	unique_file_name	Copy of C:\CONFIG.SYS
	unique_file_name	Copy of C:\OS2\OS2.INI
	unique_file_name	Copy of C:\OS2\OS2SYS.INI
	unique_file_name	Copy of C:\STARTUP.CMD
	unique_file_name	Copy of C:\AUTOEXEC.BAT
\OS2\ARCHIVES\02\		
\OS2\ARCHIVES\09\		
\OS2\ARCHIVES\0X\		

12.7 Booting with Different Configurations

In many cases it is still necessary or useful to boot with different configurations (for example, when you have a laptop computer that you are using at the office, at home, and when you are with a customer). For example:

- In the office you need the configuration for the LAN requester to get access to your server.
- At home you use a docking station, which has a SCSI adapter and CD-ROM built in.
- At your customer's office you need a configuration for LAN Distance to get remote LAN access via your PCMCIA modem.

If you try to use one CONFIG.SYS file with all drivers installed, you have to accept error messages, for example, when you are at home and your system tries to get access to the non-existent LAN.

OS/2 Warp Version 3 now gives you the ability to set up different CONFIG.SYS files, which can be chosen from the Recovery Choices screen during the boot process.

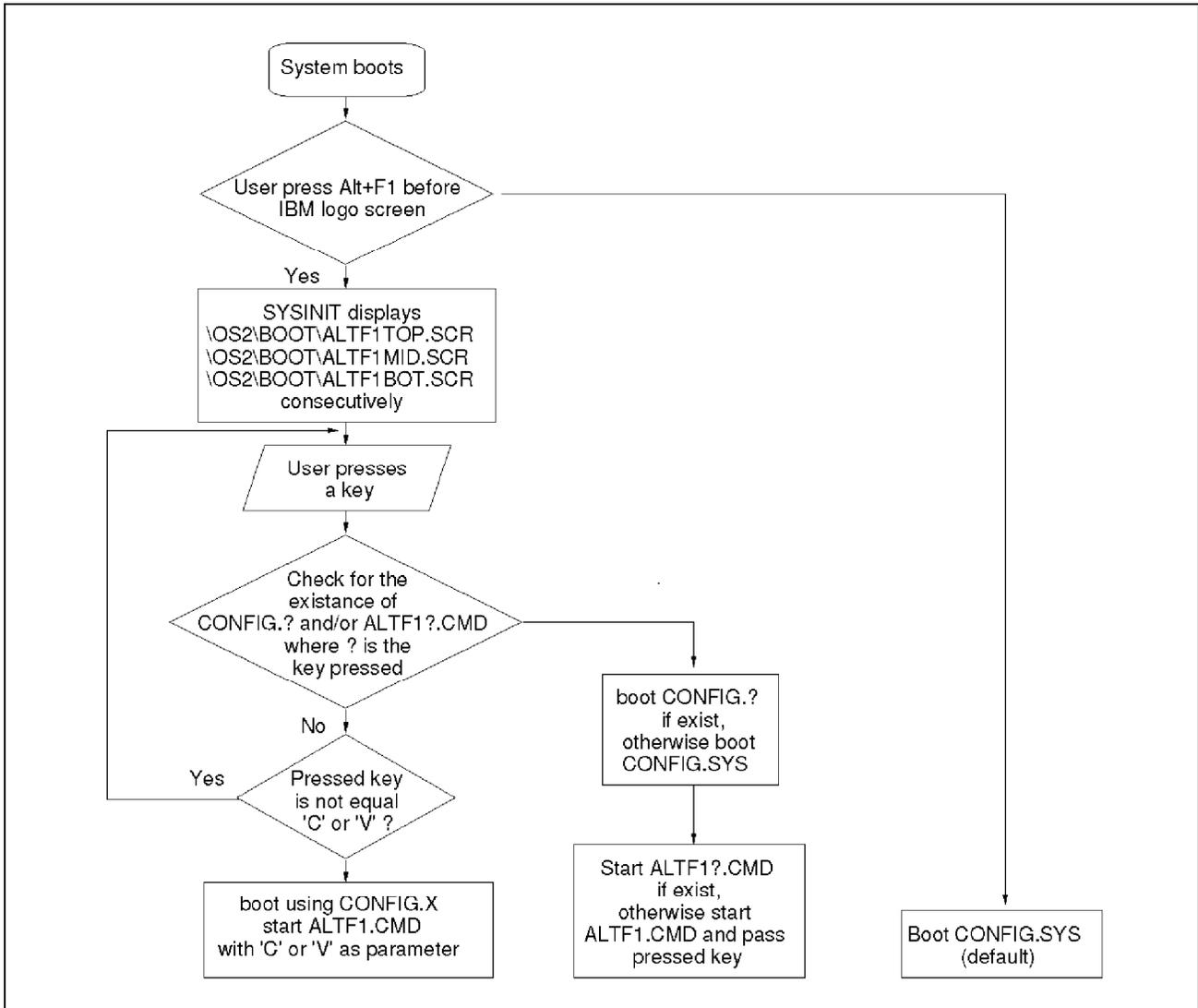


Figure 75. Alt+F1 Process

Whenever you press a key at the Recovery Choices screen, the system will check if a CONFIG.? and/or a ALTF1?.CMD exists in the \OS2\BOOT directory, where ? is the pressed key.

To display your new configuration in the Recovery Choices screen, you have to manually add the option to the ALTF1BOT.SCR file.

```
RECOVERY CHOICES

Select the system configuration file to be used, or enter the option
corresponding to the archive desired.

ESC - Continue the boot process using \CONFIG.SYS without changes
C   - Go to command line, (no files replaced, use original CONFIG.SYS)
V   - Reset primary video display to VGA
M   - Restart the system from the Maintenance Desktop (Selective Install)

Choosing an archive from the list below replaces your current CONFIG.SYS,
Desktop directory, and INI files with older versions. These older versions
might be different from your current files. Your current files are saved in
\OS2\ARCHIVES\CURRENT.

1) Archive created 8-24-94  4:59:32PM
2) Archive created 8-24-94  4:55:16PM
X) Original archive from INSTALL created 11-28-94 7:39:48PM

A) Boot with CONFIG.A (without MMPM/2)
B) Boot with CONFIG.B (without CM/2)
```

Figure 76. Customized Recovery Choices Screen

The menu displayed in Figure 76 is built from three ASCII files displayed sequentially:

1. ALTF1TOP.SCR
2. ALTF1MID.SCR
3. ALTF1BOT.SCR

ALTF1TOP.SCR contains the introductory text before the part where the restorable configurations is displayed. You can modify this file for your personal needs.

For example, if you are the administrator of several machines, you can add a line to warn your users not to use the restore option or not to switch back to VGA mode.

ALTF1MID.SCR is displayed after the introductory text and contains the options for the restorable configurations. This file is modified automatically by the system, when a configuration is automatically saved. Do not modify

this file because changes can be removed by the system when the next configuration is saved and the ALTF1MID.SCR file is rewritten.

To add your personal menu items you should use the ALTF1BOT.SCR file, which is displayed last. This file is never modified by the system, so that you can add your items permanently without them being removed when the next configuration is saved. We explain this more in 12.7.1, "Creating a CONFIG.?"

ALTF1TOP.SCR, ALTF1MID.SCR and ALTF1BOT.SCR are read-only files. You have to change the file attributes using the ATTRIB command before you can edit these files.

Note

If you are using different CONFIG.SYS configurations and you are installing a program which you want to use in the different configurations, you must copy any changes that the installation program made to CONFIG.SYS into each CONFIG.? file that is to use the program by manually editing the CONFIG.? file.

The multiple CONFIG.SYS option is a new feature in OS/2 Warp Version 3 and the old OS/2 Version 2.x programs and their installation programs are not aware of the additional CONFIG.? configurations.

12.7.1 Creating a CONFIG.?

In this part we will give you an example of setting up a CONFIG.? file and add it to the Recovery Choices screen. The example that we chose has a lot of relevance in the mobile environment. In this example we assume you have a mobile computer that is connected to a LAN in the office. When you want to use this system at home you are not connected to a LAN and therefore get a number of error messages regarding the LAN connection. We are going to show you how to create a CONFIG.? file that you can select on the Recovery Choices screen and boot without loading all the LAN drivers.

Here are the steps to add another option to the Recovery Options screen:

1. First choose a title for the Recovery Choices screen and a hot key. This letter can be any alphabetic letter except X,x,C,c,M,m or V,v. We chose the letter L and the title "Boot without the LAN drivers."
2. Change the directory to:

OS2 BOOT

3. The Recovery Choices screen's text file is read only. We need to change that on the ALTF1BOT.SCR file. As we said in 12.7, "Booting with Different Configurations" on page 258, only change the ALTF1BOT.SCR file, as the others are used by the system. To change the attribute type:

```
ATTRIB -R ALTF1BOT.SCR
```

4. Edit ALTF1BOT.SCR with your favorite editor and add the following line:

```
  L) Boot without the LAN drivers
```

We indent the text by three characters and keep an open line at the top of the file to keep within the format of the Recovery Choices Screen.

5. Find a backup copy of the CONFIG.SYS that was created before you installed the LAN drivers. Most programs automatically create backups of the CONFIG.SYS file before they change it. IBM's Multi-Protocol Transport Services (MPTS), creates a backup file in the root directory called CONFIG.MPT.

If you don't find a backup of the CONFIG.SYS then make a copy of CONFIG.SYS and make the changes to the copy.

6. Copy this file to the OS2 BOOT directory and change the extension to the hot key letter that you've chosen. In our example that will be L:

```
COPY CONFIG.MPT OS2 BOOT CONFIG.L
```

7. If you want to make changes to the CONFIG file, edit it and make your changes. Remember that these changes will only be in effect when you boot from this CONFIG file.
8. The last change that we make is to open the Desktop Settings notebook and change the archive options. We set "Display Recovery Choices at each restart" to on and set the "Timeout for the Recovery Choices screen" to 5 seconds. Therefore we don't have to press ALT+F1 when the white block appears, and the Recovery Choices screen will stay up for 5 seconds during every boot.

By changing the hot key letter and the menu option we've put in the ALTF1BOT.SCR file with your own options, you can have a multitude of different CONFIG files to boot from.

You can also have a ALTF1CMD.? file to be run after booting from CONFIG.SYS or CONFIG.?. For example, you want a specific command file to be run after booting from CONFIG.SYS but before the Workplace Shell is started. For this example we will assume that S will be the menu option letter.

1. Put the commands in an ALTF1CMD.S file.
2. Edit the ALTF1BOT.SCR file and add the menu option:

```
S) Special command file to be run
```

3. If you want to boot from a special CONFIG file, add the CONFIG.S file as described in the previous example. If you want to boot from the default CONFIG.SYS file, do not add a CONFIG.S file.

When you select S from the Recovery Options screen it will boot using CONFIG.SYS and then run the ALTF1CMD.S file as a command file before it loads the Workplace Shell.

12.8 Problem Determination

If the occasion arises where a user is experiencing a problem when running OS/2 Warp Version 3, the system provides a number of new or improved options for assisting with problem determination. These tools include:

- SYSLOG
- Traces
- System dump
- Process dump
- Dump formatter
- CONFIG.SYS options

12.8.1 SYSLOG

SYSLOG is a tool that is used to display a log file such as the error log. To start SYSLOG enter the following:

```
SYSLOG X: path filename
```

where X:\path\filename is the fully qualified path to the log file that you wish to view. SYSLOG requires a valid log file and the following entry in the CONFIG.SYS:

```
DEVICE=C: OS2 LOG.SYS  
RUN=C:\OS2\SYSTEM\LOGDAEM.EXE /E:X:\path\filename
```

The DEVICE= statement activates the system logging device driver and the run statement controls the start of the logging daemon process. The /E parameter is used to pass the fully qualified path and file name to be used

for the log file. If these statements do not appear in the CONFIG.SYS file, an error will be displayed if the user tries to run SYSLOG.

More information about SYSLOG may be found in the online help provided with OS/2 Warp Version 3.

12.8.2 Tracing

The TRACE command is used in problem determination to set system tracing, or to trace a specific system event. Two statements are added to the CONFIG.SYS file to configure the trace utility:

```
TRACE=ON  
TRACEBUF=63
```

The TRACE entry in the CONFIG.SYS file may be set to ON or OFF. TRACEBUF is supplied with a value to indicate the size of the trace buffer that the user wishes to use. This should be given a value between 0KB and 63KB. The default for TRACEBUF is 4KB. A command called TRACEFMT is used to format and view a trace.

With TRACE=ON, the system trace will continuously execute and the trace buffer will fill very quickly. This can also impact the system performance, as the system is continually having to log each action being traced. When the trace buffer fills, the system wraps and starts filling the buffer once more from the top. For these reasons, you need to ensure that you trace only the specific items that you need to identify the problem and that you remember to switch trace off once the problem has been reproduced. 63KB does not take long to fill when all of OS/2 is being traced. Each mouse movement, each keyboard stroke, will be logged, including all of the calls made to ensure that the correct action took place. There are two types of tracing, static and dynamic.

Static trace is implemented as a series of trace functions within individual software modules. Trace points for static tracing will be specified by use of a trace point that includes a major code, and possibly a minor code. Dynamic trace uses a trace definition file and normally specifies a type.

An example of static tracing is as follows:

```
TRACEON 15,31,22
```

This example shows that all static trace points with major codes of 15, 31, and 22 are to be traced.

An example of dynamic tracing that will insert all the dynamic trace points defined in DOSCALL1.TDF is shown below:

```
TRACE ON DOSCALL1
```

The online command reference contains more information on the use of trace in OS/2 Warp Version 3.

12.8.3 Dumps and Dump Formatter

The dump utility is included with OS/2 Warp Version 3 to help with information gathering to help isolate application or system problems. The dump utilities take a snap shot of the state of physical memory was in at the time a failure occurred.

The CD-ROM version of OS/2 Warp Version 3 includes a dump formatter and some documentation to help users use the facility. The dump formatter includes procedures to automatically look at many of the OS/2 structures and assist the technical support specialist in discovering exactly what caused that particular failure. The CD also includes a copy of the debug kernel to be used with the level of OS/2 Warp Version 3 supplied on the CD. The debug kernel allows a technical support specialist to connect an ASCII terminal or machine running an ASCII terminal emulator to the failing system and investigate the failure by stepping through the program instruction by instruction. The debug kernel can also be used to set up a remote debug session through a modem connection.

12.8.3.1 CONFIG.SYS Statements

There are a number of CONFIG.SYS entries that can be used to assist when taking system dumps or if the user is experiencing traps when running OS/2 Warp Version 3. These include:

- TRAPDUMP
- DUMPPROCESS
- SUPPRESSPOUPS
- REIPL

TRAPDUMP: The TRAPDUMP statement is used to determine when a dump is to be taken and where the dump should be placed. There are three possible entries:

TRAPDUMP=OFF, X: Indicates that no automatic dump should be taken and that any dump should be placed on drive X. The default is TRAPDUMP=OFF, with any dumps going to drive A.

TRAPDUMP=ON, X: This will automatically generate a system dump for any ring 3 or ring 0 trap and the dump will be stored on drive X.

TRAPDUMP=R0, X: This will automatically generate a system dump for any ring 0 trap or internal processing error and will store the dump on drive X.

Because of the protection mechanisms used by OS/2, OS/2 applications such as Workplace Shell CM/2, Excel for OS/2, etc., run at ring 3. The OS/2 Kernel and device drivers run at ring 0.

A dump may be manually taken by issuing the following:

`Ctrl+Alt+Numlock+Numlock`

or

`Ctrl+Alt+F10+F10`

As stated earlier a dump may be stored on a fixed disk or on diskette. To store a dump on a particular drive, the drive must:

- Be larger than the amount of memory in the system.
- Have a volume label of SADUMP.
- Be formatted FAT.
- Be within the first 1023 cylinders.

If no drive is specified or the system finds a problem when trying to dump to the drive specified, the dump will default to diskette.

DUMPPROCESS: The DUMPPROCESS can be used to automatically dump information specific to a process to a dump file when that application traps. A process dump can only take place for ring 3 traps and has the advantage that it is a small amount of data so it can be dumped quickly. The format of the command is:

`DUMPPROCESS=X:`

A file called PDUMP.000 will be created on drive X if this is the first process dump to be saved to that drive. The extension of the PDUMP file increments by one each time a process dump is saved. After the dump has taken place, the application will end but OS/2 Warp Version 3 will continue to function.

SUPPRESSPOPUPS: SUPPRESSPOPUPS is used to suppress the display of any trap information and to direct the output to a file. The entry in the CONFIG.SYS file should be:

SUPPRESSPOPUPS=X :

This will suppress trap information for ring 3 applications, for example SYS3175 errors, and will create a file on the root directory of drive X called POPUPLOG.OS2. Each time a trap occurs, the trap screen information will be dated, time stamped and appended to the POPUPLOG.OS2 file.

This is an extremely useful way of obtaining the trap screen information to assist with problem diagnosis, as you do not need to ask a user to read the trap screen information to you or write it down. The user can now update CONFIG.SYS, reproduce the failure and send you the information.

REIPL: The REIPL statement will automatically restart the system should a system trap or internal processing error occur. This means that the user does not need to manually restart the system should they receive a ring 0 trap; OS/2 Warp Version 3 can do this automatically. The format of the command is:

REIPL=ON

Part 2. BonusPak

Chapter 13. BonusPak Installation

OS/2 Warp Version 3 is being shipped together with a package of applications called the BonusPak.

The BonusPak is a separate package of both IBM and non-IBM applications that are used with the OS/2 Warp Version 3 base system and are intended to substitute some of the previous applets which have been taken out of the Productivity folder (such as the PM-Diary).

In the following chapters we will discuss these applications from the standpoint of a systems administrator, who will need to plan the installation of OS/2 Warp Version 3 with the BonusPak.

The following is a list of products that are included in the BonusPak:

- IBM Works
 - Word Processor
 - Spreadsheet
 - Chart
 - Database
 - Report Writer
 - Personal Information Manager
- FaxWorks for OS/2
- HyperACCESS Lite
- IBM Internet Connection for OS/2
 - One Button Install
 - One Button Registration with Advantis¹
 - Gopher
 - UltiMedia Mail/2 Lite
 - IBM NewsReader/2
 - FTP-PM

¹ Advantis is a company formed by IBM and Sears that provides network services.

- Telnet
- SLIP Connection to other service providers
- Person to Person
- CompuServe Information Manager
- Multimedia Viewer
- System Information Tool
- Video IN/2

13.1 BonusPak Install Utility

The BonusPak Install Utility is on the diskette labelled Installation Utility, or in the BPINST directory on your CD-ROM. It is used to install the following BonusPak products:

- FaxWorks for OS/2
- HyperACCESS Lite for OS/2
- IBM Internet Connection for OS/2 for OS/2
- Multimedia Viewer
- CompuServe Information Manager
- Person to Person
- System Information Tool
- Video IN/2
- IBM Works



Figure 77. The BonusPak Install Utility Product Selection Window

Before attempting to run the BonusPak Install Utility, make sure you have OS/2 REXX installed. Refer to the BonusPak README file for information on how to see if OS/2 REXX is installed and how to install it, if it is not. The BonusPak README file is on BonusPak Install Utility diskette and in the country directory (D:\US for the American README file for example) on the CD-ROM.

If you are installing from diskette, to run the BonusPak Install Utility, bring up an OS/2 command line and type:

```
A:\INSTALL
```

If you are installing from CD-ROM, change to your country directory on the CD-ROM and type:

```
INSTALL
```

The BonusPak Install Utility window will then appear so you can select which products you wish to install (See Figure 77).

13.1.1 Install Procedure

The BonusPak Install Utility should automatically set the source drive to the correct drive for your install media. However, if you want to check the source drive, it should be set to:

A:

if you are installing from diskette, or your CD-ROM drive if you are installing BonusPak from CD-ROM.

To install a product, select the product name with the mouse or keyboard and then select the **Install** button. Alternatively, use the mouse to double-click on the product you wish to install. The BonusPak Install Utility will only allow you to install one product at a time.

The System Information Tool, Video IN/2, and Multimedia Viewer install their files into predefined directories that cannot be altered. The other products have default install directories, but these can be changed during the install process. See Table 23 for details.

<i>Table 23. Default Install Directories for BonusPak Install Utility Products</i>			
Product	Installs into directory ¹	Option to change directory	Disk space required
FaxWorks for OS/2	X:\FAXWORKS	Yes	1.0 MB
HyperACCESS Lite for OS/2	X:\HALITE	Yes	0.6 MB
IBM Internet Connection for OS/2 for OS/2	X:\TCPIP	Yes	11.4 MB
Multimedia Viewer	C:\MMOS2	No	2.9 MB
CompuServe Information Manager	X:\CSERVE	Yes	2.4 MB
Person to Person	X:\P2P	Yes	4.5 MB
System Information Tool	C:\OS2\APPS	No	1.7 MB
Video IN/2	C:\MMOS2	No	0.9 MB
IBM Works	X:\IBMWORKS	Yes	12.5 MB
Note: 1 The drive X can be any drive you specify, drive C indicates it must be installed on the drive where OS/2 has been installed. (This may not be C:.)			

Follow the information in the windows to complete the installation. This will vary for each product, but will not be more than two or three more actions.

13.2 Installing without the BonusPak Install Utility

All of the BonusPak products can be installed without using the BonusPak Install Utility. To install the product you want, refer to Table 24 and follow the instructions below.

<i>Table 24. Installing BonusPak Install Utility Products Manually</i>		
Product	Product Directory 1	Install Command
FaxWorks for OS/2	\<ctry>\FAXWORKS	INSTALL
HyperACCESS Lite for OS/2	\<ctry>\HYPEROS2	HAINST 2
IBM Internet Connection for OS/2 for OS/2	\INTERNET	INSTALL
Multimedia Viewer	\MMVIEWER	3
CompuServe Information Manager	\CIMOS2	SETUP
Person to Person	\<ctry>\P2P	INSTALL
System Information Tool	\<ctry>\SYSINFO	SYSI
Video IN/2	\VIDEOIN	3
IBM Works	\<ctry>\IBMWORKS	INSTALL
<p>Note:</p> <p>1 <ctry> is the directory for your country (for example, \US for the United States).</p> <p>2 HAINST brings up a window that asks for a source drive. The files for HyperACCESS Lite for OS/2 install must be in the root of that drive. See "HyperACCESS Lite for OS/2 Redirected Installation" on page 277 for details.</p> <p>3 Multimedia Viewer and Video IN/2 use the Multimedia Install Utility to install. See 13.2.2, "Alternative Installation of Multimedia Viewer and Video IN/2" on page 278 for details.</p>		

13.2.1.1 Installing From Diskette

1. Insert the correct diskette in drive A: (The diskettes are labelled with the names of the products).
2. Go to a command prompt and type:
A:<Install_Command>

and press Enter.

3. Follow the installation instructions.

13.2.1.2 Installing From CD-ROM

1. At the command prompt, switch to your CD-ROM drive.

2. Type:

```
CD \<product directory>
```

3. Type the Install_Command for that product and press Enter.
4. Follow the installation instructions.

13.2.1.3 Redirected Installation of BonusPak Products

The BonusPak Install Utility will only work if you are installing the BonusPak products from diskettes or CD-ROM. To install the BonusPak products from another source, such as a LAN drive, you cannot use the BonusPak Install Utility.

The BonusPak products are not CID enabled so the installation is almost the same as the process described in 13.2, "Installing without the BonusPak Install Utility" on page 275. The following steps must be performed before you start the installation:

- The contents of the diskette or CD-ROM directory of the product you want to install must be copied to a LAN drive or directory and you must have at least read access to it.
- You must switch to that LAN drive before typing the Install command (as in Table 24 on page 275).

13.2.1.4 Installing the BonusPak on OS/2 Version 2.x

The BonusPak products can be installed on OS/2 Version 2.x as long as the XDF drivers have been installed first. For details of how to install the XDF drivers, refer to 2.4.7, "XDF Diskette Format" on page 23. If you are installing the BonusPak from CD-ROM, you will not need to put the XDF drivers on your system.

13.2.1.5 Special Installation Considerations

You should take the following points into consideration during the installation process.

Keep Selecting Install for Person to Person: Person to Person has a two-stage install process. First it copies the files to your hard disk. Then you must select install a second time for the icons to be put on the desktop and for Person to Person to be set up and configured on your machine.

If you do exit before selecting install the second time, to avoid starting the install from the beginning again:

1. Switch to an OS/2 command prompt
2. Change to the directory you chose for Person to Person to install to. See Table 23 on page 274 for the default directory.

3. Type

DLPINST

and press Enter.

System Information Tool Installation Complete: When System Information Tool is installed, the System Setup folder is opened behind the BonusPak Install Utility folder, but no messages are put on the screen to indicate that it has completed.

If you are running the installation from the command line, you will know when the installation has finished because the prompt reappears. If you have selected to install from the BonusPak Install Utility, watch for the folder appearing in the background.

Is MMPM/2 Installed ?: MMPM/2 must be installed before you can install either Multimedia Viewer or Video IN/2. This is because these products use the MMPM/2 installation utilities.

HyperACCESS Lite for OS/2 Redirected Installation: HyperACCESS Lite for OS/2 will only install if the files it needs are in the root of the drive selected.

If you are installing from a LAN, you will need to create an alias for the directory with the HyperACCESS Lite files in, so it will look like the files are in a root directory to the install program.

If this is not possible, you can avoid the install program and instead:

1. Copy all the files from your original HyperACCESS Lite for OS/2 diskette or CD-ROM directory to a directory of your choice on your hard drive.
2. Create a Program icon for the EXE file with the following settings:

Path and filename

```
C:\<path>\HALITE.EXE
```

Working directory

```
C:\<path>
```

Where <path> is the path to the directory where you copied the files and C: is the drive of your choice.

13.2.2 Alternative Installation of Multimedia Viewer and Video IN/2

The Multimedia Viewer and Video IN/2 do not have installation programs of their own in the BonusPak but can still be installed without using the BonusPak Install Utility. To install Multimedia Viewer and Video IN/2, you need to use MMPM/2. From the command line type:

```
MINSTALL /F:<drive>:\<path>\CONTROL.MMV
```

or

```
MINSTALL /F:<drive>:\<path>\CONTROL.VIN
```

To install Multimedia Viewer or Video IN/2 respectively. Then follow the instructions to complete the install.

13.2.2.1 Insert Diskette in the LAN Drive?

When installing from a LAN drive, the BonusPak Install Utility puts up a window asking you to put the diskette for the product you are installing in to the drive you selected. As this is a LAN hard drive, this message is obsolete and can be ignored. Click on **OK** and the product will install.

Chapter 14. IBM Works and Personal Information Manager

IBM Works and Personal Information Manager (PIM) provide a collection of office automation applications and productivity tools. They meet the needs of users. This collection of applications and tools will benefit in corporate environments, small business, home-based businesses and personal use. Both IBM Works and PIM take advantage of OS/2-specific features including 32-bit code, multi-threading, OS/2-specific controls such as notebook controls, sliders, spin buttons and value sets, as well as employing drag-and-drop interaction between applications. IBM Works is designed to be intuitive and increase your productivity

14.1 IBM Works Components

14.1.1.1 Word Processor

IBM Works includes a full-function word processor that includes advanced functions such as tables, merge printing, graphics objects, in addition to all the common features found in full-featured word processors such as fonts, print preview, styles, search and replace, headers and footers, and more.

14.1.1.2 Spreadsheet

IBM Works includes a full-function spreadsheet that includes a variety of functions to meet the needs of many applications. Combine the spreadsheet capability with the chart application and you can produce compound documents showing text, numbers, and charts on a single page.

14.1.1.3 Chart

IBM Works includes a versatile charting utility. It can produce a variety of chart types and lets you enhance these charts with text and drawing tools. Charts can be printed on their own or pasted/linked into other IBM Works documents.

14.1.1.4 Database

IBM Works includes a powerful database application that is easy to use, can organize both text and graphical information and will import and export files in a variety of formats. The database application is designed to work with the IBM Works report writer to produce customized, columnar reports.

14.1.1.5 Report Writer

Use the IBM Works report writer to produce columnar reports from any IBM Works database or dBase compatible database.

The database in IBM Works combines the data entry mode and form design into one object. The first time you create a form, you are launched into design mode so you can design the screen layout and determine the fields of your database. Once you design the form and save it, the next time you click on the database, you will be launched into data entry mode. You can switch between design and data entry mode from the application window.

IBM Works is a document or data-centric application where application functionality is called by the data, rather than application centric, where you launch an application and then load your data.

14.2 Personal Information Manager Components

14.2.1.1 Appointment Book

Multiple views of your appointments are available either in a daily two page display, regular week format with days taking equal space, work week which has the emphasis on Monday through Friday, or a two-week format. The view may be accessed via the second mouse button being clicked on the outer part of the appointment book and selecting the Open option.

Appointments may be created by dragging an item from either the contacts list or Phone book onto the day item. An appointment may also be created by clicking the second mouse button on the day required.

14.2.1.2 Yearly Planner

Appointments are displayed in a grid format. Entries are color coded by type (alarm, to do, appointment). Holidays are highlighted. Display is available in a work day or 24-hour format. Reschedule appointments by dragging them from the appointment book to a specific day on the planner. Create new appointments by dragging a contact name onto the planner.

14.2.1.3 Calendar

This is a full-year calendar display. Holidays are highlighted. Holiday database may be customized. Reschedule appointments by dragging them from the appointment book to the calendar. Scroll from year to year.

14.2.1.4 To Do List

To Do List launcher displays a full month. Double click on a day to display your to do list for that day. Scroll from month to month, or year to year. Holidays are highlighted on the to do list launcher. Printing can be done in monthly, five-week or daily tri-fold formats.

Create new To Do List items by dragging a contact onto the to do list. Assign a date deadline or priority. Description area is 65 characters. Attach notes of 512 characters. Full text search capability lets you search on type, priorities, description, or notes. Link a desktop folder with a to do list item by dragging the folder onto the to do entry.

14.2.1.5 Phone Address Book

Detail or icon view of contacts. Icons may be customized. Up to eight phone numbers with labels (phone, fax, home phone). The last page of the notebook can hold free text. Create a new desktop folder for a contact. Create new appointments by dragging a contact name onto the appointment book or a planner.

Create new To Do List items by dragging a contact onto the To Do List or full year calendar. Search on all fields or selected fields. Sort by name or company. Place outgoing calls. A phone log displays all your logged calls both incoming and outgoing. Filter calls by name, date range and call status.

14.2.1.6 Contact List

Contact lists are subsets of the phone book. Changes made in the contact list are reflected in the phone book and vice versa. Deleting a contact from the contact list only deletes it from this subset, but will not delete it from the phone book. Create new appointments by dragging contacts to the appointment book or the planner. Create new to do list items by dragging a contact onto the to-do list or the full year calendar.

14.2.1.7 Notepad

Add, append and insert pages into the notepad. The notepad can hold text or graphic information. Text or graphics are pasted from the clipboard into the notepad pages. Information cannot be dragged and dropped into the notebook. Pages can be rearranged by dragging and dropping entries in the table of contents. There is full text search capability. You can print pages from the notepad.

14.2.1.8 Preferences

Customize features in the PIM components. Customize holiday types and associated colors. Customize modem settings and appointment headings. Use the auto launch Event Monitor to launch any program you wish.

14.2.1.9 Event Monitor

The event monitor triggers alarms and launches initiated by the appointment book or general alarm settings. The event manager does not have any user modifiable setting.

14.2.2 HPFS - Restrictions

OS/2 has two file systems File Allocation Table (FAT) file system and the High Performance File System (HPFS). IBM Works for OS/2 will run with either file system, but there are certain restrictions within the database in IBM Works for OS/2. File names within the Datafiler are limited to the conventional eight characters, with an optional period and three-character extension.

This restriction also affects the other modules, whenever Data Filer files are used as follows:

- Word Processor, Mail merge with Data Filer files
- Report Writer, Imbedded references to Data Filer files

With the above restrictions in mind, long file names are supported across all applications allowing for meaningful descriptions of files. You can have long file names with or without file extensions.

14.2.3 Printer Setup

The Portrait/Landscape orientation selection in IBM Works for OS/2 has to be reset in both the Page Setup menu and the Printer Setup menu.

You may find it easier to set up two printer objects, one for Landscape and one for Portrait.

1. Select **Printer Setup** from the file menu.
2. Select the printer name from the Printer List.
3. Click on **Setup**.
4. A dialog with options for the selected printer opens.
5. Select the options you want and select **OK**.

6. To store the settings, click on **Save**.

Printer Setup is controlled by OS/2

If your page setup parameters and your printer setup parameters are different, the page setup parameters will take precedence.

Note

When you change printer setup, the default settings suggested for page setup will change for any new documents that you create.

14.2.4 Printing

In all modules, printing is performed in the background. A movable floating print palette is visible while printing is taking place. This shows all IBM Works for OS/2 print jobs in the OS/2 Warp Version 3 printer queue. Files can be deleted from the queue by highlighting any you wish to delete and pressing cancel.

While a file is being printed, you are able to switch to a different module or perform limited work within the file being printed, including saving it, but you cannot make changes to the file being printed. For each module, the following tasks can be carried out during printing:

The steps for printing are the same in all IBM Works programs, although the dialog box is a little different between the Data Filer and Spreadsheet.

1. Select **Print** from the file menu.
2. In the dialog box, select the appropriate options.
 - Printer - Allows any defined printer selected.
 - Copies - Shows the number of copies to be printed
 - Reverse Order - Prints the document in reverse order from the last page to the first page.
 - Draft - Prints in draft quality if this mode is supported by your printer.
3. Select the pages to be printed. The default is all pages, but you may choose to print a range of pages by selecting the **Form** radio button and entering the beginning and ending page numbers.
4. To begin printing, click on **Print**. To end the operation, click on **Cancel**.

14.2.5 Drag and Drop

You can use drag-and-drop action to achieve many results with IBM Works. It is possible to use this technique to copy and paste link information between applications and/or use it to print or fax documents.

You may use it to connect contacts with a document creating a merge document or a fax distribution list. There is support for drag and drop between applications and to the Desktop. You can drag and drop documents on the printer object to print a document, or on the fax object to fax a document.

It is possible to drag the entire document or just the highlighted text or objects on a document and drag them on the shredder to delete them. Dragging and dropping allows you to copy information from one document to another.

You can drag and drop one or more contacts from the Phone/Address Book or Contact List onto documents created with any of the IBM Works components (word processor, spreadsheet, chart, database or report writer). You can also drag and drop a contact list on a document to attach all the contacts in the list to the document. Currently this only works when you drop contacts onto the Workplace Shell document object and not when you drop it onto the open document window.

These documents that have contacts attached (dropped on them) will display their icons with cards attached. (This is a little business symbol in the right bottom corner). It is also possible to use drag and drop to create a mail merged document.

To do this, drag and drop one or more contacts from your Phone/Address book or contact list to a word processor document (object or open window) containing merge fields. When needed, drag and drop a contact list onto this document to attach everyone in that list to it. The contacts will then be merged with the document creating a merged set of documents.

Now that document can be dragged and dropped on a printer. It may also be printed from the open document to produce a mail merge batch with one document tailored for each contact. If you drag this merged document to the **Fax** icon it will use the fax numbers associated with each contact to produce a fax distribution as part of the mail merge.

You may use drag and drop to create a fax distribution list. When you drag and drop contacts that have fax numbers in their phone books onto any IBM

Works document, the result is an attached fax distribution list for the document. Drag this document object onto the fax icon to fax the document to all those contacts.

The program will look for the word "fax" or "facsimile" (lower or uppercase) in the labels of the contacts phone numbers and will identify the fax number among the other phone numbers. If your document was a merge document (using contacts from IBM Works and Personal Information Manager), a tailored fax will be sent to each contact in the merged list.

For any of the works components (contact list, report writer, database, chart, spreadsheet or document) you can open the settings notebook to review, modify or delete contacts that are currently attached to them. The document can be set up to open on receipt of new contacts or print automatically when contacts are dropped on it.

Use drag and drop between IBM Works components for ease of use. You can drag and drop selected text and graphics from charts and spreadsheets to the word processor, another chart or another spreadsheet. By default, drag and drop copies information.

Using the Ctrl-Shift keys in conjunction with the drag and drop, you can achieve a paste-link between a spreadsheet and a document. If a document contains an embedded chart, you can double click on the object to start the chart application.

14.2.6 Background Tasks

In addition to printing, certain other activities are carried out in the background, as follows:

- Word Processor

When a document is opened, the first page appears on the screen before the rest of the document is re-formatted. Also, when a change is made to one page which would affect many subsequent pages, re-formatting of those pages is carried out in the background.

- Spreadsheet

Calculation is carried out in the background. Scrolling is permitted, but the spreadsheet cannot be edited.

- Data Filer

In "record select mode", pre-fetching of next, previous, first and last records meeting the current selection criteria is performed in the background.

When a record is selected, IBM Works for OS/2 selects the next five, previous lines first and last records in the background, in case these are required. This means that if one of those selections is then made, IBM Works for OS/2 is able to move the current record pointer immediately and it does not have to load these records first.

Scrolling between records is permitted, but you cannot do anything that would change the database or its representation, such as record select or index redefinition.

- Report Writer

File Save and Save as are performed in the background. This is particularly useful when creating very long .TSV and .CSV files.

Copy to Clipboard is useful for copying very long blocks, or when Select all is in effect.

- Background formatting

In View mode, or when editing the Record selection or the index, the first page is selected and displayed while subsequent pages are being formatted in the background. This makes scrolling through a long report faster, as IBM Works for OS/2 does not have to pause at page breaks to format the next page.

14.2.7 Installation

IBM Works has two main executables and six types of Workplace Shell objects.

The Workplace Shell objects are derived from OS/2's Data File object type. This means that they inherit some behavior from the Data File object type directly in the code and attempt to mimic the rest of the behavior of the Data File object type where possible. In addition, if another application (such as Lotus ccMail) comes along and replaces the Data File object to add EMail capabilities to Data Files, then these objects inherit that behavior as well. Inheriting an additional behavior in this way will always work unless it was one of the behaviors these objects specifically had to override. This holds true for applications of which we may not be aware, and which in turn may not be aware of us.

Workplace Shell objects may need to perform some activities when they become awake. Because of this it is required that their code modules be

available as the Workplace is starting up. The only secure place to put these objects is in the \OS2\DLL directory for the currently active OS/2 partition. These files take up to 1.1MB of space and will be locked, that is, not deletable (if you do want to delete them, use the ATTRIB -r command to delete them), while the partition of OS/2 for which they were installed is running the Workplace Shell. This is why the product requires 12.5MB to install, but puts 11.5MB in the IBMWORKS directory.

The Document, Spreadsheet, Chart, Database and Report objects all print or open a view to their contents by calling IBMWORKS.EXE from the path. The Contact List object calls FPWPIM.EXE from the path to open a view to its contents. This means that for these objects to open or print, the path to these two executables must be currently active.

For these executables to work, they must be able to locate their respective dynamic link libraries from the LIBPATH environment variable. To make this LIBPATH active in OS/2 Warp Version 3 you must reboot, in order for the system to read the CONFIG.SYS file. The following statements will be automatically added to your CONFIG.SYS or you can add them manually:

```
LIBPATH=. ;D:\.....;D:\IBMWORKS;  
PATH=. ;D:\.....;D:\IBMWORKS;  
SET HELP=d:\.....;D:\IBMWORKS;  
SET IBMWORKS_INI=D:\IBMWORKS
```

This also means that only one version of IBMWORKS.EXE and FPWPIM.EXE may be installed at a time, since only the first version of a filename along any given path will be the one considered found. For either PIM help or IBM Works help to function, the help path must also be set and active. It is possible to verify if the PATH and HELP path are active by typing SET at any OS/2 command line. If there is too much information for one screen, just type SET |MORE to display one screen at a time.

Paths should be verified in CONFIG.SYS and by typing SET if the IBM Works Workplace Shell objects do not open or print or if help is unavailable.

IBMWORKS.EXE and FPWPIM.EXE also need access to the file IBMWORKS.INI to find out where all of their other components are located.

The path to IBMWORKS.INI is in the IBMWORKS_INI environment variable. If this environment variable is not correct, various unusual behavior may occur. It can be verified in the same way that the PATH or HELP path is verified.

The IBMWORKS.INI file contains readable ASCII text that may be viewed with an editor, such as E.EXE, EPM.EXE or TEDIT.EXE.

There are various sections in the file denoted by square brackets. The PIM section (PIM) contains the path to the PIM's INI file and its file name.

That is:

```
PIMInitPath=D:\IBMWORKS  
PIMInitFile=FPWPIM.INI
```

If these are not correct, the PIM will not be able to find its data and preference settings and the merge information, resulting in the dragging and dropping of people's business cards, which will not be available in either the object merge panels or in the attached data dialog of the word processor.

This also means that merge faxing and mail merging from the PIM will not work correctly.

There is also an object called <FPW_CATALYST> on the desktop. Although this object is hidden it can be made visible. When this hidden object isn't present you get problems with IBM Works for OS/2. In case you are missing this object you can recreate it by running IBMWDESK.CMD.

Note

You should leave this object hidden to prevent it from being erased accidentally.

During installation of IBM Works for OS/2, OS/2's multitasking capabilities mean that other tasks within the OS/2 Warp Version 3 desktop can be carried out.

14.3 Word Processor

The Word Processor allows you to quickly and easily create and edit documents and letters. You can produce high-quality documents that combine text, tables, and graphics.

The word processor allows you to draw graphics objects directly within your documents and then to size and move them as desired.

You can choose a drawing tool from either the draw palette or Tools submenu of the Objects menu. The available drawing tools are:

- Line
- Rectangle
- Rounded Rectangle
- Ellipse
- Polygon
- Text

You can change the appearance of a graphic object with a variety of attributes including:

- Outline Color
- Fill Color
- Pattern
- Line Type

To change attributes, select the attribute from the Objects menu, then choose the desired characteristics from the submenu.

14.3.1 Importing Text

1. To insert a text file in your document, select Import Text from the file menu.
2. Type the file name of the import file, or select the file name from the list in the dialog.
3. Click on **Import**.

If you are importing an unformatted text file, when you click on Import, a dialog box appears in which you identify the character set to be used.

The choices are:

- DOS characters (ASCII)
- Windows characters (ASCII)

The text from the file is inserted at the current cursor position.

<i>Table 25. Word Processor Formats</i>	
File Extension	Description
.WP5	WordPerfect Version 5.0, 5.1 and 5.2 ¹
.WPD	WordPerfect Version 6.0
.DOC	Microsoft Word for Windows 1.0, 2.0
.RTF	Microsoft Rich Text Format
.SAM	AmiPro
.TXT	Text in ASCII or ANSI
.LWP	IBM Works for OS/2
Note: ¹ Windows Version only.	

14.4 Spreadsheet

The Spreadsheet allows you to enter and calculate rows and columns of numeric data. You can enter text, numbers, and formulas in a tabular format. The Spreadsheet has built-in functions that provide shortcuts to complicated formulas. Once you have entered formulas, you can change the data and the spreadsheet is automatically recalculated.

A IBM Works spreadsheet can be a maximum of 768 columns by 1024 rows.

You may link data from a spreadsheet to a chart or to a table in the Word Processor. When the spreadsheet changes, the chart and document is automatically updated.

14.4.1 Text Functions

This group of functions deals exclusively with characters string operations. A character string can be letters, numbers, spaces, and punctuation marks as long as they are enclosed within quotation marks or occupy a cell.

14.4.1.1 Find

Returns the numeric position of first occurrence of specified text within a string. Text and string refer to character strings enclosed within quotation marks or to a cell containing a character string. Startchar is an option that indicates at what character to begin searching. It must be a value greater than zero, but less than the length of string. If not entered, it defaults to starting at character 1.

Syntax:

FIND(text,string,startchar)

```
FIND("J", "Dr.Jekyll and Mr. Hyde") =5
```

```
FIND("k",B5) =7
```

```
if cell B5 = Dr.Jekyll and Mr. Hyde
```

14.4.1.2 Left

Returns the leftmost number of characters from a string.

Syntax:

LEFT(text,nchar)

```
LEFT(B5,10) = Dr.Jekyll
```

```
if cell B5 = Dr.Jekyll and Mr. Hyde
```

14.4.1.3 Len

Returns the total number of characters in the text string.

Syntax:

LEN(text)

```
LEN("Lettice and Lovage") = 18
```

```
LEN(B5) = 22
```

```
if cell B5 = Dr.Jekyll and Mr. Hyde
```

14.4.1.4 Mid

Returns specified number of characters from text beginning with the characters at startnum.

Syntax:

MID(text,startnum,nchars)

MID("Lettice and Lovage",1,7) = Lettice

MID(C12,13,6) = Lovage
if cell C12 = Lettice and Lovage

14.4.1.5 Rept

Returns a character string consisting of a specified number of repetitions of text.

Syntax:

REPT(text,ntimes)

REPT("Lettice",3) = Lettice Lettice Lettice

REPT(C12,3) = LetticeLetticeLettice
if cell C12 = Lettice

14.4.1.6 Search

Returns the numeric character position where the text being found first occurs. Startnum is an option that indicates at what character to begin search. It must be a value greater than zero, but less than the length of the string. If not entered, it defaults to starting at character 1. It allows * and ? wildcards.

Syntax:

SEARCH(findtext,intext,startnum)

SEARCH("Ice","Lettice" = 5

SEARCH("L",C12,3) =13 or
SEARCH("L",C12) =1
if cell C12 = Lettice and Lovage

14.4.2 Trim

Removes leading and trailing spaces from text string.

Syntax:

TRIM(text)

TRIM(" Lettice and Lovage") = Lettice and Lovage

14.4.2.1 Upper

Converts character string to uppercase.

Syntax:

UPPER(text)

UPPER("Lettice and Lovage") = LETTICE AND LOVAGE

14.4.3 Date Functions

This series of functions is useful in calculations based on the passage of time. The IBM Works calendar begins January 1, 1900 and ends December 31, 2078. In order to calculate date arithmetic, the dates must be represented as serial numbers. Jan.1, 1900 is serial day number 1; Jan 1901 is serial day number 367 since 1900 was a leap year. Once you calculate the serial number, change the display using the Cell Date command.

14.4.3.1 Date

Returns the serial number corresponding to the year, month, and day.

Syntax:

DATE(yr,mon,day)

DATE(63,9,14) = 23268

DATE(92,1,1) = 33604

14.4.3.2 Datevalue

This converts date text to a serial number. The date format you determined will control the serial number returned. For instance, the data format being used could be MM/DD/YY or DD/MM/YY. The system will return the serial number for whichever format is current.

Syntax:

DATEVALUE(datetext)

DATEVALUE("9/14/63") = 23268

14.4.3.3 Day

Returns calendar day of the month corresponding to a specific serial number.

Syntax:

DAY(number)

DAY(23268) = 14

14.4.3.4 Month

Returns month corresponding to a specific serial number.

Syntax:

MONTH(number)

MONTH(23268) = 9

14.4.3.5 Weekday

Returns integer number for the day of week corresponding to the serial number. Sunday is day 1.

Syntax:

WEEKDAY(number)

WEEKDAY(23268) = 7 or Saturday

14.4.3.6 Year

Returns year corresponding to a specific serial number. The year will be returned as an integer between 1900 and 2078 since the IBM Works calendar begins January 1, 1900 and ends December 31, 2078.

Syntax:

YEAR(number)

YEAR(23268) = 1963

14.4.4 Financial Functions

This category of functions allows you to build formulas used for examining investments. In these functions, rate is the interest rate per period. If the period is monthly, the monthly interest rate should be used. If an annual interest rate is 12% (expressed as .12), it is monthly rate 12% divided by 12 or 1% (expressed as .01).

14.4.4.1 Annuity (FV)

Returns the future value of annuity investment for a certain number of periods at a particular interest rate. Optionally, you can enter the present value of the payments and the type. If omitted, present value is assumed to be 0. The type indicates whether payments are due at the end of the period or at the beginning of the period. The default is 0 for the end of period; enter 1 for the beginning of period.

Syntax:

`FV(rate,nper,pmt,pv,type)`

`FV(.01,12,-1000)=12,682.50`

14.4.4.2 Depreciation (DDB)

Returns the double declining balance depreciation for a particular period based on the purchase price of the item; its salvage value, useful life and current age. Double declining depreciation accelerates depreciation during the early period with less depreciation taken during later periods.

Syntax:

`DDB(cost,salvage,life,period)`

`DDB(2400,300,10,1)=1.32`

14.4.4.3 Internal Rate of Return (IRR)

Returns the internal rate of return for a series of cash values represented in a cell range. Values must be expressed as a range of cells and must include at least one positive and one negative value. You can supply a realistic guess for the rate, or IRR will guess in the range .1% to 10%. Internal rate of return calculates the interest rate that yields a net present value of a project equal to zero. It is possible mathematically that more than one interest rate will yield a zero net present value. IRR will only return on such value.

Syntax:

`IRR(values,guess)`

`IRR(A1:B1)=.10 if A1=100 , B1=-110`

14.4.4.4 Netval (NPV)

Using a constant interest rate, this returns the present value of future cash flows represented by the list of values. A series of up to 14 values may be used. Each value can be expressed as a number, cell reference, or cell range.

Syntax:

NPV(rate,value1,value2,.....)

NPV(.88,2000,2000,...) = 991

14.4.4.5 Payment (PMT)

Returns payment amount based on constant payments for a specified number of periods at a constant interest rate. Options are future value and type. Optionally, you can enter the present value of the payments and type. If omitted, future value is assumed to be 0. The type indicates whether payments are due at the end of a period or at the beginning of a period. The default is 0 for the end of period; enter 1 for the beginning of period. This determines the payment amount that would need to be paid in each of N periods (nper) to pay back an initial investment (loan) or amount PV.

Optionally, the payments can be calculated using a specified cash balance future value (FV) at the end of "nper" periods. The default for FV is zero.

Syntax:

PMT(rate,nper,pv,fv,type)

PMT(.01,12,0,12682.50)=-1000

14.4.5 Logical Functions

This category of functions deals with testing logical arguments. Logical functions can be used to evaluate the contents of cells and take action based on contents.

14.4.5.1 And

Returns the logical value true if all argument values in the list are true (that is, non-zero). Otherwise, returns false.

Syntax:

AND(logical1,logical2,....)

AND(0,1) = FALSE
AND(1,1) = TRUE

14.4.5.2 False

Returns the logical value false, which is 0. This is generally used as a function within another formula.

Syntax:

FALSE()
FALSE() = FALSE

14.4.5.3 If

If logical test is true, returns first value following the logical condition. Otherwise returns second value following logical condition.

Syntax:

IF(test,trueval,falseval)
IF(B5=C12,"YES","NO") = NO
If cell B5 = Dr.Jekyll and Mr. Hyde
and
If cell C12 = Lettice and Lovage

14.4.5.4 Not

Reverses the value of the logical.

Syntax:

NOT(logical)
NOT(B5=C12) = TRUE
If cell B5 = Dr.Jekyll and Mr. Hyde
and
If cell C12 = Lettice and Lovage

14.4.5.5 Or

Returns the logical value true if any value in the list is true. Otherwise, it returns false.

Syntax:

OR(logical1,logical2,...)

OR(0,0) = TRUE
OR(0,1) = FALSE

14.4.5.6 True

Returns the logical value true, which is 1. This is generally used as an argument within another formula.

Syntax:

TRUE()

TRUE() = TRUE

14.4.6 Statistical Functions

This group of functions allows you to perform frequently used arithmetic operations.

14.4.6.1 Average

Returns the average of the arguments.

Syntax:

AVERAGE(num1,num2,.....)

AVERAGE(3,5) = 4

AVERAGE(D3:D5) = 120

if D3 = 150,D4 = 110, and D5 = 100

14.4.6.2 Count

Counts the number of entries in the list of arguments.

Syntax:

COUNT(val1,val2,.....)

COUNT(3,5) = 2

COUNT(D3:D5) = 3

14.4.6.3 Max

Returns the largest number in the list of arguments.

Syntax:

MAX(num1,num2,.....)

MAX(3,5) = 5

MAX(D3:D5) = 150

If D3 = 150, D4 =110, and D5 = 100

14.4.6.4 Min

Returns the smallest number in the list of arguments.

Syntax:

MIN(num1,num2,.....)

MIN(3,5) = 3

MIN(D3:D5) = 100

If D3 = 150, D4 =110, and D5 = 100

14.4.6.5 Sqrt

Returns the square root for a positive number. If the number is negative, it will return #NUM!

Syntax:

SQRT(number)

SQRT(10) = 3.1623

SQRT(d3) = 12.24745

If D3 = 150

14.4.6.6 Stdev

Estimates the standard deviation of values in the argument list.

Syntax:

STDEV(num1,num2,.....)

STDEV(3,5) = 1.414

STDEV(D3:D5) = 26.457

If D3 = 150, D4=110, and D5 = 100

14.4.6.7 String

Converts a numeric value to a character string and rounds to the number of decimal places specified.

Syntax:

STRING(val,numdec)

STRING(123.46.1) = 123.5

14.4.6.8 Sum

Adds all the numbers in the list of arguments and returns the sum.

Syntax:

SUM(num1,num2,...)

SUM(3,5) = 8

SUM(D3:D5) = 360

if D3 = 150, D4 = 110, and D5 = 100

14.4.6.9 Var

Calculates the variance of a sample population based on values in the argument list.

Syntax:

VAR(num1,num2,...)

VAR(3,5) = 2

VAR(D3:D5) = 700

if D3 = 150, D4 = 110, and D5 = 100

14.4.6.10 Varp

Calculates the variance for an entire population based on the list of arguments.

Syntax:

VARP(num1,num2,...)

VARP(3,5) = 1

VAR(D3:D5) = 466.6667

if D3 = 150, D4 = 110, and D5 = 100

14.4.7 Table Lookup Functions

The functions in this category can be used to determine a variety of things ranging from what is the desired weight for one's height to what must be paid to the tax man once the annual income is calculated.

14.4.7.1 Hlookup

Searches the value cells in a table range by column until it finds a value equal to the specified value, but not greater than the next value in the table. When found within the table, it looks a specified number of rows down within the same column and returns the value found.

Syntax:

HLOOKUP(value,table,rownum)

AVERAGE(3,5) = 4

HLOOKUP(180,B1:H2,2) = 10%

if D3 = 150,D4 = 110, and D5 = 100

Using the following scenario:

Number of widgets bought = 180.

	A	B	C	D	E	F	G	H
1	QUANTITY	1	25	50	100	250	500	800
2	DISCOUNT	0%	5%	7.5%	10%	12%	15%	18%

To find the discount rate for a purchase of 180 widgets, look up actual number purchased in the Quantity - Discount Table and go down a row to find the discount rate.

14.4.7.2 Vlookup

Searches the value cells in a table range by row until it finds a value equal to the specified value, but not greater than the next value in the table. When found, it looks a specified number of columns to the right within within the same row and returns the value found.

Syntax:

VLOOKUP(value,table,column)

AVERAGE(3 , 5) = 4

VLOOKUP(156 , A2 : C9 , 3) = 53

Using the following scenario:

Actual height = 156

<i>Table 27. Height - Weight Table</i>			
	A	B	C
1	HEIGHT (in cm)	WEIGHT-MALE (in kg)	WEIGHT-FEMALE (in kg)
2	150	53	48
3	155	58	53
4	160	63	57
5	165	67	63
6	170	73	66
7	175	80	70
8	180	86	74
9	185	95	78

To find the target weight of a woman who is 156 centimeters tall, look up actual height in the Height - Weight table and go over 2 columns from the height column to find the target weight.

14.4.8 Time Functions

This series of functions is useful in calculations based on the passage of time. In order to calculate time arithmetic, the time must be represented as a serial decimal number. 12:00 AM is a serial time number 0; 12:00 PM is serial number .5. Once you calculate the serial number, change the display using the Cell Time command.

14.4.8.1 Hour

Returns the hour for a specified serial decimal number.

Syntax:

HOUR(number)

HOUR(.5) = 12

14.4.8.2 Minute

Returns the minute for a specified serial number. Minute will be an integer ranging from 0 to 59.

Syntax:

.MINUTE(number)

MINUTE(.05) = 12

14.4.8.3 Now

Returns serial number for the current system date and time.

Syntax:

NOW()

NOW() = 33571.468

if the current date is 11/29/91, at 11:14:55AM

14.4.8.4 Second

Returns the second for a specified serial number. Second will be an integer ranging from 0 to 59

Syntax:

SECOND(number)

SECOND(33571.468) = 55

14.4.8.5 Time

Returns the serial number for the specified time.

Syntax:

TIME(hr,min,sec)

TIME(18,45,15) = .7814236

14.4.8.6 Timevalue

Converts time text to a serial number.

Syntax:

TIMEVALUE(timetext)

TIMEVALUE("11:14:55AM") = 11:14:55

14.4.9 Trigonometric Functions

These functions are useful in a variation of applications ranging from physics and the sciences, to navigation arithmetic and statistics.

14.4.9.1 Acos

Syntax:

ACOS(number)

ACOS(.5) = 1.0741

14.4.9.2 Asin

Arcsine of a number in the range of -1 to 1.

Syntax:

ASIN(number)

ASIN(.587785) = 1.0471

14.4.9.3 Atan

Arctangent of a number. The result is returned in radians from -pi/2 or -3.147/2 to pi/2 or 3.147/2.

Syntax:

ATAN(number)

$\text{ATAN}(.5) = .4636$

14.4.9.4 Cos

Returns the cosine of a number, which is presented as an angle in radians.

Syntax:

$\text{COS}(\text{number})$

$\text{COS}(1.0471) = 5$

14.4.9.5 Degrees

Converts from radians to degrees.

Syntax:

$\text{DEGREES}(\text{number})$

$\text{DEGREES}(1) = 57.296$

14.4.9.6 Radians

Converts from degrees to radians.

Syntax:

$\text{RADIANS}(\text{number})$

$\text{RADIANS}(57.296) = 1$

14.4.9.7 Sin

Sine of number which must be presented as an angle in radians.

Syntax:

$\text{SIN}(\text{number})$

$\text{SIN}(3.14/5) = .587785$

14.4.9.8 Tan

Tangent of a number where the number is an angle.

Syntax:

$\text{TAN}(\text{number})$

$\text{TAN}(.587785) = .666$

14.4.10 Supported Import and Export File Formats for the Spreadsheet

File Extension	Description
.WKS/WK1	Lotus 1-2-3
.XLS	Excel Version 2.1, 3(import only)
.CSV	Comma Separated Variables
.TSV	Tab Separated Variables
.LSS	IBM Works for OS/2

If you want to import a spreadsheet from Excel that has a higher level than which can you can import in IBM Works, you must first save the Excel spreadsheet to the (lower) level and then import this spreadsheet.

14.5 Chart

The chart module of IBM Works allows you to graphically present numeric data in a variety of chart types. You can use data from IBM Works spreadsheet, or paste data from a report or Word Processor table. It is also possible to enter directly. Chart accepts Paste Link data from the spreadsheet. If you use this method, the chart will automatically update as you change data in the spreadsheet. The finished chart can easily be incorporated into a word processor document or a spreadsheet.

There are eight different chart types you can use in IBM Works:

- Bar
- Stacked Bar
- Line
- Area
- Bar/Line
- Stacked Bar/Line
- Scatter
- Pie

All charts, except for the pie type, accept multiple data series. There can be a maximum of eight sets of data within each cluster and a maximum of 60 clusters. Pie charts only display one data series.

To import data from another program select **File** from the chart menu and then select **Open**. Then you select the type of file.

14.5.1 Supported Import Graphics File Formats for IBM Works Chart

<i>Table 29. Graphic Formats</i>	
File Extension	Description
.BMP	Windows/OS/2Bitmap
.CGM	Computer Graphics Metafile
.CLP	Windows Clipboard Bitmap
.DRW	Micrografx Designer
.DXF	Autocad DXF
.EPS	Encapsulated PostScript
.GIF	Compuserve
.GRF	Micrografx Charisma
.HGL	HPGL
.IMG	GEM Bit map
.MAC	MacPaint
.MET	OS/2 Metafile
.MSP	MS Paint
.PCT	Macintosh PICT
.PCX	PaintBrush
.PIC	IBM Storyboard
.PIC	Micrografx Draw
.PIF	IBM Picture Interchange Format
.TIF	TIFF
.WMF	Windows Metafile

14.6 Database

Data Filer is where you create databases for organizing and storing information. Data Filer has two modes of operation:

form design

data entry/query

In form design, you define what data is to be stored and how it will appear. In data entry/query, you enter the actual data and query existing data using the form you have designed.

After creating a data form and entering data, you can modify the form to add, delete, or change fields. It is best to make modifications to the form before entering a large amount of data. Modifying the form once data has been entered may result in a lengthy reorganization of the database.

Form design involves creating the layout of the form as well as specifying the field names, types, and widths. Optionally, you can describe field defaults and verification conditions.

You can add information to your database by importing a previously created database file.

1. To insert records from another database, select **Import Data** from the File menu.
2. Select the import file type from the file Type list.
3. Select the appropriate drive and directory for the file, if other than the default.
4. Type the file name of the import file in the import Filename edit box, or select the file name from the list.
5. Click on **Import**. The records from the import file are appended to the current data file.

<i>Table 30 (Page 1 of 2). Database Formats</i>	
File Extension	Description
.DBF	dBase IV
.CSV	Comma Separated Variables
.TSV	Tab Separated Variables

<i>Table 30 (Page 2 of 2). Database Formats</i>	
File Extension	Description
.LDB	IBM Works for OS/2

If the file selected is not an IBM Works database, a dialog will display allowing you to choose how the fields are to be matched.

The options are:

- Matching by field names
- Matching by field order

When you match by field names, only data with exactly the same field names as those in the current form are imported. Matching by field order imports the contents of field one of the import file into field one of the import form, and so on until the fields in the form have been filled or there are no fields remaining in the import file.

14.7 Report Writer

After you have designed the report, you may want to view the report that fills the document window. You can move between viewing the report and changing the format.

To view more of the report, click on the **View Report** button on the ribbon or select **View Report** from the File menu. The format Report Panel is removed and the report fills the whole document window. Operations while viewing the report in this mode are limited to scrolling through the records, selecting and copying records to the clipboard, and returning to report edit.

To return to the Report Format Panel from View, click on the **Edit Report** button on the ribbon or select **Edit Report** from the File menu.

14.8 Templates

Templates give you a starting point for new documents. To create a new document from a template you peel off a copy from the template and place it on your desktop or in a folder. This gives you a new document. Then double click on the document to launch it. Also provided is a program icon from which to launch new files or open existing files.

IBM Works comes with the following templates:

- Balance Sheet
- Bank Record
- Budget
- Forecast
- Credit Application
- Invoice
- Estimate
- Fax
- Memo

14.9 Personal Information Manager Preferences

The Personal Information Manager Preferences Notebook has four main features:

1. Holidays

There are eight holiday types of which 6 have a default name and two of which you can change the name if you wish. It is also possible to rename the other (default) holiday types.

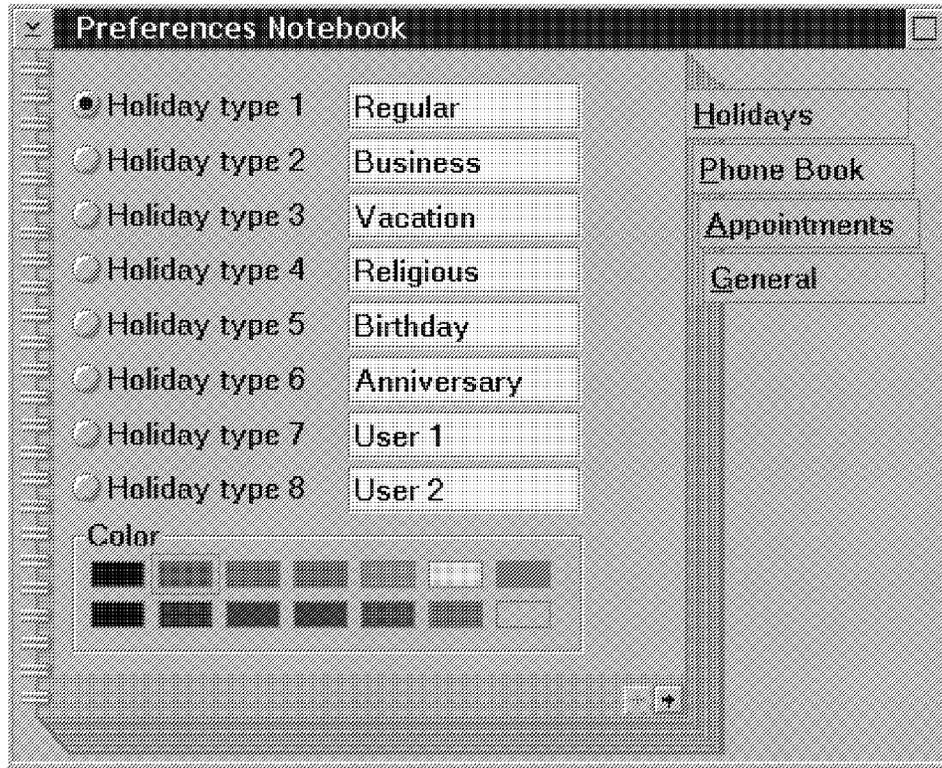


Figure 78. Screen shot of the Holidays Screen of the PIM

2. Phone Book Preferences

Page one of the Phone Book preferences lets you change the Modem, Strings, Local Area Code, and Enable Modem settings.

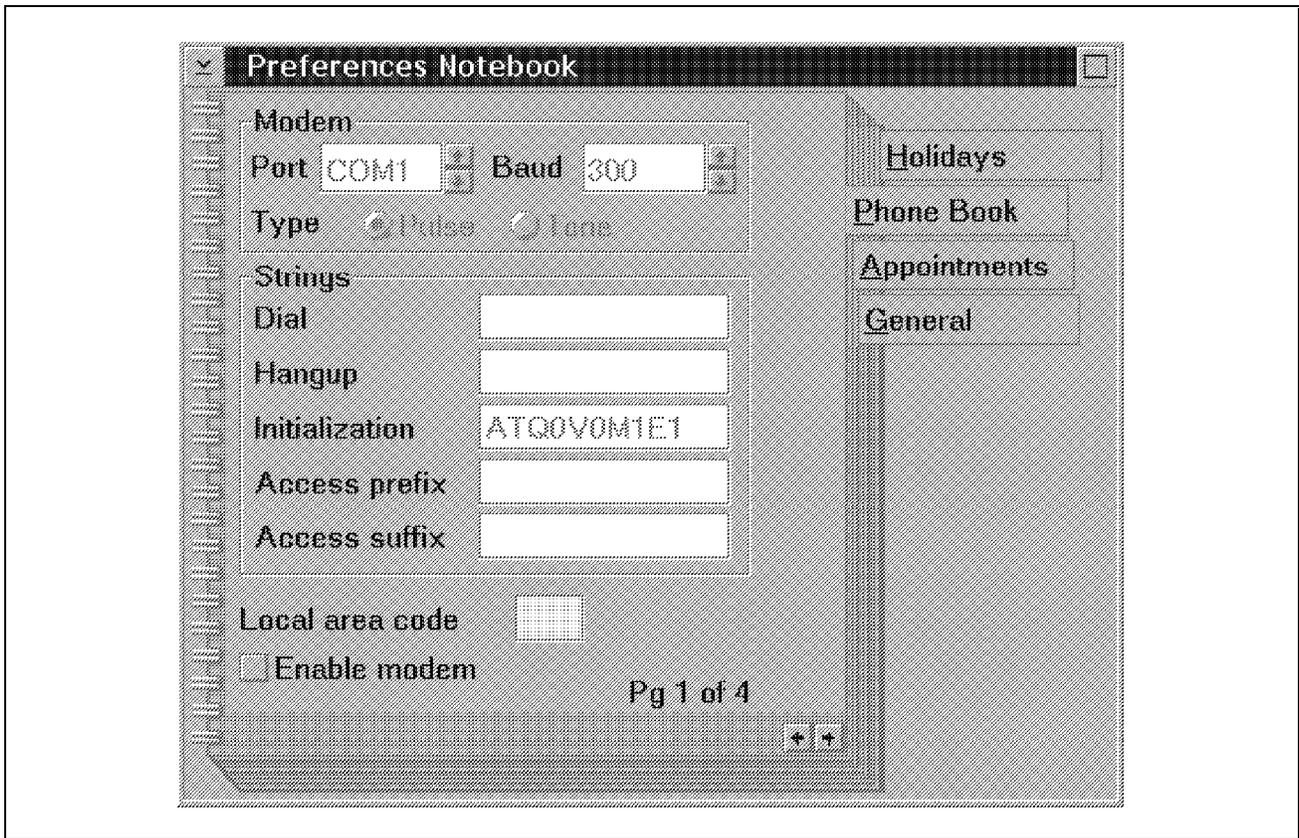


Figure 79. Phone Book Preferences Screen 1

PORT

- COM1 (default)
- COM2
- COM3
- COM4

The port setting tells your Personal Information Manager which communications (or COM) port your modem is attached to. If your modem is attached to a COM port other than COM1, change the default setting.

Make sure your Personal Information Manager is addressing the proper COM port. Also, make sure no other serial devices are using the same COM port. Otherwise, you will not be able to use the dial feature.

COM1 and COM3 use the same address and COM2 and COM4 are using the same address. Therefore, if you have a serial device configured as COM1, you may not be able to use COM3. Similarly, if you are using a

serial device device configured as COM2, you may not be able to use COM4.

Baud

You can select between 300 and 38400 baud, although this may be left at 300, as dialing does not require a high data rate.

Type

The Type setting tells your modem to use the pulse (rotary) or Touch-Tone (DTMF) dialing method when originating call. The default setting specifies pulse dialing. If you dialing area supports Touch-Tone dialing, you will need to change this setting.

Strings

Strings lets you specify Dial, Hangup, and Initialization strings required by your modem. The Dial and Hangup fields are left blank, so you can enter the information appropriate for your modem.

An Initialization string is provided. The Initialization string field uses the industry-standard Hayes command set to tell your modem to send response in numeric format (V0), keep the modem speaker on until the remote modem' s carrier is detected (M1), and use medium speaker volume (L2).

These settings should be satisfactory for the majority of modems. If you require an access code you can enter this code in the Access code field.

Local Area Code

Enter your three-digit area code in this field. Personal Information Manager will recognize a local call when the area code in the Phone Book matches with the value in this field.

Enable Modem

If you will be using a modem with Personal Information Manager click on this check box to enable this feature. Enabling this feature also enables the Options that are used when calling through the Phone Book or Contact List.

Page two of the Phone Book preferences lets you personalize the Labels for five User Fields and six User Check Boxes.

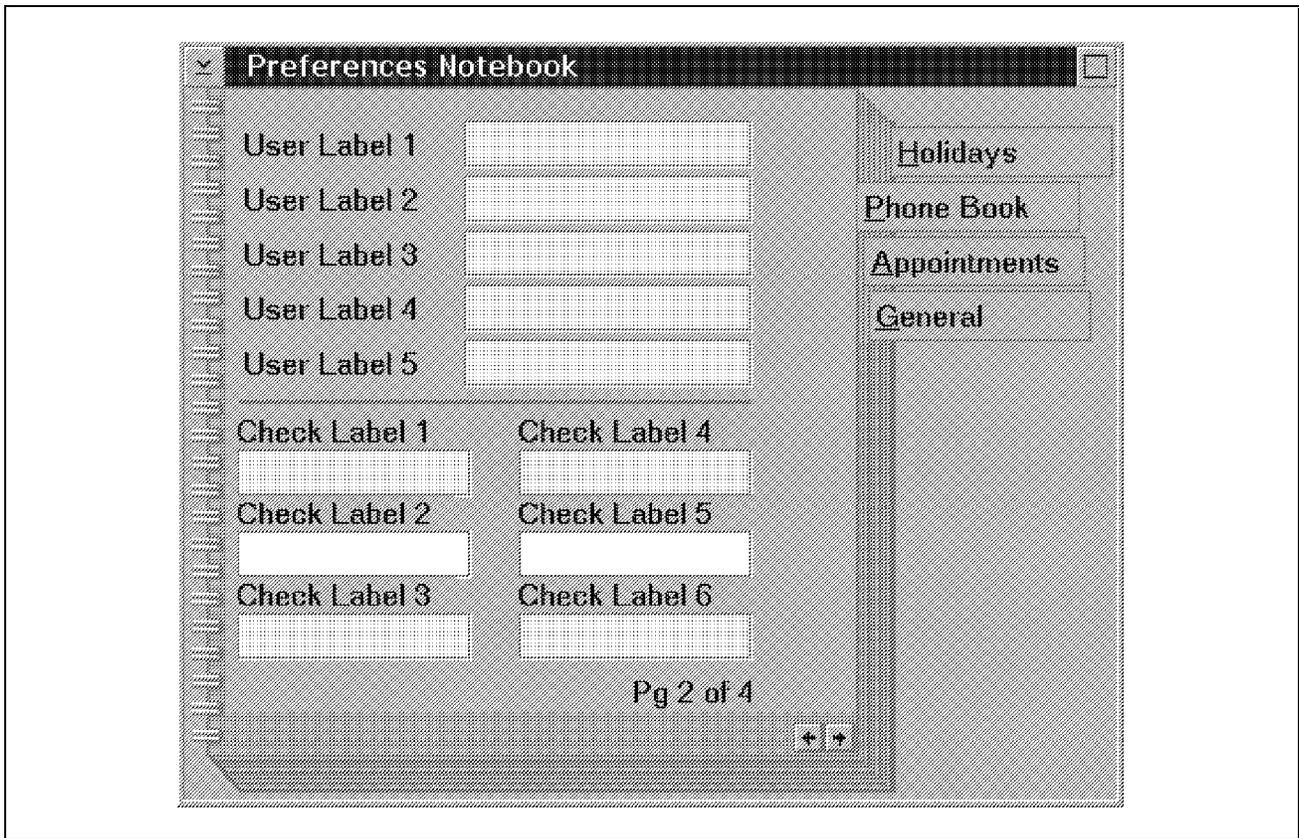


Figure 80. Phone Book Preferences Screen 2

You can use the User Fields to specify various information. The User Labels you enter as preferences appear on the Custom page of the Phone Book notebook.

For example, assume you want to gather information about the gender, income, education, marital status, and hobbies of the people in your Phone Book. You can type each of these items as separate User Labels. When you display the Phone Book, these User Labels appear at the top part of the page. You can then type the appropriate information next to each label, or if you have previously typed information, select the appropriate data for that user.

For further identification, you can specify six Check Labels. These Check Labels also appear as check boxes on the Phone Book, and allow you to check any information that is applicable.

For example, you want to know whether the people in your Phone Book own their own car, their own house, have an annual income over \$25,000, and have any children. You can type this information as Check Labels. When you display the Phone Book, these Check Labels appear.

The third page of the Preferences notebook gives you the possibility of adding more Check Labels.

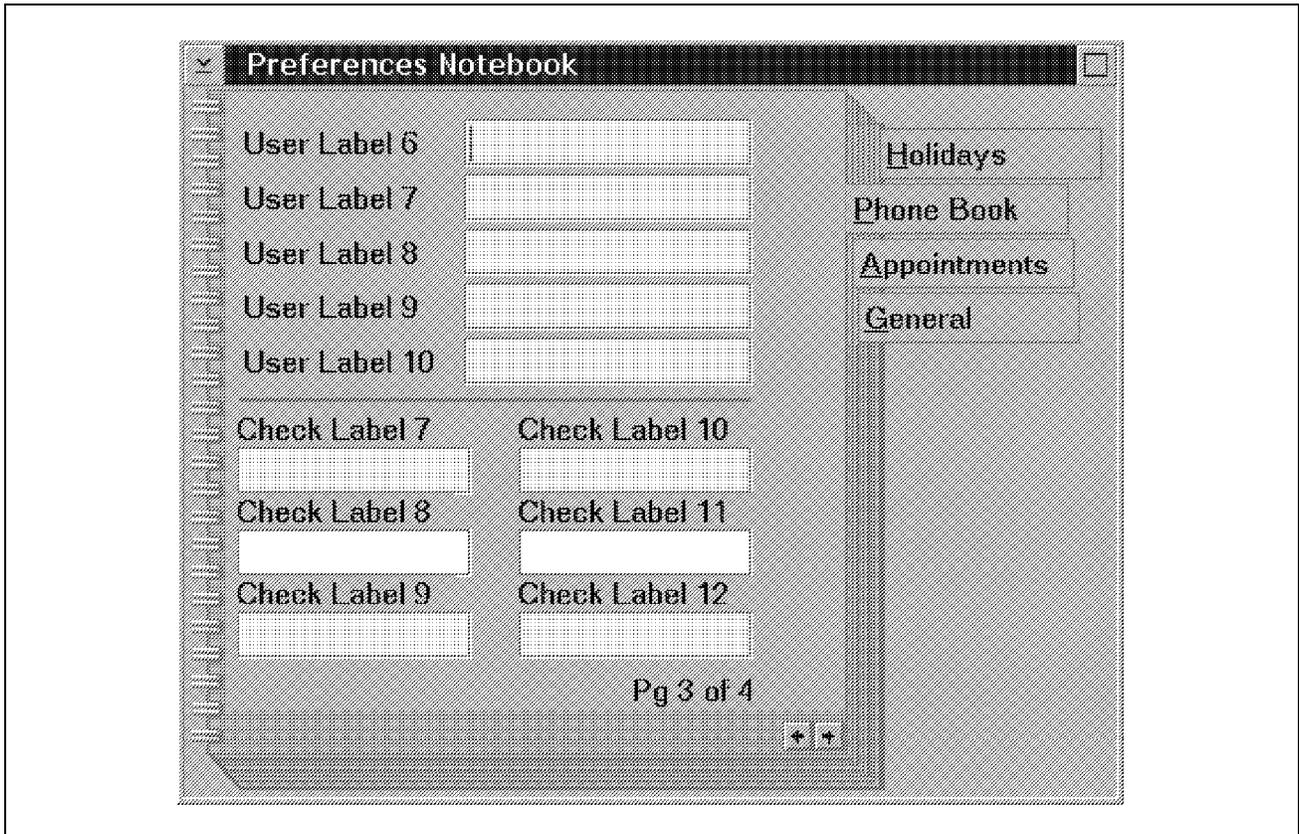


Figure 81. Phone Book Preferences Screen 3

The fourth page allows you to add two more columns to be displayed in the Phone Book window. Each of these windows will display another type of information kept by the Phone Book in the Personal Information Notebook, but not previously displayed in the Phone Book window.

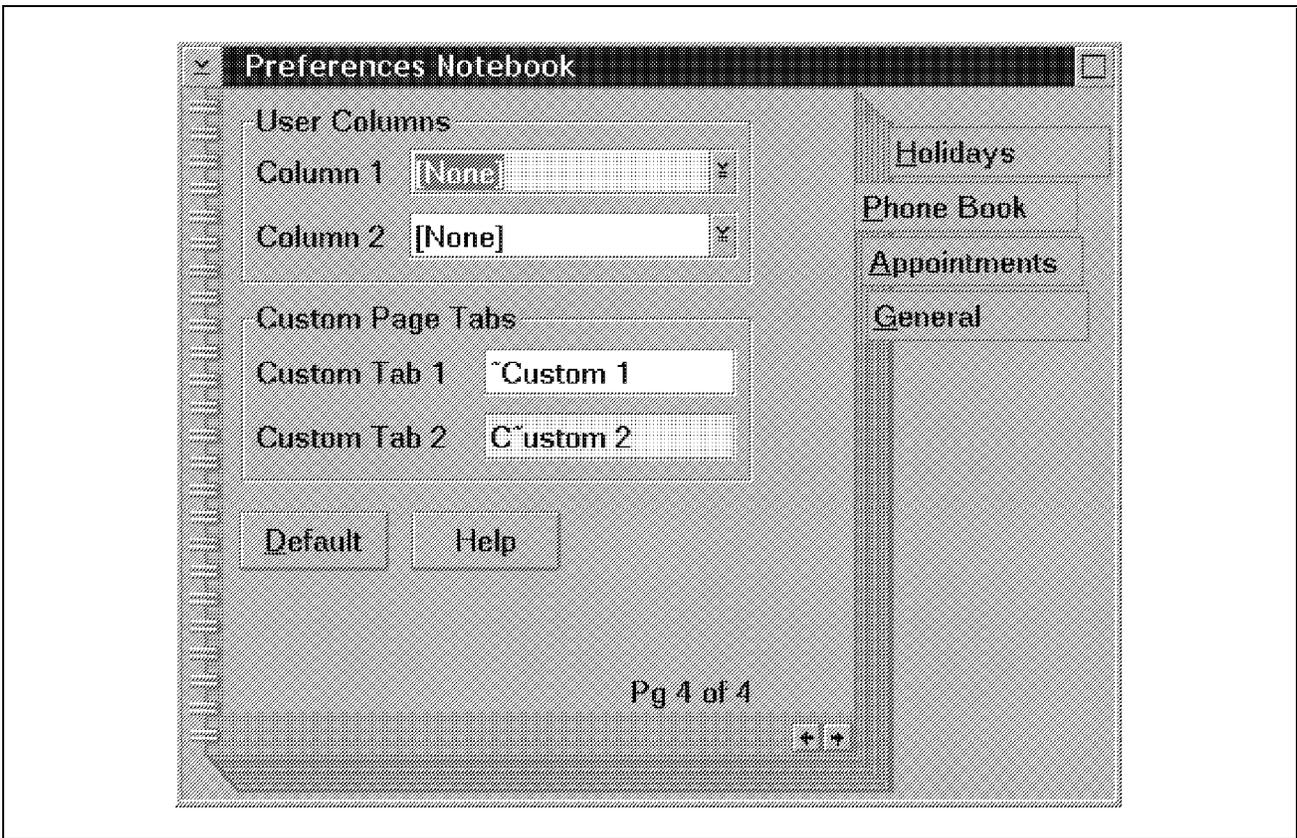


Figure 82. Phone Book Preferences Screen 4

The type of information that a new column can contain are as follows:

- Title
- Primary Address line 1
- Primary Address line 2
- Primary Address City
- Primary Address State
- Primary Address Zip Code
- Primary Address Country
- Secondary Address Line 1
- Secondary Address Line 2
- Secondary Address City
- Secondary Address State
- Secondary Address Zip Code

Secondary Address Country

Notes

Custom fields 1-10

The Custom Page Tab area allows you to define the two tabs of the custom pages in the Personal Information Notebook of the Phone Book. You may also define the hot-keys for these custom tabs by entering a tilde "~" symbol before the letter you wish to define. The hot key letter will be underlined on the tab of the Personal Information Notebook.

3. Appointment

Here you can select schedule settings for your workday and appointments. The Work Day settings specify the time when your workday begins and ends. The default settings specify that the work day starts at 9:00AM and ends at 5:00PM.

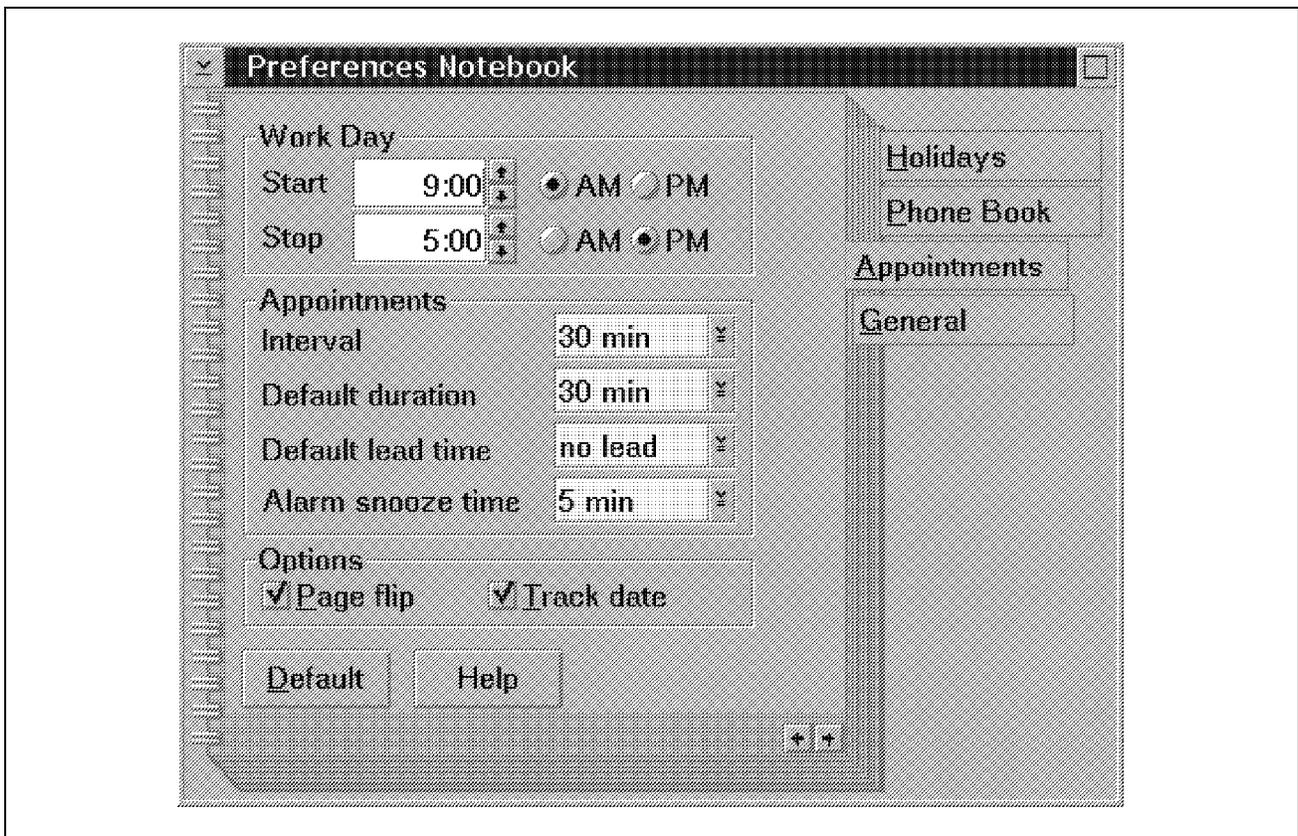


Figure 83. Appointments Screen

If you want to specify different start and stop times, use the up and down arrows next to these settings.

The Appointment settings specify the Interval and Default Duration of your appointments. The selections for this setting are 5 minutes, 10 minutes, 15 minutes, 30 minutes, 1 hour, 1.5 hour and 2 hours. The default is 30 minutes.

The interval you select as your preferences is displayed when you "chord" (press left and right mouse buttons at the same time) within the appointment book.

Default duration refers to the length of time specified for your appointments. The default setting schedules your appointments for 30 minutes.

Default lead time refers to the amount of advanced time you desired to alert you to an appointment. The default setting is NO Lead Time, which means you will be alerted to an appointment at the time the appointment is scheduled.

There are two options: Page flip and Track date. Page flip determines whether you see an animated page flipping when you flip the pages in your Appointment Book. The default is On.

Track date determines whether the Appointment Book tracks the currently selected day in the calendar. The default is On.

4. General

Verify Menu Delete Choice determines whether a precautionary message appears when you try to delete any information from the Personal Information Manager.

Note

The Verify Menu Delete Choice options does not affect the shredder. That is, dragging items to the shredder deletes them without displaying precautionary message, regardless of whether the Verify Menu Delete Choice is enabled.

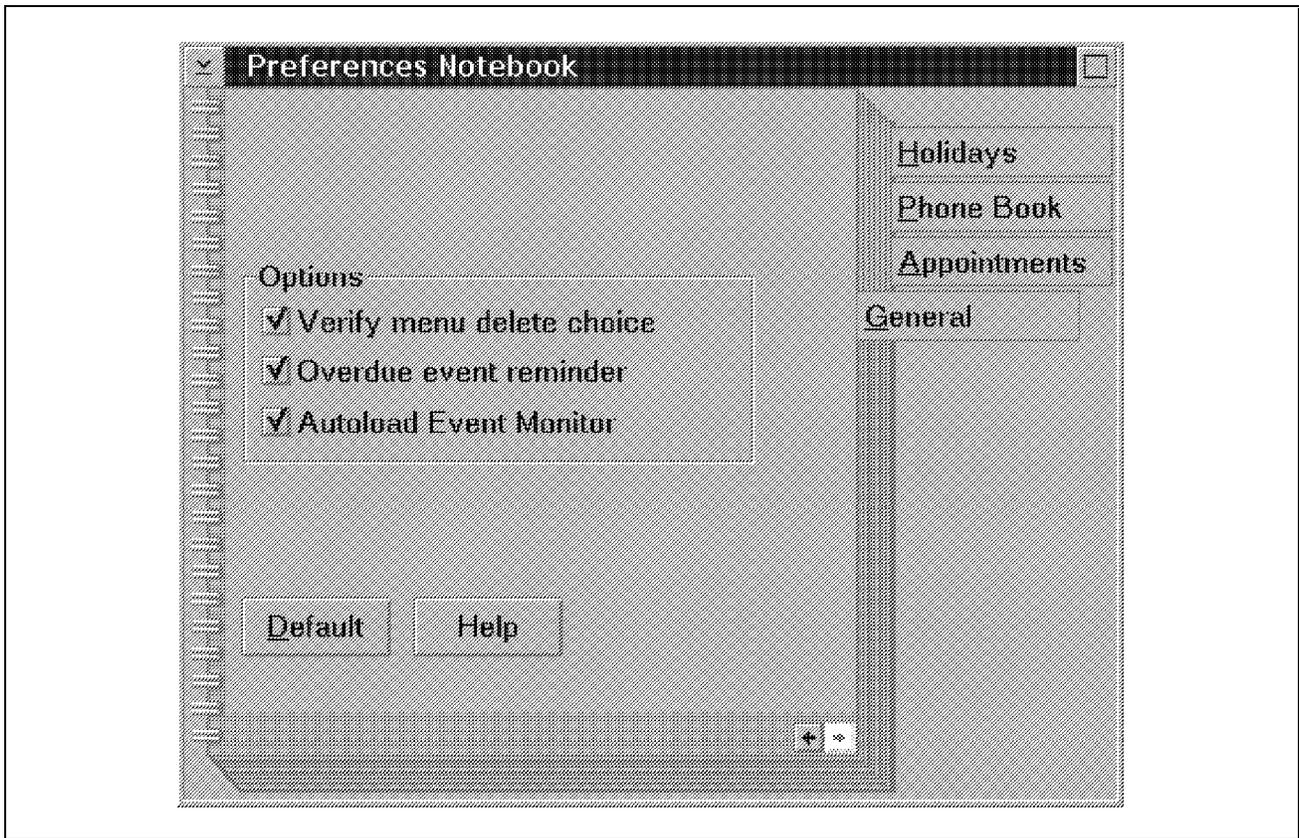


Figure 84. General Information Screen

14.9.1.1 Error Messages and the Corrective Action

<i>Table 31 (Page 1 of 6). Error table</i>		
Message	Meaning	Corrective Action
"A duplicate name has been entered. Do you want to proceed?"	You entered a duplicate name in the Phone Book.	Specify whether you want to include the duplicate name in your Phone Book.
"A holiday must have a name."	You tried to specify a user-defined holiday without providing a name for the holiday.	Enter a name for the holiday you want to define.
"All information in your database file will be erased. Are you sure?"	This precautionary message lets you verify whether you want to delete your database.	Indicate whether you want to delete your database.

Table 31 (Page 2 of 6). Error table

Message	Meaning	Corrective Action
"An error occurred opening the Alarm database."	Your Personal Information Manager encountered an error when opening the alarm database.	Exit from the Personal Information Manager Make sure the PIMInitFile = FPWPIM.INI and the PIMInitPath are correct. Also check the \Data subdirectory for the ALARM.DBF file. same the
"An error occurred opening the To-Do List database".	Your Personal Information Manager encountered an error when opening the To-Do List database.	Exit from the Personal Information Manager Make sure the PIMInitFile = FPWPIM.INI and the PIMInitPath are correct. Also check the \Data subdirectory for the TODO.DBF TODO.DBT TODO.MDX Then try to access the To-Do List again.
"A Phone Book entry must have at least a last name or a company name".	You created a Phone Book entry without specifying a last name or a company name.	A Phone Book entry must have at least a last name or a company name.
"A Phone list entry must have a primary phone number".	Your failed to specify a phone number on the Phone Book page of the Personal Information Notebook.	Be sure to include a telephone number on the Phone Book page of the Personal Information Notebook.
"Are you sure you want to delete the selected items?"	This precautionary message lets you verify whether you want to delete the selected items.	Indicate whether you want to delete the selected items.
"A To-Do list entry must have a title".	You want to create a To-Do list, but have not specified a title.	A To-Do List entry must have a title.

Table 31 (Page 3 of 6). Error table

Message	Meaning	Corrective Action
"Could not find PIM help".	Your IBM Works cannot find the PIMs help file.	Make sure the Path specified in the CONFIG.SYS (SET HELP) is correct. Also check if the IBMWORKS.HLP and FPWPIM.HLP are present.
"Do you want to save changes before exiting?."	You made certain changes and want to exit without having saved your changes.	Indicate Whether you want to save your changes.
"Out of disk space. Unable to complete re-indexing and packing of databases. Additional disk space must be cleared."	You tried to exit IBM Works but do not have enough space on your computer's hard disk to save the changes made to your database.	Make enough space available on the hard disk by deleting or removing unnecessary files. The next time IBM Works will save the changes.

Table 31 (Page 4 of 6). Error table

Message	Meaning	Corrective Action
<p>"The database was NOT successfully restored."</p>	<p>You failed to restore the database successfully.</p>	<p>IBM Works cannot find any backup files from which to restore the database. Make sure the path of IBM Works working directory, as specified in the settings notebook, is the same as where you installed IBM Works. Also check your \DATA subdirectory for the backup files. Backup files are identified by having an underscore in the first character of the file extension.</p> <p>That is:</p> <p style="padding-left: 40px;">PHONE._BF PHONE._BT PHONE._DX</p> <p>Similarly, the Appointment Book has the following backup files:</p> <p style="padding-left: 40px;">APPT._BF APPT._BT APPT._DX</p> <p>After locating the backup files, try the restore procedure again.</p>
<p>"The database was NOT successfully backed up."</p>	<p>You tried to back up the database, but were unsuccessful.</p>	<p>Check to make sure your computer has enough hard disk space available to back up the database. Then try the procedure again.</p>

Table 31 (Page 5 of 6). Error table

Message	Meaning	Corrective Action
"The file specified could not be found."	You specified the path of an application you want to launch from your Planner, but the specified application cannot be found.	Make sure the path you specified is where the application you want to launch resides.
"The maximum numbers of Phone numbers (8) for this entry has been reached. You must delete a number before adding any others."	You tried to enter more than 8 telephone numbers for an entry in your Phone Book. Eight telephone numbers are the maximum that can be specified for a Phone Book entry.	To add a new phone number for this entry, you must first delete another one.
"There is an existing appointment at this time. Do you wish to overwrite it?"	You scheduled more than one appointment for the same time.	Keep the previous appointment or overwrite it with the new appointment.
"This action may cause conflicts. Do you wish to proceed?"	You performed an action that may conflict with a previously scheduled appointment.	Indicate whether you want to proceed.
"When Specifying a date range, the first date must be less than or equal to the second".	You specified a date range for searching through the Phone Book, but the first date specified occurs after the second date.	When specifying a date range, the first date must precede (be less than) or be the same as the second date.
"You cannot schedule an appointment without entering a title for it."	You tried schedule an appointment without entering a title for it.	Enter a title for the appointment you want to schedule.
"You may only track one incoming or outgoing call at a time."	You tried to track more than one incoming or outgoing call.	You can only track one in or outgoing call at a time.
"You must select a list box item before calling/answering."	You tried to call or answer a call before selecting a list box item from the Contact List.	You must select a list box item before calling or answering.

Table 31 (Page 6 of 6). Error table

Message	Meaning	Corrective Action
"You must select a phone book entry before calling/answering."	You tried to call or answer a call before selecting a Phone Book entry.	You must select a Phone Book entry before calling or answering.
"You must select a container item before deleting it."	You selected a DELETE command without first selecting one or more container items.	You must select a container item before deleting it.

Chapter 15. IBM Internet Connection for OS/2

With the Internet Connection, IBM has brought to the computer user, access to the largest and fastest growing network of computers and users in the world. All of the major TCP/IP protocols that the user is likely to need for connecting to the Internet via a standard telephone link are here, as well as the most popular applications to help you "surf the net".

Features include automated Internet registration and connection at the click of a mouse button on a single icon. Become a part of the Internet world; browse newsgroups, send and receive electronic mail, download free software, subject research and document retrieval, and much more.

Backed by the power of OS/2 you can simultaneously read newsgroups whilst transferring files using the file transfer protocol (FTP). What's more, you don't get corrupted or lost data, which has been a common problem in the past on other operating system platforms.

Following on from IBM's full-function TCP/IP set of products, the IBM Internet Connection for OS/2 is simple to install and use, and registration with Internet providers has been fully automated.

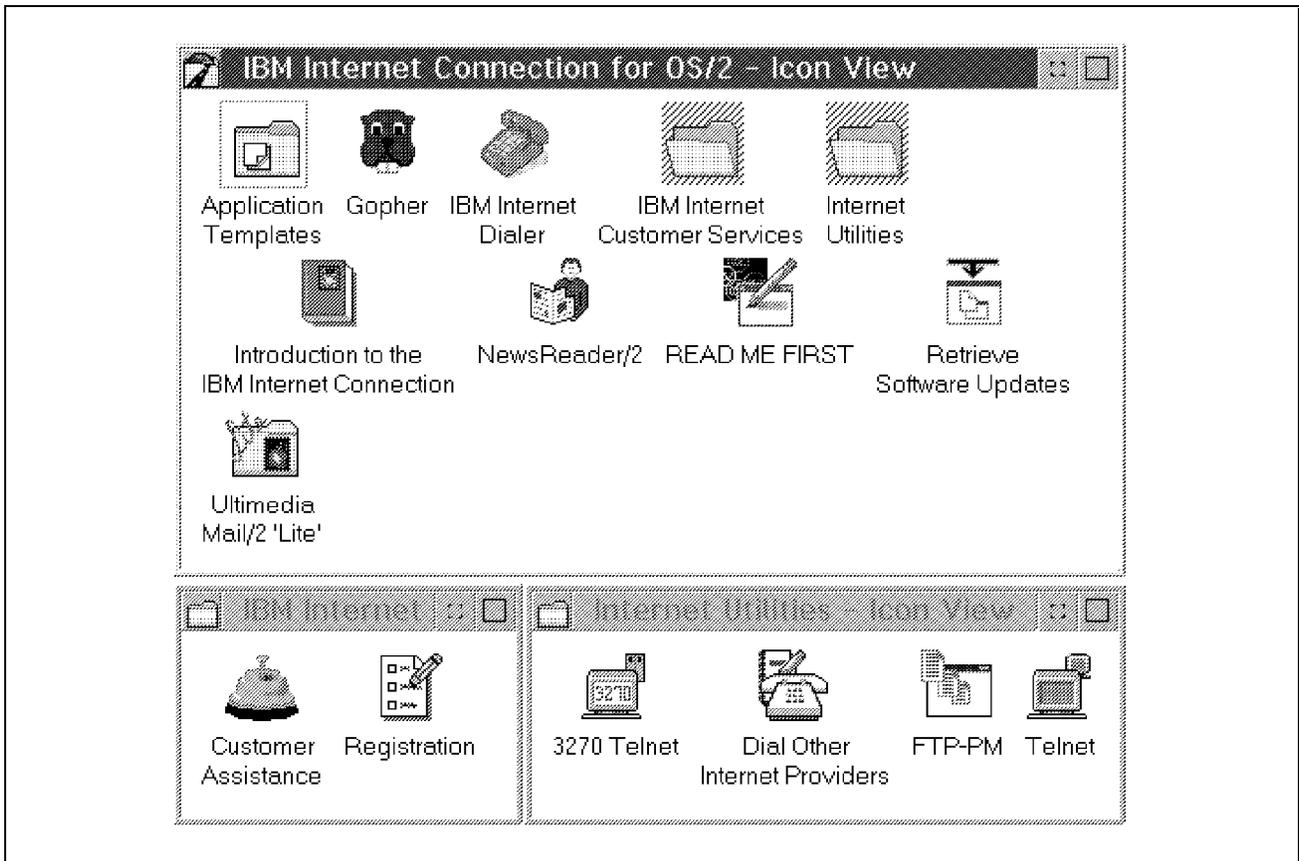


Figure 85. IBM Internet Connection for OS/2 Folder

Users may already be familiar with IBM's TCP/IP V2.0. The following table lists some of the differences between IBM Internet Connection for OS/2 and TCP/IP for OS/2 V2.0.

Table 32 (Page 1 of 2). Feature Comparison Between IBM Internet Connection for OS/2 and IBM TCP/IP for OS/2 V2.0

Feature	IBM Internet Connection for OS/2	IBM TCP/IP for OS/2 2.0
SLIP access	Y	Y
PPP access	X	N
LAN	N	Y
Extended Networking	N	Y
NetBIOS	N	Y
Automated Internet Dialer	Y	N

Table 32 (Page 2 of 2). Feature Comparison Between IBM Internet Connection for OS/2 and IBM TCP/IP for OS/2 V2.0

Feature	IBM Internet Connection for OS/2	IBM TCP/IP for OS/2 2.0
DOS/Windows support	Y	Y
Gopher client	Y	X
Newsreader/2	Y	Y
UltiMail/2	Y	Y
Web Explorer	X	X
X-Windows Server	N	Y
X-Windows Client	N	Y
Programmers Toolkit	N	Y
Domain Name Server	N	Y
NFS	N	Y
OSF/Motif	N	Y

Note:

This will be available in a later release.

Available as a separate add-on kit.

Freely available via FTP from the Internet.

A *lite* version - some elements not included.

The ability to run IBM Internet Connection for OS/2 and IBM TCP/IP V2.0 on the same computer is not supported. However, we have reason to believe that this configuration will work so long as the latest CSDs are installed for the TCP/IP product.

The IBM Internet Connection for OS/2 does support proxy ARP, which can allow a LAN-based host to route IP datagrams via its SLIP interface onto the Internet. However, this is not a recommended way for LAN-based users to access the Internet and will not be discussed here.

This document is intended to provide technical information on the installation, configuration, and usage of the various parts of IBM Internet Connection for OS/2. For an excellent exposition on aspects of navigating the Internet, see *Ed Krol's The Whole Internet - User's Guide and Catalog*.

15.1 The Internet

The Internet is a single logical network of computers incorporating many thousands of individual subnetworks called internets, spelled with a small 'i' to distinguish it from the main Internet.

It is the largest network of computers in the world and is increasing in size at a remarkable rate as individuals and businesses recognize the advantages of being a part of such a network. As of January 1994 there were an estimated 2.2 million hosts on the Internet representing a year-to-year growth of 69%.

The Internet started off as a U.S. Defense Department network called ARPANET, which subsequently split into two separate networks, one called MILNET for military use, and the other retained the ARPANET name for further research. The National Science Foundation internet, which was part of the ARPANET, soon realized it needed to help out in streamlining the network, and created a central backbone connecting six supercomputer centers. The software being used was all freely available from the University of California's Berkeley Software Distribution. This group distributed its operating system called BSD UNIX, which incorporates the TCP/IP set of protocols and TCP/IP application programs to facilitate networking.

From that beginning stems the TCP/IP open standard for network communication used as an integral mechanism behind the Internet, and supported by most major hardware and software developers.

The IBM Internet Connection for OS/2 code that comes as part of the BonusPak thus uses the TCP/IP standard for its networking capabilities.

15.1.1 Internet Addressing

Addressing within the Internet can be complex and confusing. The following is intended to serve as a basic introduction to the subject of internet addressing. Readers who wish to study the subject in more detail are referred to the book *Internetworking with TCP/IP Volume 1* by Douglas E. Comer.

Two basic types of address are used, the dotted decimal notation form, and the system of domain names. Dotted decimal notation consists of four 8-bit integers separated by a decimal point. The first 1,2, or 3 bytes represents the network address; the remaining bytes represent the host address on the network.

Thus a typical IP address could be written as 124.85.3.15.

The system of domain names is much easier to use (though complex to implement), and has a hierarchical format. Every network on the Internet has a unique domain name, for example, a domain name may be *sales.comptech.com* in the hierarchical scheme. This reflects a three-level domain. The top domain *com* is a standard format to encompass commercial companies, its subdomain *comptech* could be a company network, and *sales* could be a separate logical network for the salesmen of the Comptech company.

Individual computers in the Internet also use the domain name system, and *ps2pete.comptech.com* may be the IBM PS/2 belonging to Pete on the Comptech internet.

Individual users also fall into the domain name system, where the user is separated from the network domain name with an '@'. Pete may thus be addressed via E-mail as *pete@sales.comptech.com*.

An address is unique to its location on the Internet, and is therefore not associated with a single user or a single computer, since either of these can change its position on the Internet.

Typically, as a user of the Internet, you will want to use the domain name system of addressing for its ease of use most of the time.

15.2 Installation

For details of the installation of IBM Internet Connection for OS/2, see 13.1, "BonusPak Install Utility" on page 272.

15.3 SLIP and PPP

Serial Line Internet Protocol (SLIP) and Point-to-Point Protocol (PPP) are TCP/IP protocols that allow a computer to become an independent host on the Internet across a standard telephone line. This gives you the full functionality of such a connection, allowing you to use such programs as gopher, E-mail and FTP as if you were a permanently connected host on the Internet.

The initial release of IBM Internet Connection for OS/2 will only support a SLIP connection, but PPP should be available shortly afterwards. It does appear, however, that PPP is the emerging standard offering certain benefits over a SLIP connection. Loopback over a SLIP connection for example is not supported, so *pinging* yourself for test purposes is not possible. For

information on the Packet Internet Groper (PING), see 15.12.3, "PING" on page 357.

For details on SLIP and PPP, see 15.12.9, "Request For Comments (RFCs)" on page 359 for information on downloading the relevant Request For Comments (RFCs).

15.3.1 Hardware Requirements

In order to connect to the Internet you are going to need a modem to connect your computers serial port to the phone line. We recommend that you use a good quality high-speed modem, preferably 9600 bite per second (bps) or above. If you intend buying a new modem it is worth looking for at least a 14,400Kbps modem with Fax facilities, supporting the V42bis protocol. New modems are now available supporting connection rates of 28,800 bps. For information on these and emerging protocols, speak to your local hardware dealer.

The serial port you have in your computer is also important. The ability of the serial chip, or Universal Asynchronous Receiver/Transmitter (UART), to buffer data will improve throughput and reliability. Most new software packages, as well as the OS/2 COM.SYS drivers, will detect the presence of hardware buffering and use these extended features to give better throughput. If you are looking for a new computer, or intend purchasing a serial I/O card, look for hardware buffering capabilities.

The most common serial port that supports hardware buffering uses the National Semiconductor 16550A UART chip, but there are now other serial and combination I/O cards, as well as internal fax/modem cards that have their own buffering capabilities which work just as well as the NS 16550A.

When you configure the modem speed during the registration process, the speed referred to is the DTE speed, that is, the speed at which the serial port sends and receives data from the modem, and not the modem-to-modem speed.

If your modem is only capable of speeds up to 9600 bps, you should configure the modem speed to the maximum speed that your modem is capable of.

For better performance, if you have a buffered UART and a modem that operates at speeds in excess of 9600 bps, you should set the serial port Baud rate to a value greater than your modem transfer rate. A value of 38,800 or 57,600 Baud should work fine.

If you have an old, unbuffered UART in your computer you may be able to directly swap the chip for a buffered UART. The NS 16450 UART is pin compatible with the 16550A UART. Check at your local electronics store for more details.

15.4 Single Button Registration with Advantis

Registering and connecting to the Advantis Internet service provider is just a click away using the DIALER.EXE program.

To register you can either use the IBM Internet Registration icon, or simply starting one of the Internet applications for the first time will trigger the registration process.

Here is what you are going to need to know before you start to register a personal account:

- Name, address, and telephone number
- Credit card number and expiry date
- Your modem make and model
- The communications port number your modem is connected to
- Any dial prefix you may need to use to get an outside line
- The dial type you are using, pulse or touch dial
- A choice of three preferred user IDs; the first unique name will be used as your E-mail user name.

Now you need to register yourself with Advantis:

1. Open the **IBM Internet Connection for OS/2** folder.
2. Open the **IBM Internet Registration** icon; this will launch DIALER.EXE.
3. Double click with the mouse on the **Customer Assistance** icon.
4. Select the **Open a New Account Option**.
5. Select the type of account you wish to open:
 - Personal Account
 - Business Account
6. Fill in the details you recorded earlier in the appropriate fields

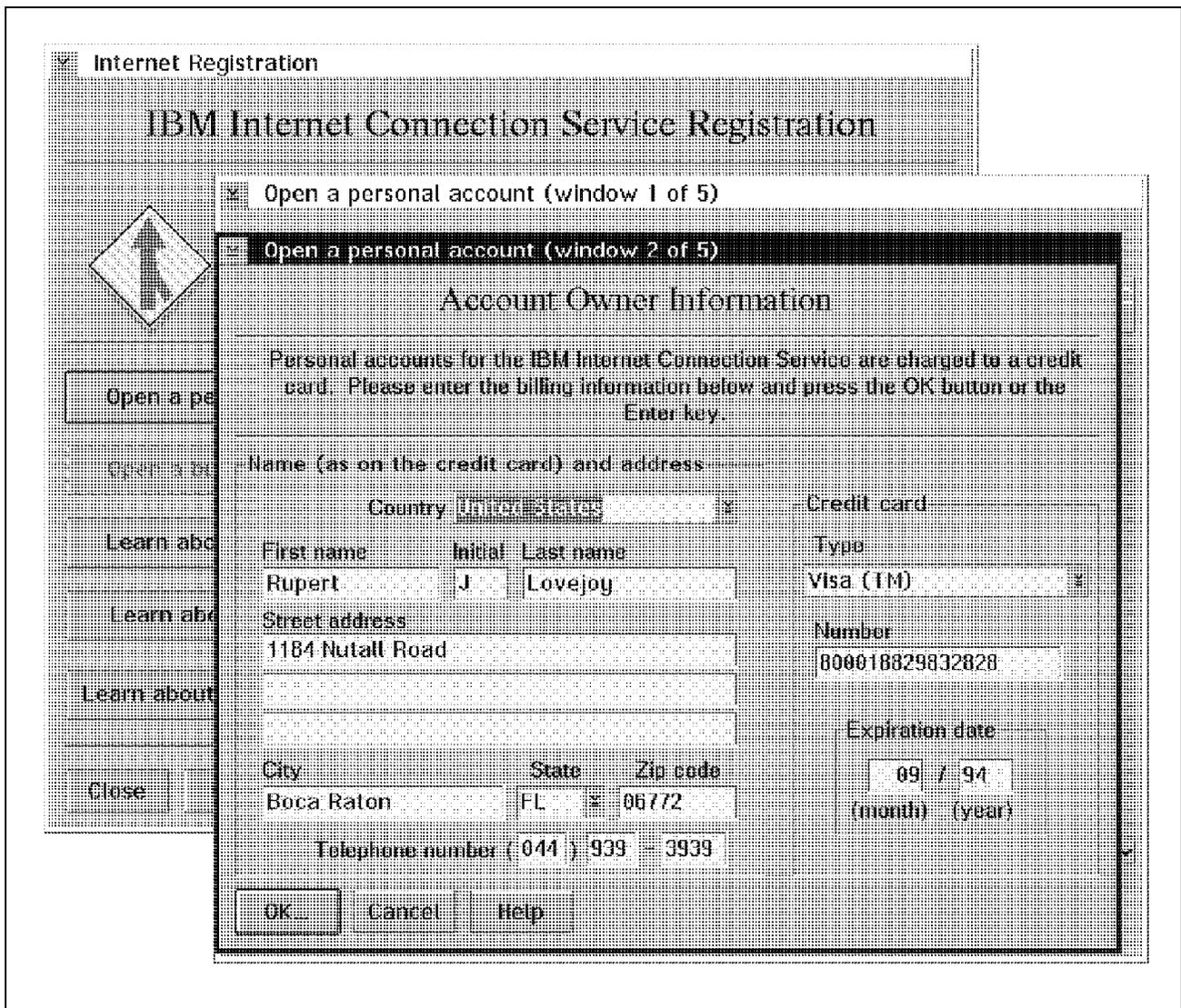


Figure 86. Advantis Account Registration

After filling in the appropriate fields correctly you will be presented with the option to send your registration to Advantis. Once this is done, all your details are recorded for future use and you can use the *IBM Internet Dialer* to connect to the Internet. The Advantis system will automatically configure your computer each time you login, tailoring for example the RESOLV file as well as your UltiMedia Mail/2 Lite configuration.

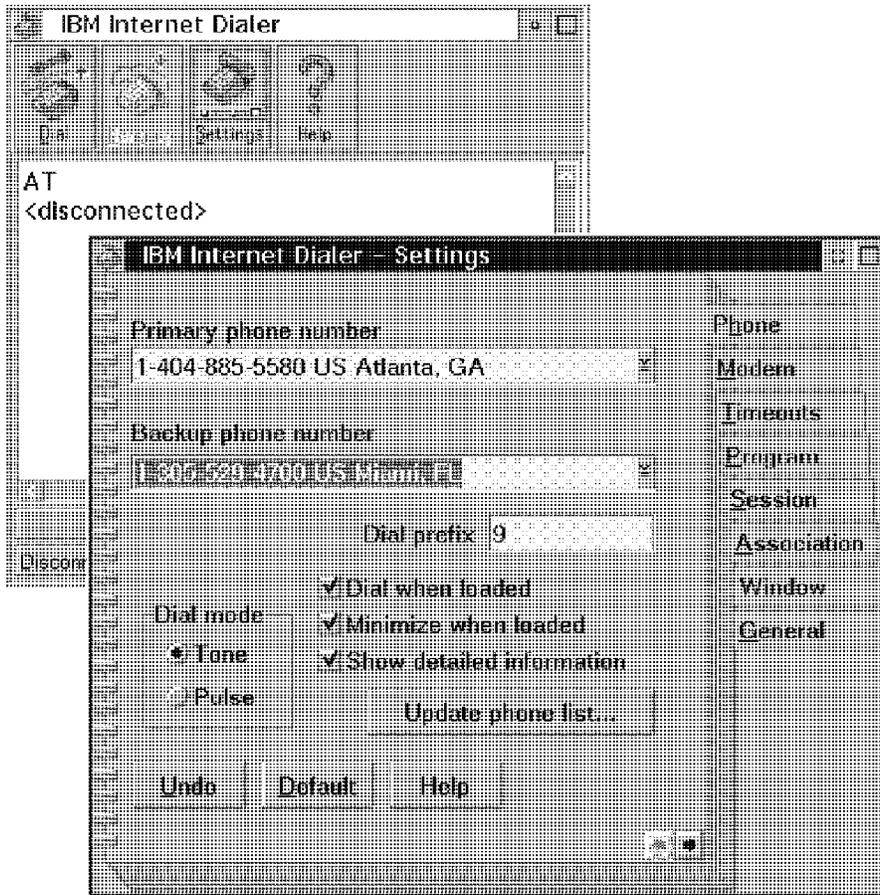


Figure 87. IBM Internet Dialer - Settings

If you experience problems at this stage, open up the settings option and on the first page select **Show Detailed Information**. Now when you dial you will see extended details of what is happening.

The following is a typical example of a detailed login to Advantis:

```
[IBM Internet Dialer version 0.86 (beta)]
[OS/2 2.3.0]
[Fri Sep 30 14:22:15 1994]
['C:\TCPIP\ETC\ADVANTIS.INI' used]
['C:\TCPIP\ETC\TCPOS2.INI' used]
[1: Opening the Comm port...]
[Open 'COM2']
[1: Initializing the Comm port...]
[Set comm port DCB settings]
[Set line control to 8, none, 1]
[Set speed to 19200]
[Speed set to 19200]
[DTR OFF]
```

```

[DTR ON]
[2: Initializing the modem...]
AT
OK
ATZ
OK
[IBM MWave Windsurfer Adapter]
AT&F
AT&F

OK
ATE0Q0S0=0V1X1&C1&D2\N2%C1
ATE0Q0S0=0V1X1&C1&D2\N2%C1

OK
[3: Dialing...]
[1-800-627-3969]
ATDT9,18006273969
CONNECT 14400/ECLC
[4: Logging in...]
[Carrier detect ON]
&

*****
      Welcome to the Advantis Dial Gateway
*****
Enter Advantis Dial Script Version ==>
1.0
Gateway:IBMFL7A0 Port:8
Select one of the following Services:
INTERNET
Enter Service ==>
INTERNET
Enter Account UserId Password ==>
[5: Waiting for password to be entered...]
atap jono <password>
[6: Waiting for authentication...]
129.37.1.136 is your IP Address
[129.37.1.136]
129.37.1.2 is your Destination Address
Begin IP Communication Now[129.37.1.2]
[7: Starting SLIP...]
[SLIP.EXE -com2 -speed 19200 -nocfg -p -rtcts
      -ifconfig 129.37.1.136 129.37.1.2 +defaultroute]
[7: Connected.]
[1 ping(s)]
[Sending CfgServer request to 192.147.13.14]
[Received CfgServer response]
[TCP/IP INI file defaults updated.]
[news server: news-slave1.openlab.advantis.net]
[gopher server: www.openlab.advantis.net]
[smtp server: smtp-gw.openlab.advantis.net]
[pop server: pop1.openlab.advantis.net]
[www server: http://www.openlab.advantis.net]
[name server 1: 192.147.13.10]
[name server 2: 192.124.113.30]
[config server 1: 192.147.13.14]
[config server 2: 164.120.163.56]
[reg server 1: 129.37.1.59]
[reg server 2: 129.37.1.60]
[FTP server 1: 192.147.13.18]
[FTP server 2: 192.147.13.18]
[Resolv files updated]

```

15.5 Connecting to Other Internet Service Providers

Connecting to other Internet service providers is done by clicking on the **Dial Other Internet Providers** icon in the Internet Utilities folder. This starts the SLIPPM.EXE program in the /TCPIP/BIN directory. The SLIPPM Dialer is used to configure your connection, as well as to perform the connect and disconnect operations.

When the Dialer is used to connect to the Internet it updates information in the TCPOS2.INI file which has attributes read-only and system. This file is used by other applications, for example UltiMedia Mail/2 Lite in their dynamic configuration.

When you configure via the Dialer you are presented with a series of menus designed to make connecting to your chosen service provider easier.

Fill out the Appendix I, "IBM Internet Access Configuration Sheets" on page 541 before continuing.

After filling out the forms enter the details using the **Add provider** icon. After you have completed all the menus presented to you, you can attempt to dial your service provider. Click with the mouse on the **Dial** icon, and check the dial and login progress in the status box at the bottom of the screen.

If you do not have an Internet connection up and running, see 15.12, "Troubleshooting" on page 355.

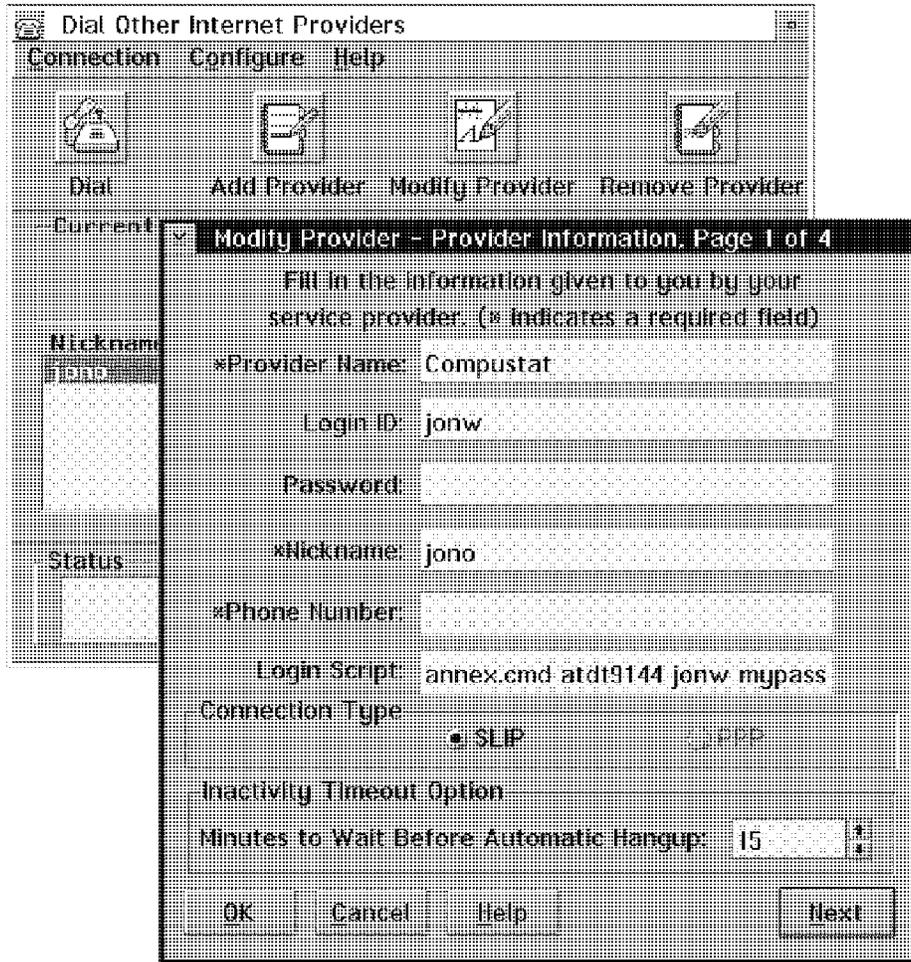


Figure 88. Connecting to a Non-Advantis Internet Service Provider

15.5.1 Login Scripts

The variety of SLIP connection software and connection scripts offered by service providers may make it necessary to manually tailor your login using a login script.

The SLIPPM Dialer supports three types of logon script:

- Simple response files (for example, RSAS.RSP)
- REXX scripts (for example, ANNEX.CMD)
- Executable files

These files can be specified on the *Login Script* field of page 1 of the Dialer Add Provider menu. Just remember to include the extension as well. Configuration information from these files will then be used for your Internet connection.

Users familiar with IBM's TCP/IP V2.0 for OS/2 will know that a REXX script can be used in conjunction with the SLIP.EXE file from the command prompt. Parameter values were passed to the REXX file from a default configuration file SLIP.CFG, which is the default configuration file for SLIP.EXE.

This option is still supported. However, the SLIP.EXE file now has parameter options that negates the need for the SLIP.CFG file. The following example shows the available SLIP.EXE parameters:

```
[C:\tcpip\bin]slip -?
```

```
SL/IP      OS/2 TCP/IP Multiple Interface SLIP Driver
2.00      Copyright(c) IBM Corp. 1993, 1994
          Revision: 1.17 24 Aug 1994 13:41:40
```

Usage: slip [options], where options are:

```
-?                Usage help.
-com<n>          Use com port <n> for interface sl0.
-connect "command"  Invoke command to setup modem connection.
-d              Increase debug level.
-exit <timeout>   Exit SL/IP <timeout> minutes after line di.
-f <config file>  Use <config file> instead of default: slip
-hangup <command> Send <command> to sl0 com port on exit.
-idle <timeout>   Exit SL/IP after <timeout> minutes of idle
-ifconfig <ipaddr> <ipdest> Configure sl0 with the specified IP addr
                  +defaultroute  optionally add a default route through <ipc
                  +proxyarp      make a proxy ARP entry for <ipdest> using <i
-modem <command>  Send modem <command> to interface sl0 com
-mtu <size>       Set interface sl0 MTU to <size>.
-nocfg           Ignore configuration file.
-notify         Notify on termination of Data Carrier Detect
-p             Run SL/IP in time critical server mode.
-rtscts        Use RTS/CTS hardware flow control.
-speed <baud>   Set sl0 com port speed to <baud>.
-t[i|o]        Trace input and output packets.
-vj            Use VJ header compression for interface sl0.
```

Exiting...

Note

If you use the command line option to connect to the Internet, UltiMedia Mail/2 Lite will not work since it requires a dynamic update of information from the TCPOS2.INI file at login time.

15.5.2 Login Script Using Response Files

There are a number of sample response files in the /TCPIP/ETC directory, for example, RSAS.RSP is a simple-to-use response file containing alternate "wait-for" and response strings. The response strings supply information to prompts from the host you are connecting to. To use this response file, enter RSAS.RSP on page 1 in the Login Script field.

If your service provider presents you with a question-and-answer type questionnaire during login (for example just asking you to enter your user ID and password), you should be able to use a response file.

It is best to leave off the first one or two characters in the wait-for string; for example, if you are waiting for the "Connect" message, then code `connect` in the wait-for string.

Edit the file so that the wait-for strings match what the remote host actually sends. If for example the remote host asks you for 'Login>' instead of 'User name>' then in RSAS.RSP change 'name>' to 'Login>'.

15.5.3 Login Scripts Using REXX Files

There are a number of sample REXX files in the /TCPIP/BIN directory. For example ANNEX.CMD is a REXX automated login script which, with a certain amount of REXX knowledge, will allow you to connect to Internet service providers. The REXX option must be installed on OS/2 Warp Version 3.

The ANNEX.CMD script is designed for login to a Xylogics Annex terminal server, but can be adapted to allow connection to other servers also.

If specified on page 1 in the Login Script field you could use:

```
Login Script: annex.cmd atdt999-9999 loginid password
```

While ANNEX.CMD supports the use of the '*' character in order to prompt for a password, this will not work using the Dialer. You must therefore openly specify your password.

You may need to remove whole sections of code here, modify sections, and perhaps hard code the *ifconfig* and *route* commands. Refer to a TCP/IP command reference manual such as the *IBM TCP/IP V2.0 for OS/2: Command Reference* SC31-6077, for information regarding these commands.

15.6 UltiMedia Mail/2 Lite

UltiMedia Mail/2 Lite is an electronic mail program that allows you to send and receive mail across the Internet.

UltiMedia Mail/2 Lite is built upon two main TCP/IP protocols. Simple Mail Transfer Protocol (SMTP) is used for standard text-based messages that most people are familiar with. An addition to this is the Multipurpose Internet Mail Extensions (MIME), which allows multimedia type images as well as audio to be included in your note.

Underlying the design of UltiMail is IBM's System Object Model (SOM) resulting in a highly powerful and flexible, object-oriented E-mail application.

15.6.1 Installation and Configuration

UltiMedia Mail/2 Lite is installed automatically as part of the IBM Internet Connection for OS/2 install process, and creates its own folder inside the IBM Internet Connection for OS/2 folder. There are five icons within this folder:

- The **In-basket** is a folder for holding incoming mail.
- The **New Letter** icon is a template for creating new mail.
- The **Mail Cabinet** is a filing cabinet for holding UltiMedia Mail/2 Lite folders, which are used to hold and sort your mail.
- A **Names and Addresses** book for recording E-mail addresses and aliases.
- An **Information** folder which contains:
 - An object to rebuild the UltiMedia Mail/2 Lite desktop
 - A **User's Guide**, in view format
 - A **README** file
 - A **tutorial** - Don't ignore this; it really is well worth going through

Figure 89 on page 340 shows the UltiMedia Mail/2 Lite folder:

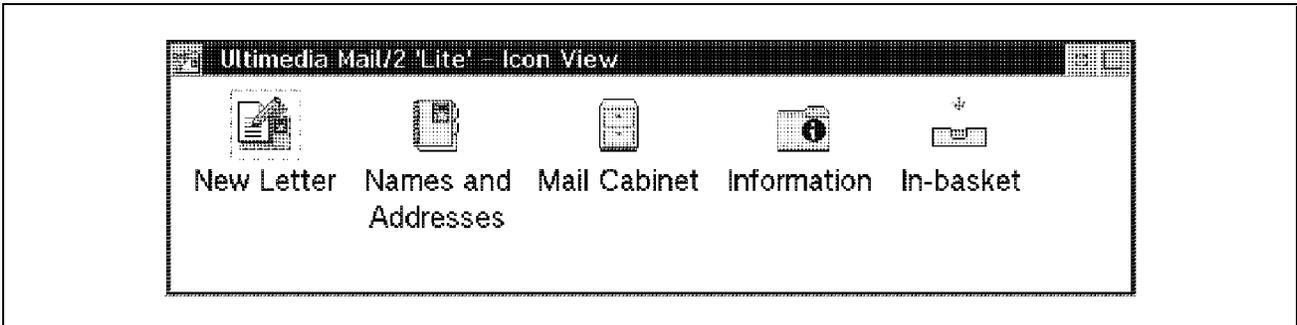


Figure 89. UltiMedia Mail/2 Lite Folder

If you connect to Advantis using the dialer, UltiMedia Mail/2 Lite will be configured automatically. Connecting via SLIP/PPM to another Internet provider also configures UltiMedia Mail/2 Lite dynamically. However, any information that is required and was left out of the initial Internet configuration will be prompted for. This includes information on the POP server as well as your POP user ID and password.

When UltiMedia Mail/2 Lite sends mail, it invokes the SENDMAIL.EXE program. This program uses a configuration file called SENDMAIL.UML, which contains certain path information as well as placeholders to information dynamically tailored at login time when using the dialer. For this reason it is not possible to use UltiMail Lite when connecting to the Internet from the command line. The only thing a user may need to change in the SENDMAIL.UML file is the path to the mail queue. This is set during the install process but it may be that the user changes the TCP/IP drive or decides to change the location of the mail queue. It is essential that an editor that preserves tabs is used when editing this file.

If a user decides to connect via the command line, or wants to use a different mail program, the sendmail program can be used. However, the user will have to supply and configure his own default SENDMAIL.CF configuration file.

When UltiMedia Mail/2 Lite starts up it invokes the Post Office Protocol (POP), in order to retrieve mail that has arrived since the last connection to the Internet. Mail for the user is stored on a host configured as a POP server. The information on the whereabouts of this POP server is obtained dynamically when connecting to Advantis, and is configured by the user during the configuration process for connection to other Internet service providers. Your service provider will be able to provide this information.

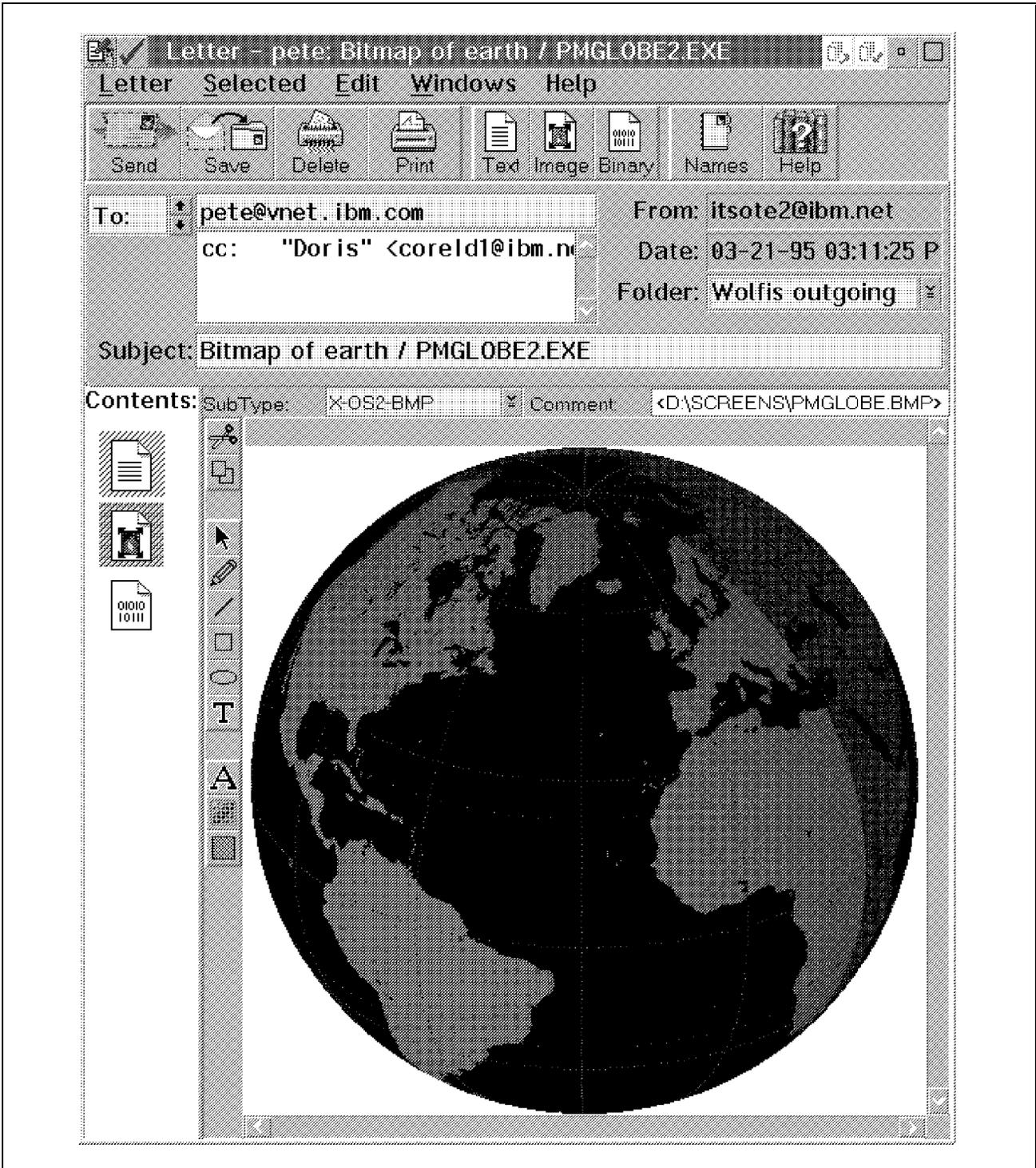


Figure 90. UltiMedia Mail/2 Lite New Letter Incorporating a Bitmap Image

Users who select to use their own mail package will also probably want to use POP software. POP shareware software is available on the Internet but

users should bear in mind that there are two current POP protocols in use; POP2 that uses port address 109 and POP3 that uses port address 110. The default address of 109 is set in the PROTOCOL file in the /TCPIP/ETC directory. If your service provider uses POP3 you may have to change the port address in the protocol file.

15.6.2 UltiMedia Mail/2 Lite Tips

Please go through the tutorial. Using this and the online help will give you just about all the information you need on using the product.

The editor in UltiMail Lite is currently designed to incorporate basic editor features. The only real option you can change is to set word wrap on or off. You can do this by clicking with the right mouse button to give a context menu while in the editor. Remember that this does not insert carriage returns or new lines, so someone reading your note with wrap turned on will see a message on a single line.

One way of using UltiMail is to start it using the Mail Cabinet icon, everything else can be kicked off from there. The other icons in the UltiMail folder can be treated pretty much as templates for quick access to specific tasks you wish to perform.

15.7 NewsReader/2

Although the reading and posting of news items is an integral part of the Internet, a network for this purpose called USENET existed before the Internet came into being. USENET defines seven main categories of news, each of which contains many related news groups. In addition to USENET, there are also servers that hold and distribute their own news groups which fall under a variety of news category headings. All of these together constitute the world of news on the Internet, and all can be connected to transparently using NewsReader/2.



Figure 91. NewsReader/2 Screen

There are three files on the local host that the news reader uses in order to connect to the newsgroups subscribed to by the user. These are:

File Name	Description
NEWS.GRP	This file lists the newsgroups currently subscribed to, and records details of articles read. This is used to position the user at the next unread article.
NEWS.ALL	This file contains a list of all newsgroups currently available at your default news server. It contains information on each newsgroup, such as whether the newsgroup is open for posting. It is used when new newsgroups are added within NewsReader/2 and when posting to newsgroups.

NEWS.SAV This is a backup of NEWS.GRP and is saved each time NewsReader/2 is used.

A further file NEWS.TIM contains a time stamp corresponding to the last time NewsReader/2 was used.

The news server that NewsReader/2 connects to by default is configured either dynamically during login to Advantis, or is specified as an option in the configuration panels for connecting to other service providers.

A different default news server can be specified from within NewsReader/2 as a pull-down option under the Actions menu item. This information is then saved for future use. If you do elect to change news servers it is likely that the news groups that the new server holds is different from the old one; you will need to download the new list of news groups using the List News Groups option under the File menu heading. You will be given the option to either list groups from the NEWS.ALL file or download the list from the news server. In addition, the article numbers will be different, so you will either have to manually edit the NEWS.GRP file or unsubscribe and re-subscribe again.

You may occasionally see articles that appear full of garbage. There is a simple encryption mechanism known as rot13 that rotates the letters of the alphabet by 13 positions. This mechanism is used if someone is posting "sensitive" material. There is an *unrot13* option under the **File** menu option when reading an article which will de-encrypt the message for you if you insist on reading it.

The following lists some of the functions of NewsReader/2:

- Subscribe/unsubscribe to news groups
- Copy selected information to the clipboard
- Print article
- Find and search all articles in a news group
- Post articles
- Reply to articles
- Forward articles
- Block (do not view) by author/subject

15.8 File Transfer Protocol (FTP)

Many sites on the Internet offer the capability of directly accessing certain areas of their remote host for uploading and downloading of files. The most commonly accessed of these are known as anonymous FTP sites since they are open to anyone to download files from. The convention usually being that the user connects with a user ID of *anonymous* and password set to the E-mail address of the user.

Other sites, or protected areas of anonymous FTP sites, use user ID/password pairs, and sometimes account information, to enforce security.

FTP is supported in the IBM Internet Connection for OS/2 in two ways: directly from the command prompt, and using the PM Shell application FTTPM.EXE, which appears as the FTP-PM icon in the Internet Utilities folder.

15.8.1 Command Line FTP

FTP can be started using the command:

```
FTP remote-host-name
```

This puts the user inside the FTP shell and starts the logon connection to the remote host. The FTP shell supports a number of commands:

```
[C:\]FTP
IBM TCP/IP for OS/2 - FTP Client ver 09:44:28 on Mar 04 1994
ftp> help
Commands may be abbreviated.  Commands are:
```

!	delete	macdef	put	status
\$	debug	mdelete	pwd	struct
account	dir	mget	quit	sunique
append	disconnect	mkdir	quote	tenex
ascii	form	mode	recv	trace
bell	get	mput	remotehelp	type
binary	glob	nmap	rename	user
bye	hash	ntrans	reset	verbose
cd	help	open	rmdir	?
cdup	image	prompt	runique	
close	lcd	proxy	send	
cr	ls	sendport	site	

```
ftp>
```

For more information on using FTP, see one of the many books on using the Internet.

15.8.2 FTP-PM

FTP-PM automates FTP as a PM Shell application. It gives a representation of files and directories on the local host as well as the remote host.

On first starting FTP-PM, you must enter the remote host name as well as your user ID and password. If, however, you have configured a NETRC file in the /TCPIP/ETC directory with a user ID and password for the remote host, then this will be used by FTP-PM and the user ID and password do not need to be specified. The NETRC file is an ASCII file of the form:

```
MACHINE remote-host LOGIN your-userid PASSWORD your-password  
[MACDEF] identifier {command1, command2, ..}
```

It is also possible to configure host/user ID/password details by opening the settings page for the FTP-PM icon and specifying them there.

Once this is done, a connection to the remote host is made and a listing of files on the local and remote hosts is performed.

Navigation of directories is possible using the mouse, and multiple files can be selected for transfer between the two hosts (get or put). Different hosts can also be accessed using the Open Remote Host option under the Connection pull-down menu item. This allows you to have multiple hosts open at the same time, and swapping between them is possible using a pull down menu.

15.9 Remote Login Using TELNET

IBM Internet Connection for OS/2 supports four different methods of logging on to a remote host using the telnet protocol. These are:

- The TELNET ASCII-based terminal emulation client, executed from the command prompt
- The TN3720 IBM 3270 mainframe terminal emulation client, executed from the command prompt
- 3270 TELNET, a PM Shell application for connecting to an IBM mainframe supporting 3270 type terminals
- TELNETPM, a PM Shell application

One of the most common uses for telnet is in logging on to one of the many Archie servers around the world. These sites help in solving one of the biggest problems associated with the Internet, that is, the question of how to

find a particular file that is out there somewhere. See any of the books designed to help you use the Internet for more information on Archie.

15.9.1 The TELNET Client

Simply typing

```
telnet
```

from a command prompt puts you inside the telnet shell. From there the telnet set of commands is available to you; these include:

```
telnet> ?
```

```
Telnet - 08:32:06 on Sep 27 1994.
```

```
Commands may be abbreviated. Commands are:
```

```
open          Connect to a site
close         Close current connection
quit          Exit telnet
status        Print status information
help          Print help information
send          Transmit special characters
emulate       Specify an emulator type (vt220, vt100, ansi, hft, nvt)
set           Set operating parameters
toggle        Toggle operating parameters
display       Display operating parameters
environ       Change environment variables
!             Invoke a subshell
?             Print help information
telnet>
```

The format for opening and closing a connection is similar to the FTP set of commands.

The normal use of the telnet command line option is to include the remote host name as a parameter:

```
telnet archie.doc.ic.ac.uk
```

This will present you with a logon screen as if you were an ASCII terminal directly attached to the host. You can now proceed with whatever tasks you would normally perform from a terminal session.

This ASCII-based telnet client supports a variety of terminal emulation types via the *emulate* telnet subcommand.

15.9.2 The TN3270 Client

The TN3270 client is similar in use to the ASCII-based client, only it supports the 3270 data stream.

It requires a host name as a parameter and supports additional 3270-based parameters, namely:

```
usage: tn3270 [-b] [-ext] [-nb]
           [-h] [-o] [-p port]
           [-tx filename] [-bc] hostname

-b          Display '[' and ']' correctly.
-nb         Suppress the bell.
-ext        Use extended data streams.
-h          Use boxes for characters in hidden fields.
-o          Use old-style keyboard. (SHT-F1=PF13).
-p          Specify port to use.
-tx         Specify the translation table filename.
-bc         Use a block cursor.
```

15.9.3 PM Shell Based Telnet and 3270 Telnet

These applications provide extended functions to telnet sessions, such as the ability to customize your display.

Both of the icons allow you to configure individual sessions using the *settings* option in the pop-up menu (click with the right mouse button on the icon). These icons can thus be used as templates, creating an individual icon for each telnet session you use.

15.10 Gopher Client

Of all the utilities that allow you to browse around the Internet, gopher is probably the easiest to use and is a good starting point for the Internet novice.

Gopher allows you to navigate to a resource through a hierarchy of menus which connect many different and disparate hosts together, without the need for the user to need to know such things as Internet addresses. Both gopher and the Web Explorer have their advantages and disadvantages, but step one is to connect to a gopher server as your starting location and navigate out from there. You'll get the hang of it as you go along.

15.10.1 Installation and Configuration

Gopher is installed as part of the IBM Internet Connection for OS/2 installation. If you use the single button connection to Advantis the logon negotiation creates a default gopher starting point at *www.openlab.advantis.net*. If, however, you connect to another service provider, the initial configuration notebook asks you for a gopher server. Don't worry if you didn't define one at the time. When you start gopher you will be asked which server you wish to connect to. If you don't know, ask your service provider to let you know which is the closest gopher server to you, or try one of the common gopher sites predefined within the gopher application. You will see these under the Gopher menu item and select **Well Known Gopher Servers**.

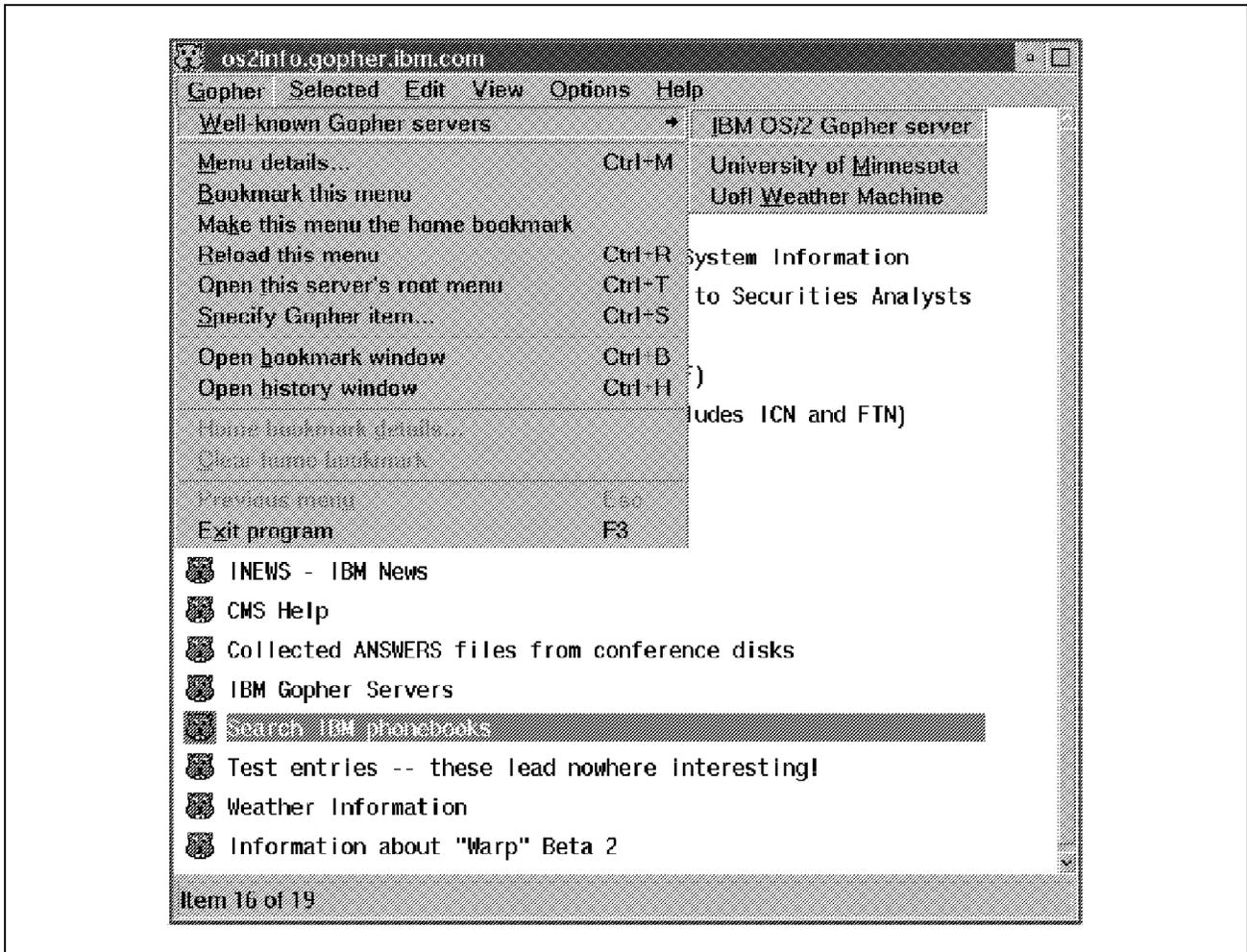


Figure 92. Connecting Using Gopher

15.10.2 Using Gopher

Using gopher is very much like reading a book. The only difference is that this book has to be read from page 1 every time, then page 2 and so on, until you arrive at the page you really wanted to get to. There are a lot of pages!

This can become something of a painful process, so there is always the ability under the *Gopher* option to save the current page as a bookmark, or alternatively as the home bookmark, in which case this is the page you will see when you first connect to the Internet. Saved bookmarks can then quickly be accessed by selecting from the *Open Bookmark Window*.

In addition to being able to save the current location as a bookmark, it is possible to explicitly specify a location and save it as a bookmark. To do this select the **Specify Gopher Item** under the Gopher menu option. You will be presented with a panel requesting among other things the gopher location and path. Once completed, this can be saved either as a bookmark or as a home page.

Every page you open as you use gopher opens up a separate window. Gopher pages can then be accessed immediately by selecting them from the Open History Window, or from the OS/2 Window List.

In order to view image and audio formats, Gopher uses external programs. You will need to install the Multimedia Viewer BonusPak product as well as have OS/2 Multimedia Software Support installed.

When it comes to closing gopher down, you can either navigate backwards, closing each page that you had previously opened, or select the **Exit Program** option, which will shut everything down for you.

Most of the submenu items can be accessed using hot-keys. If you decide to be a frequent gopher user, you will want to learn some of the more useful ones. **Exit Program**, for example, can be selected using the ALT-X key combination.

15.11 IBM Web Explorer

IBM's new Web Explorer is a tool designed to browse that part of the Internet known as the World Wide Web, or *the Web* for short. The Web is still relatively new, but is so powerful and flexible that it is one of the fastest growing areas of use within the Internet, and its rapid growth is likely to continue unimpeded for some time to come.

The Web is a massive information space spanning multiple hosts using a technology known as *hypertext*. Hypertext allows selected words or graphical images to be expanded, acting as dynamic links, called hyperlinks, to other documents, graphics, sound, moving pictures and so on, which may reside on hosts on the other side of the world. Through using these hypertext links, the Web may be traversed according to a particular line of interest.

15.11.1 Design Considerations

The IBM Web Explorer has been designed as a multi-threaded, 32-bit application. This is reflected in a vast improvement in performance and usability over similar Windows-based applications.

The inclusion of separate networking threads means that different logical networking tasks within the application can be carried out concurrently, so, for example, both documents and images can be loaded simultaneously.

15.11.2 Installation

To install, insert disk 1 of the IBM Web Explorer and type *install* at the OS/2 command prompt, but before you do that take a look at the README file. It contains details on registration and other useful technical information. The installation process will create an icon in the IBM Web Explorer folder. A reboot will be necessary if you have installed IBM Web Explorer immediately after IBM Internet Connection for OS/2.

15.11.3 Home Pages and QuickLists

A home page is a hypertext document that you first see on entering the Web, it is, if you like, an entry point to the Web. Every location you wish to visit can be accessed by navigating the Web via hypertext links in the document, starting from the home page.

This can be a slow process if you know there is an end point, maybe a particular gopher server or interesting document, you want to get to, but in order to do so you must navigate long, tortuous paths of the Web.

To make this easier, you can save commonly used end points as entries in the QuickList. You can do this easily every time you visit a location you would like to return to, just select **QuickList** from the menu bar, and then **Add current document**, or simply select the hand icon on the toolbar.



Figure 93. Using IBM Web Explorer

If you used the single button registration to Advantis you should automatically be connected to the Advantis home page at www.openlab.advantis.net. If you are using a different Internet service provider, you will have specified a default home page during registration.

Home page and other Web options are stored in the EXPLORE.INI file, but use caution if you decide to edit this file. The Configure option on the Web tool-bar allows you to configure all options in an easy-to-use manner.

15.11.4 Configuration

One of the first things you will want to do is configure the Web Explorer for your own use. As an Advantis user, much of the configuration will be done for you as part of the logon to the Advantis service.

Click on **Configure**, then **Servers**. The first option on the Configure Servers dialog box is the home document URL which allows you to change your default home page. URL stands for Uniform Resource Loader, a mechanism that allows you not only to connect to a hypertext home page, but also to access a gopher server, view news groups, transfer files, and perform remote login.

To load a hypertext home page you would use the form:

```
http://internet-address/path-to_page/
```

where path-to-page is optional.

As a non-Advantis subscriber you can still use the Advantis home page as your default home page by entering:

```
http://www/openlab.advantis.net
```

and save it as the default or in the QuickList.

The next option in the dialog box allows you to define your E-mail address. For Advantis users you will find your address in the settings page of UltiMail after a successful connection, and for non-Advantis users, your address will have been assigned to you by your Internet provider.

If you use IBM Web Explorer for FTP (file transfer protocol) the E-mail address will appear as the default password in an option window, you should use this password for most anonymous FTP locations, depending on the convention required at the remote host.

IBM Web Explorer can also be used to view Usenet news items. At the time of writing the specifications for reading Usenet news on the Web only allow for connecting to a particular news group, without being able to specify a news server on the URL. For this reason there is an option in the configuration to point to a default news server. This will be tailored automatically during logon for Advantis users. Non-Advantis users should enter their nearest news server in the dialog box.

The fields for Proxy Gateway and Socks Server are of interest only to Internet users who connect in a way other than SLIP or PPP. They allow the user to connect to the Web through a firewall. A firewall is a node that links a

specific internet to the global Internet. Its purpose is to limit, usually for security reasons, the flow and nature of traffic between the local internet and the global Internet. Whether you code the Proxy Gateway option or the Socks Server option will depend on the software used on your firewall. Speak to your local network administrator to find out what address to insert here.

15.11.5 What Else Can I Use the Web For?

You don't have to use the Web just to browse hypertext documents. The flexibility of the Web allows you to do a host of other exciting things, too.

The ability to add a current document to the QuickList for future rapid reference was mentioned earlier. If you already know location details of different favorite starting points they can be pointed to for easy access by selecting the **Open a document option** and entering the URL, for example:

```
gopher://gopher-address:port-no.
```

This will connect you to the selected gopher server.

You can then save this for future use by adding the current document to the QuickList.

Other types of resource you may wish to consider defining for quick access are:

anonymous FTP sites - `file://internet-name/remote-path`

FTP sites - `file://user-id@internet-name/remote-path`

telnet sites - `telnet://internet-name`

news groups - `news:newsgroup-name`

There is also a *Webmap* option which is essentially an extended history option. Using relative links, it allows the user to revisit previously visited documents in a hierarchical manner.

15.11.6 Hints and Tips

- Consider turning off the Load graphics switch under the Options menu item. This will make the retrieval of pages incorporating graphical images much faster.
- If you have started loading a document that is going to take more time to get than you want to spend (the file size and transfer statistics will

appear on the bottom bar), the process can be stopped by clicking on the moving progress icon in the upper righthand corner.

- Create QuickLists of all you favorite items instead of navigating the Web for them each time. Do this for hypertext pages as well as gopher and FTP locations.

15.12 Troubleshooting

Most of the problems a user is likely to experience will occur the first time an attempt is made to connect to a service provider. During the connection attempt, the dialog between computer and modem, and computer and remote host, will appear in the status box. The dialog will vary with the service provider, but the following example should give an indication of what sort of things to look out for.

```
ATZ                                     1
OK
AT&F
OK

ATE0Q0S0=0V1X1&C1&D2\N2%C1
OK                                     2
ATDT9,18006273969
CONNECT 14400/ECLC                     3

&
***** 4

Welcome to the Advantis Dial Gateway

*****
Enter Advantis Dial Script Version ==>
1.0
Gateway:IBMFL7A0 Port:30
Select one of the following Services:
INTERNET
Enter Service ==>
INTERNET                               5

Enter Account UserId Password ==>
atap userid <password>

129.37.1.158 is your IP Address
129.37.1.2 is your Destination Address
Begin IP Communication Now             6
```

- 1 - The initial dialog between computer and modem; the modem is being initialized. Check with your modem supplier for details of appropriate initialization strings.
- 2 - If you see OK, this is being returned by the modem in response to a command directed at the modem. If the modem does not respond, check:
 - Is the modem powered on?
 - Is the modem connected to the COM port configured in the configuration panel?
 - Can you talk to the modem using a terminal emulation package, for example HyperACCESS Lite? If you can, it may be that the initialization string for the modem is incorrect.
- 3 - After the dial command, either ATDT.. or ATDP.. Do you get a CONNECT message? If you do, your modem has successfully negotiated a connection to the remote modem. If not, the fault may be:
 - An incorrect phone number
 - An incorrect dial type (ATDP instead of ATDT)
 - A faulty phone line
 - The modem at the other end is not responding; try dialing the number using HyperACCESS Lite
- 4 - The login menu is coming from the remote system, so you are ready to start negotiating your SLIP connection. If you see nothing or get garbled characters, it may be that your parity or BAUD rate settings are incorrect.
- 5 - You are in the process of negotiating your SLIP connection. If login hangs at this stage it is likely that you will need to supply a tailored login script. See 15.5.1, "Login Scripts" on page 336.
- 6 - You are up and running.

15.12.1 IFCONFIG

At this stage you will probably want to confirm that your SLIP connection is fully configured and functioning correctly. There are several utilities to help you in this area.

Check to see whether your SLIP connection is really configured. Use the IFCONFIG command specifying the SLIP interface (sl0).

```
[C:\]ifconfig sl0
sl0: flags=11<UP,POINTOPOINT>
    inet 129.37.1.148 --> 129.37.1.2 netmask ffffffff00
```

This tells you that your SLIP connection is up, and that there is a point-to-point connection between the two IP addresses shown.

See also 15.12.10, “Ifconfig Command” on page 360 for additional information.

15.12.2 NETSTAT

From a command prompt use the NETSTAT command for more information on your network connection. Type `netstat -r` for routing information:

```
[C:\]netstat -r
```

destination	router	refcnt	use	flags	snmp	intrf
				metric		
129.37.1.2	129.37.1.147	0	1	U	-1	sl0
default	129.37.1.2	0	0	U	-1	sl0

The first line shows that there is a route between your machine, IP address 129.37.1.147, and the service provider at IP address 129.37.1.2. The second line tells you that the default route is via the service provider.

15.12.3 PING

The ping command will check whether a particular IP address can be reached. PING or the Packet Internet Groper can be used to test the reachability of a host. It uses an error and control message protocol called the Internet Control Message Protocol (ICMP) to send an echo request to the named host.

```
[C:\]ping 129.37.1.2
PING 129.37.1.2: 56 data bytes
64 bytes from 129.37.1.2: icmp_seq=0. time=563. ms
64 bytes from 129.37.1.2: icmp_seq=1. time=750. ms

----129.37.1.2 PING Statistics----
2 packets transmitted, 2 packets received, 0% packet loss
round-trip (ms)  min/avg/max = 563/656/750
```

A result of no route to host does not mean that anything is necessarily wrong. It could be that ping is timing out. But if you know that the host should be available on the Internet, it is an indication that there may be a problem.

Ping can be used with either a dotted decimal type address, or a domain name style address, and so can be used as an indication of whether your domain name server is configured correctly.

One disadvantage of using ping as a troubleshooting tool is that response times can be extremely slow depending on the host, or route to host, that you are attempting to ping.

15.12.4 TRACERTE

The TRACERTE program can be a useful tool if you suspect the problem is elsewhere on the Internet. It will show the route taken to a given destination, or will show the route until it can get no further.

```
OS/2 2.0 C:\ tracerte software.raleigh.ibm.com
```

```
tracert to software.raleigh.ibm.com (9.67.99.243), 30 hops max,  
38 byte packets  
0 gwab54b50.bocaraton.ibm.com (9.83.96.1) 0 ms 0 ms 0 ms  
1 gwab54b50.bocaraton.ibm.com (9.83.96.1) 0 ms 0 ms 0 ms  
2 bcrwell1.bocaraton.ibm.com (9.83.2.230) 31 ms 0 ms 31 ms  
3 * bcrwell2.bocaraton.ibm.com (9.83.3.38) 0 ms *  
4 192.156.219.34 (192.156.219.34) 32 ms 31 ms 31 ms  
5 rtp-b675.raleigh.ibm.com (9.67.11.153) 32 ms 31 ms 32 ms  
6 software.raleigh.ibm.com (9.67.99.243) 62 ms 31 ms 62 ms
```

Each router on the path to the destination is shown along with an indication of the responsiveness of each section of the network path. It should be remembered that the Internet involves the interconnection of many different types of networks; your SLIP connection, for example, will show relatively slow responses, as will heavily congested links.

The example above was taken from a token-ring LAN connection, so the response times indicated will be different from those obtained using a SLIP connection.

Included in IBM Internet Connection for OS/2 are tracing and trace formatting tools, IPTRACE and IPFORMAT. The use of these tools, however, falls outside the scope of this document.

15.12.5 Restoring the Internet Connection Desktop

If you should accidentally delete part of your Internet Connection folder, you can run the IFOLDER.EXE program from a command prompt. This will rebuild the folder for you. If you find that some icons still do not function correctly, you should delete the whole folder and run IFOLDER again. Then, assuming you installed to the 'C' drive, enter:

```
MAKEIDX C:\TCPIP\UMAIL\MAILSTOR\internet-user-id
internet-user-id
```

15.12.6 Anonymous FTP Sites

- software.watson.ibm.com
- ftp.cdrom.com pub/os2/2_x/... - OS/2 shareware
- hobbes.os2.cdrom

15.12.7 Gopher Sites

- gopher.advantis.com
- index.almaden.ibm.com
- gopher.ibmlink.ibm.com
- ike.engr.washington.edu

15.12.8 World Wide Web Home Pages

- <http://www.openlab.advantis.com>
- <http://www.austin.ibm.com/pspinfo/>

15.12.9 Request For Comments (RFCs)

Most of the information you may require regarding aspects of how TCP/IP works can be found from a set of documents known as Request For Comments. RFCs can be obtained in a number of ways, and from a number of sites. One method is to use the File Transfer Protocol (FTP), to host NIC.DDN.MIL. Logon as *guest* with a password of *anonymous*. Issue the GET command for the RFC you want. For example, to obtain the Request For Comments reference guide issue the `get rfc1000.txt` command.

RFC 822 - SMTP

Simple Mail Transfer Protocol (SMTP) describes the way in which text based mail is sent and received by UltraMedia Mail/2 Lite.

RFC 1521 - MIME

Multipurpose Internet Mail Extensions (MIME) describes extensions to SMTP that allow for the receipt and transmission of multimedia mail. This standard is used as an extension of SMTP in UtiMedia Mail/2 Lite.

RFC 1081 - POP V3

A mechanism for receiving mail stored for you on a remote host.

RFC 1134 - PPP

Point-to-Point Protocol (PPP) describes a mechanism for interconnecting hosts, usually across a serial connection, and usually across the phone lines.

RFC 1055 - SLIP

Serial Line Internet Protocol (SLIP) describes the way in which Internet datagrams may be exchanged across a serial connection.

RFC 1118 - The Hitchhikers Guide to the Internet

A good starting point for using the Internet.

RFC 1290 - There's Gold in them thar Networks

More useful information on surfing the net.

15.12.10 Ifconfig Command

`ifconfig` is a `tcp/ip` command used to configure and test your network connection. In the case of a SLIP connection this will be of the form:

```
ifconfig sl0 your-ip-address remote-host-ip-address
```

As with most TCP/IP commands, help on the command can be viewed using the `'-?'` parameter, for example:

```
[C:\tcpip\etc]ifconfig -?  
Usage: ifconfig interface  
      [ [af] [ address [ dest_addr ] ]  
        [ up | down ][ netmask mask ]  
        [ broadcast brd_addr ] ]  
      [ metric n ]  
      [ mtu    n ]  
      [ trailers | -trailers ]  
      [ arp | -arp ]
```

```

[ -allrs ]
[ bridge | -bridge ]    [snap | -snap ]
[ icmpred | -icmpred ]
[ 802.3 | -802.3 ]
[ canonical | -canonical ]

```

15.12.11 Route

route is a TCP/IP command that is used as part of a REXX login script. Its purpose is to define routing information for IP datagrams from this host out onto the Internet.

```
[C:\tcpip\etc]route -?
```

Usage:

```
route [-fh?] (add | delete) (net | host | subnet)
        (<destination> | default) <router> [<metric>]
```

Where:

```

-?          Displays this message.
-f          Flushes network entries in the routing table prior to this e
-h          Flushes host entries in the routing table prior to this e
add         To add a route.
delete      To delete a route.
net         To add or delete a network.
subnet     To add or delete a subnet.
host        To add or delete a host.
destination Is the destination host or network.
default     All destinations not defined with another routing
            table entry.
router      Is the next-hop in the path to the destination.
metric      Number of hops to destination. Metric is
            required for add commands.

```

```
Example: route -fh add net 129.34.10.0 129.34.10.60 1
```

Typically, for a SLIP connection, you will want to assign a default route through the SLIP gateway you attach to. For example:

```
route -fh
route add default remote-host-ip-address 1
```

15.12.12 RESOLV

The RESOLV file in the /TCPIP/ETC directory is used to resolve internet addresses that use the domain name style of addressing. It identifies the local domain of this host, and then identifies the internet addresses of the domain name server and backup domain name server. This file is created during dialer configuration.

```
domain  
openlab.advantis.net nameserver 192.147.13.10  
nameserver 192.124.113.30
```

Chapter 16. CompuServe Information Manager

The CompuServe Information Manager for OS/2 Warp Version 3 (CIM for OS/2 Warp Version 3), is a software product developed by CompuServe that brings new dimensions and a new look to using the CompuServe Information Service.

CIM for OS/2 Warp Version 3 allows new CompuServe members to quickly get acquainted with and use CompuServe more productively. Existing CompuServe members can access, sort, and utilize the online information and services more effectively.

CIM for OS/2 Warp Version 3 features an OS/2 Warp Version 3 Presentation Manager interface with pull-down menus and dialog boxes. It frees you from having to memorize navigational and service related commands. With the ability to see and manipulate multiple objects or windows on your screen, you can access many sources of information without getting lost or wasting time.

CIM for OS/2 Warp Version 3 interacts with CompuServe's network and computer systems using a layered protocol approach to which CompuServe has given the name HOST-MICRO INTERFACE.

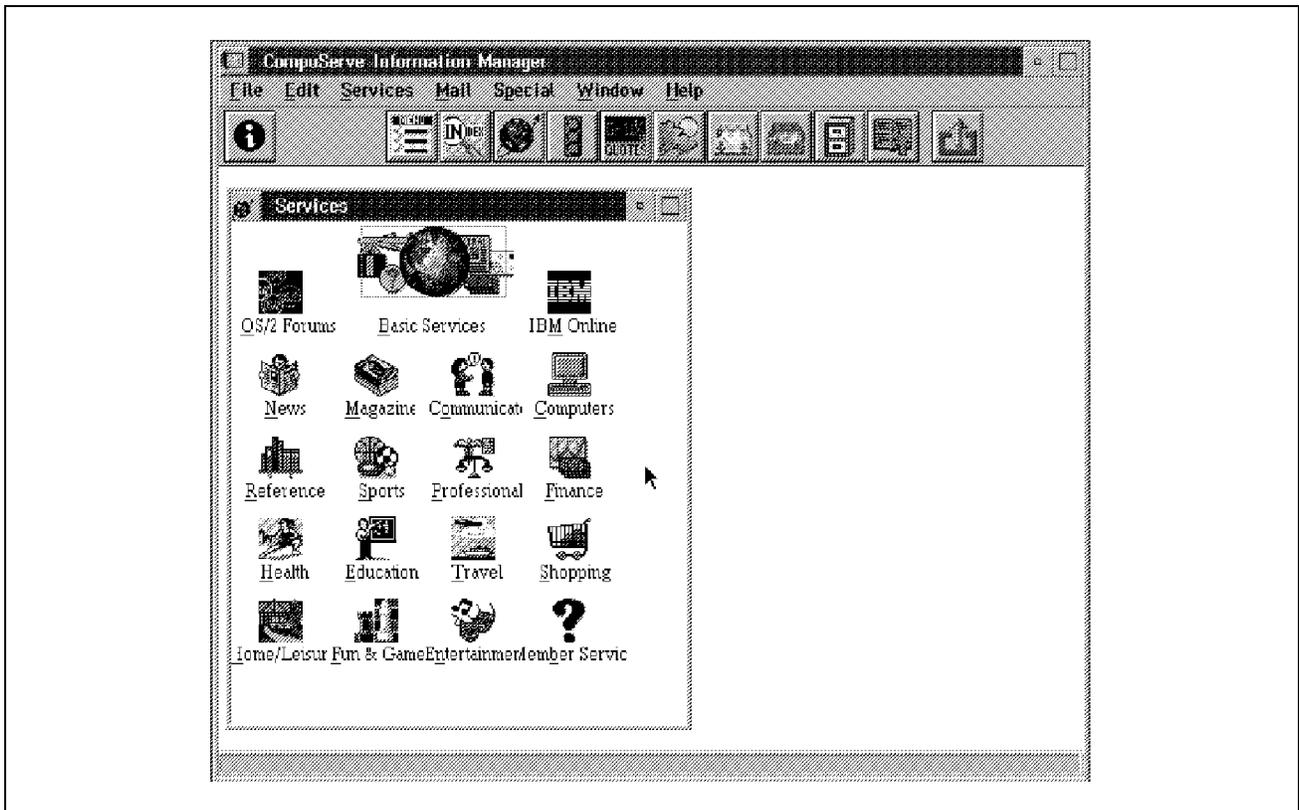


Figure 94. CompuServe Information Manager Main Menu

16.1 Setup Session Settings

In this screen you can select which type of modem you are using and other setting for your own personal use:

- Current Session
 - This displays the current session you are using (default: CIS connection).
- Alternate Session
 - Here you can add an alternate session if you want (default: none).
- Connector
 - This gives you the possibility to select COM1 through COM4; in case you want to use a LAN connection, select INT14.
- Baud Rate
 - The following Baud rates are supported, depending on which modem you are using:

300, 450, 1200, 1800, 2400, 4800, 9600, 14400, 19200, 38400

- Network

The following networks are selectable:

CompuServe

Datev-P

Falnet

Fenics II

GNS Dialplus

Datex-J

Hungray

InfoNet-Euro

InfoNet-Kor

InfoNet-Mex

InfoNet-RSA

InfoNet-Taiw

InfoNet-Wrld

Infonet

Israkav

Lata

Lata-CT

Mercury

Niftyll

Pacnet

Pos-Serve LL

SprintNet

Telepac

Transpac

TTN-Net

Tymnet

VNZ-Net

- Dial type

Here you can select which dial type you want: Tone, Pulse, Direct and Manual.

16.2 Connection

When you select Connection from the pull-down menu, the following information will be displayed:

Last Connection Port ID

Last Connection Baud Rate

Last Connection Session name

Accumulated Connection

Since

Those can be reset to zero

Last Host Alert

16.3 Preferences

To choose preferences, select **Special** from the menu bar, and then select **preferences** from the pull-down menu.

1. General

Within this General screen you can select the following options:

First name first

Last name first

Access Count

Alphabetic

None

Prompt for user Messages in Out Basket

Display News headline Minimized

Prompt for Unsaved Graphics

Play Sounds

2. Display



Figure 95. CompuServe Information Manager Preferences Settings

Within this Display screen you can select the following options:

- Browse
- Favorite places

3. Directories

Within this Directories screen you can select in which directory you want your data stored:

- Support
- Script
- Graphics
- Filing
- Cabinet
- Download

4. Mail

Within this Mail screen you can select how to receive or deliver and even save your mail by selecting the following:

- Do not retrieve
- Always retrieve
- Delete without retrieving
- Retrieved Mail Disposition
- Keep
- Immediate delete
- Delay delete
- Automatically file
- Manual
- After Disconnecting
- Before Exiting

5. News

Within this News screen you can select how to display your news:

- Show Folders
- Show Toolbox
- Delete retrieved stories

6. Messages

Within this Message screen you can select how to display your messages:

- Show News Flash
- Show Toolbox
- Show Forum Logo
- Show Numbers
- Show List

Automatically file

7. Library

Within this Library screen you can select how to set up your library:

Title

File Name

File Size

Access Count

Submission Data

Submitter's ID

Show Numbers

Show List

Allow Graphics viewing by file type

8. Conference

Within this Conference screen you can select how to set up your conference environment:

People Entering

People Leaving

Switching Locations

Changing Nicknames

Accept Group Invitation

Accept Talk Invitation

Room Conversation

Group Conversation

9. CB

Within this CB screen you can select how to set up your "Chat Box":

Show Toolbox

People Entering
People Leaving
Switching Locations
Changing Handles
Only Friends
Invitation
Accept Group Invitations
Accept Talk Invitations
Default Recording Option
Channel Conversation
Group Conversation

10. Terminal

Within this Terminal screen you can select how many lines must be kept in the buffer:

Saved buffer lines (Default 100)

Strip High Bit

Modem Note

Refer to the online guide for supported modem types.

Chapter 17. Person to Person

Person to Person is a suite of programs that help users in different locations work together and communicate with each other through their workstations. Users can connect to each other over one or more of the following communication protocols:

- Asynchronous Communications
- TCP/IP
- NetBIOS
- Novell IPX/SPX

As almost every machine has a serial port, the asynchronous communications option will be available as soon as Person to Person is installed. The other protocols will only be available once additional software has been installed (See 17.5, "Communication Considerations" on page 375 later in this chapter).

17.1 Installation and Setup

Person to Person can either be installed with the BonusPak Install Utility or with its own install program (See 13.1, "BonusPak Install Utility" on page 272 for details). During the second part of the installation process you will be asked to give your addresses for the different communications protocols (NetBIOS Name for NetBIOS, for example). Person to Person will check to see what is installed, and only ask for addresses for those protocols available.

If other communications software is added at a later date, Call Manager will give you the option to set up the relevant addressing information for the new protocol. At least one protocol should be enabled during installation. When installation is complete, you will have a folder with all the necessary icons on your Desktop.

17.2 Call Manager

A *call* is any connection in Person to Person between one user and another. You can have a maximum of 15 calls connected at any time.

The Call Manager's function can be split into foreground tasks and background tasks.

17.2.1 Foreground Tasks

The Call Manager window in the foreground allows the user to configure Person to Person to be able to call and receive calls from other users on the different protocols. All Person to Person settings and options can be view and changed from this window. You can view information about current calls and previous calls in this session. You can select to end a current call.

17.2.2 Background Tasks

Unseen to the user, Call Manager connects the enabled communications and monitors for incoming calls and outgoing call requests.

If a call comes in, Call Manager will handle it depending on which status the user has set for *Answer mode*:

- **Manual**

The call will be started only after the user has agreed to the connection.

- **Autoanswer**

The call will be started automatically without any verification from the user.

- **Bar**

The call will be rejected automatically.

When the user requests to call someone, Call Manager will use the necessary protocol to contact the workstation. If Call Manager is running on the target workstation it will start the call, depending on the answer mode as above. If Call Manager isn't started on the target, the user will be warned that his call could not be connected.

For example, a user is connected to two or more other users over different communication protocols. He can disconnect (or *unshare* in Person to Person) himself from the others and choose to end the call, as the other users have no direct connection to each other. Alternatively, he can choose to be a *passive* user on the call. This means Call Manager on his

workstation will act as a bridge between the two protocols of the other workstations. The benefit of this is that you don't need everyone to have the software for all the different protocols. The disadvantage is that the *bridging* machine may suffer a performance loss, as Call Manager is passing the information between the other two machines.

17.3 Address Book

The Address Book is used to store addresses for anyone you want to contact. You can call someone using the address book by selecting his or her name and the type of connection (Talk, Chalkboard, etc) you want. Alternatively, if you are already using a tool such as Chalkboard, you can select to call someone, and the information will be retrieved from the address book.

17.4 Person to Person Tools

Users may use the following tools:

- **Talk**

A facility for having a conversation between two or more users. Any user sharing a talk connection can send a message to everyone else sharing this talk connection. You cannot send a message to only some of the users participating in the call. If you need to send a message to one of the participants without the others reading it, you will need to start another talk session. A *Talk history* area lists all the previous messages sent by the users.

- **Chalkboard**

A facility for creating and annotating pictures. All the users share the same drawing space. You can create simple drawings, or upload pictures. The pictures can then be edited with the drawing tools (to annotate a bitmap of a screen, for example). Any Desktop window can also be copied, or *mirrored*, to the Chalkboard.

When a window is mirroring into the Chalkboard, it gets an extra pushbutton on its title bar (see Figure 96 on page 374).

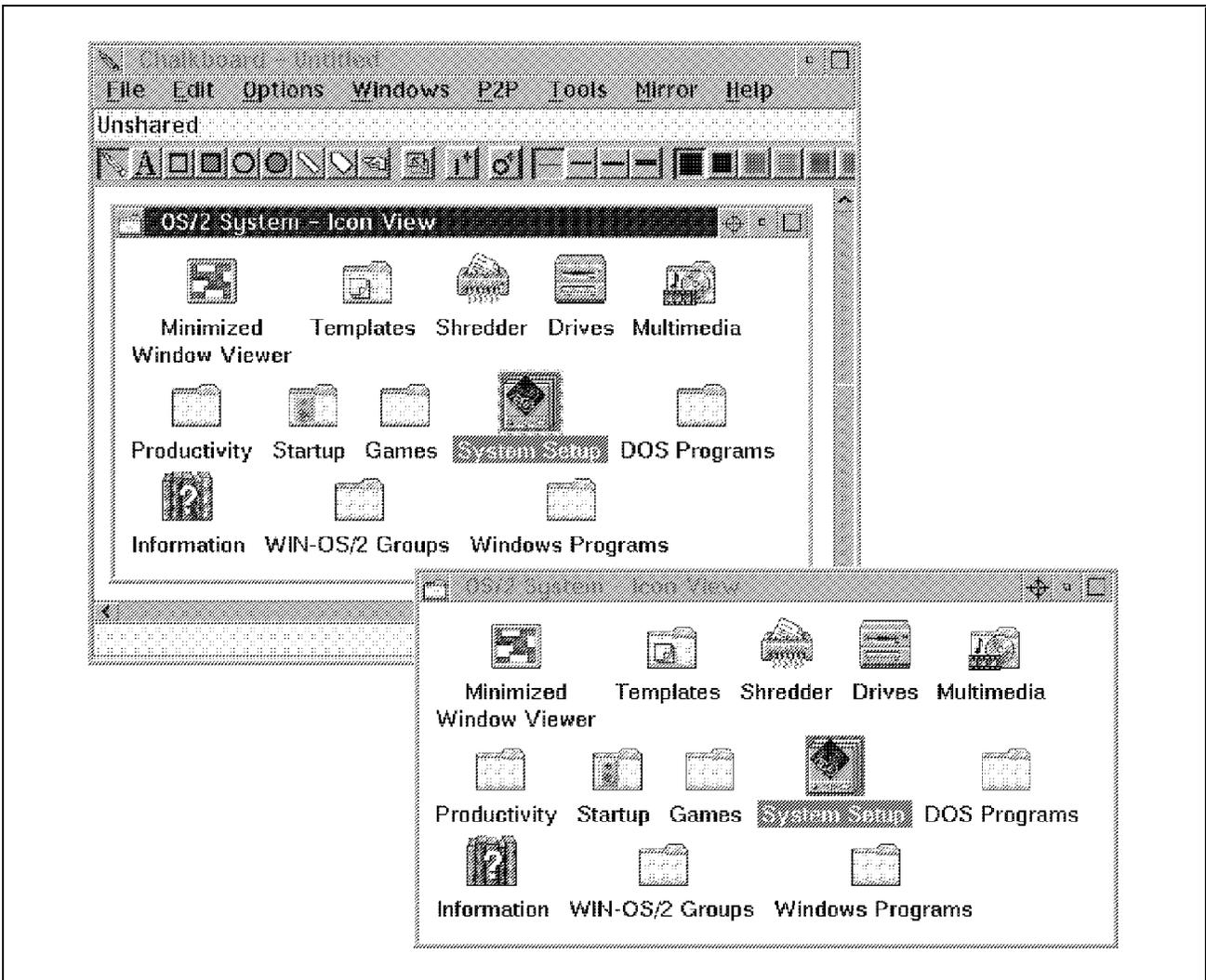


Figure 96. Chalkboard Mirroring a Window

This button will refresh the Chalkboard with the latest view of the window.

- **Video**

Allows you to send video pictures, of yourself for instance, to the other users sharing the call. This is only available to users with an ActionMedia II card. A connection without an ActionMedia II card will show a bitmap instead of the input from the video camera. This enables someone with an ActionMedia II card to connect to someone without an ActionMedia II card and the video to work, although only in one direction.

- **Stills Capture**

Allows you to create bitmaps from your video camera, so you can send them to other users with the Chalkboard facility. Stills capture doesn't connect to other users. This also requires an ActionMedia II card.

- **Clip**

Lets the connected users share a common clipboard. This allows you to cut and paste text to another user. You will need to unshare this tool if you want to use cut and paste without other people changing your text.

17.5 Communication Considerations

Person to Person can communicate over many different protocols. You will only get the option to use the protocols that are available on your system. If you do not have the option to use a protocol in Person to Person, it is probably not there. See if you can use the protocol outside of Person to Person if you think the protocol is installed. The protocol must be enabled before you can connect to someone. This means in the configuration window, *Enabled* is ticked. Below are some tips on connecting Person to Person via the different connection protocols.

17.5.1 Asynchronous Communications

This allows you to use either a modem or a null modem cable. Most modems can be set to 9600 or 19200 baud without problems. Consult the information supplied with the modem if you want to run at other speeds, as the modem must be running in AT compatible mode.

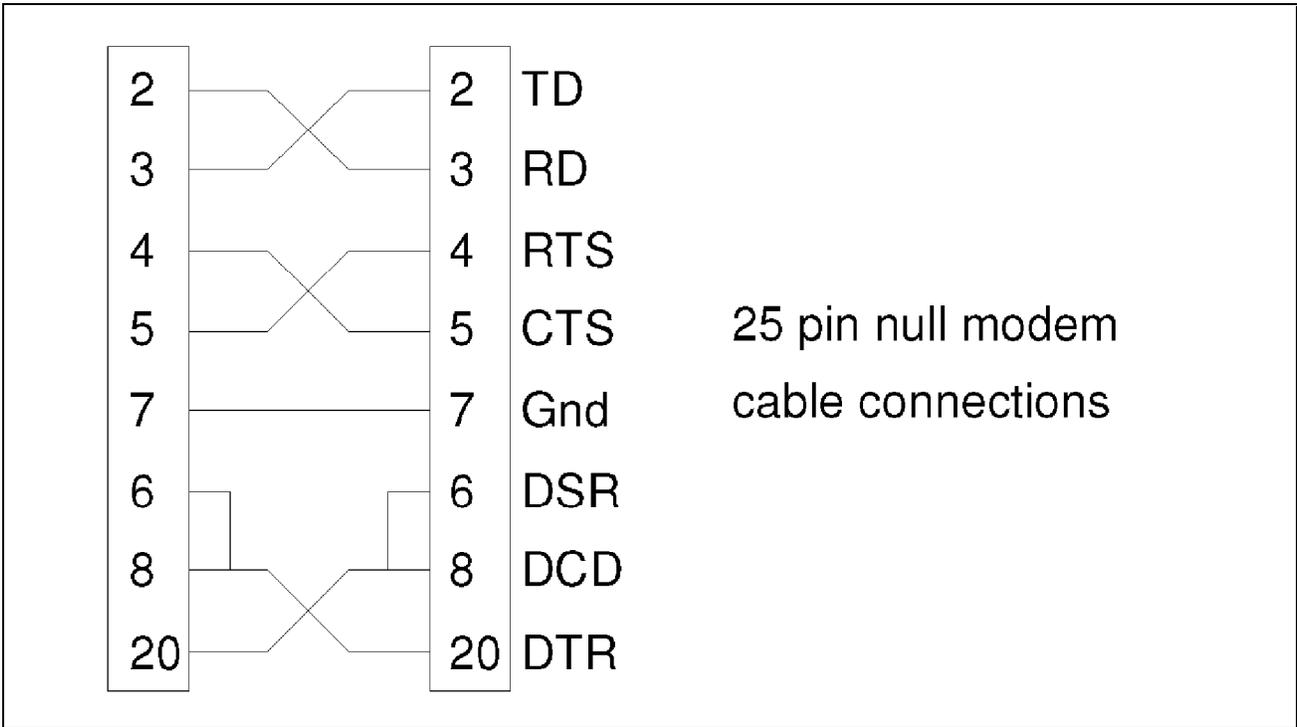


Figure 97. Null Modem Cable with 25 Pin Connectors

The null modem cable should have the wiring pattern as in Figure 97 for 25 pin connectors and Figure 98 on page 377 for 9 pin connectors.

Other connection patterns are possible and may be found on standard cables, but they may cause problems.

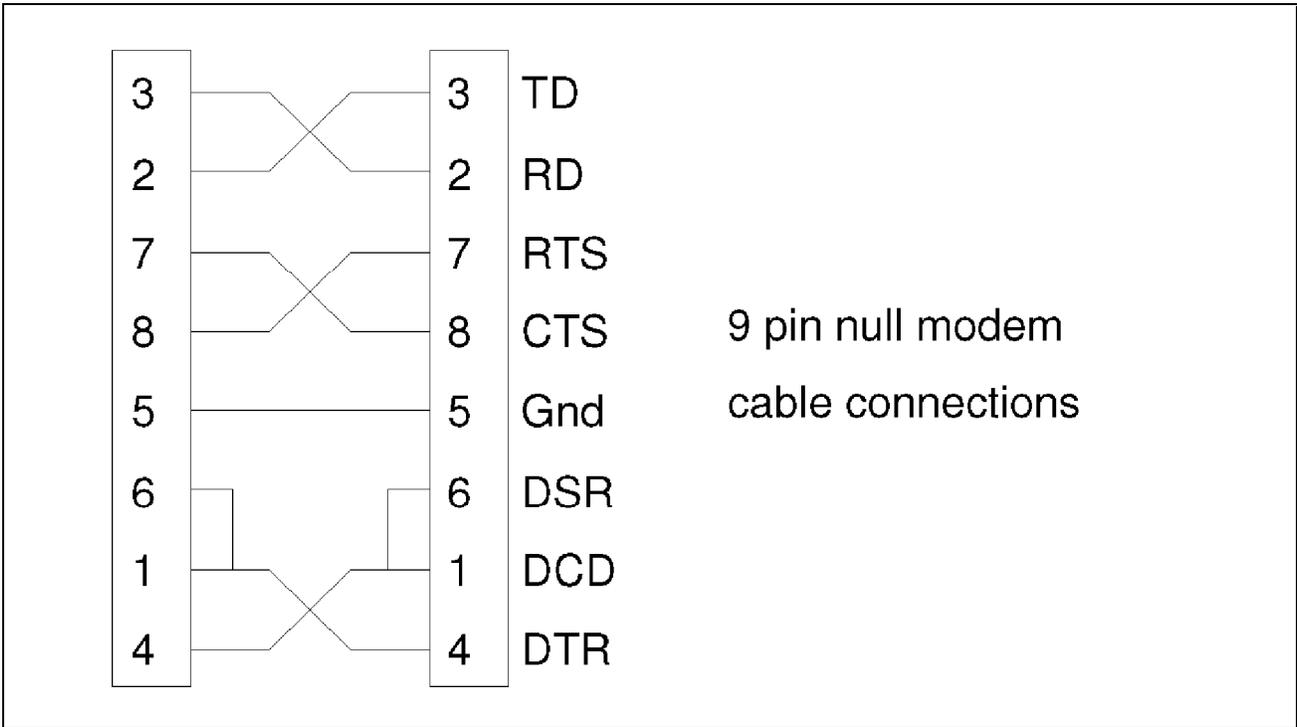


Figure 98. Null Modem Cable with 9 Pin Connectors

Also note that even a null modem must have a phone number for Person to Person to allow a connection. When adding the address of the null modem to the address book, select *Set Address* and enter anything as the phone number (although it would be better to use "0" or "NULL" so it is obvious that it is not used). If the address has been set correctly, the protocol (shown as *Async coms port*) will have (Set) next to it.

17.5.2 TCP/IP

If you do not have a full copy of IBM TCP/IP for OS/2 V2.0 then you can install the IBM Internet Connection for OS/2 application from the BonusPak. See 13.1, "BonusPak Install Utility" on page 272 for installation details. It has all the necessary files to allow Person to Person to recognize and use the TCP/IP protocol. However, it does not have the ability to use TCP/IP over the LAN as in the full IBM TCP/IP for OS/2 V2.0 product.

The TCP/IP support used by Person to Person uses the TCP protocol with port number 1376 (this has been assigned to Person to Person by the Internet Assigned Numbers Authority). You must ensure that no other TCP/IP application uses this port number.

17.5.3 NetBIOS Local Area Network

NetBIOS local area network connections require a P2P NetBIOS name. This is the address your Person to Person session will have on the local area network. Your address can be up to 16 characters long and must *not* be the same as:

- The P2P NetBIOS NAME of any current Person to Person user
- The LAN server/requester name of the machine you are using
- The names used by any other NetBIOS users on the network

Call Manager will not allow you to log on if a duplicate name exists on the LAN. Using a name that is also used by another user will mean only one of you will be able to log on at a time.

Note

Duplicate NetBIOS names can cause problems on LANs and should be avoided at all costs.

17.5.4 Novell IPX/SPX

To use Person to Person you must have Version 2.1 of the NetWare requester for OS/2 or later installed.

17.6 Readme and Online Help Documentation Errors

The information supplied with Person to Person comes in two parts. A README file describes installation and lists common problems and tips. Secondly, an online help directs you in the use of Person to Person and can point you towards where your problems may be if you experience errors.

Note

It even tells you which parameter in PROTOCOL.INI or NET.CFG to increase (and in some cases by how much) if there are no free sessions on the network.

The documentation comes from the full Person to Person product. There are functions that have been removed from the BonusPak version of Person to Person:

- File Transfer between two Person to Person users

- APPC/APPN communication support
- Graphics Tablet support

These functions are still documented in the online help, but you will not be able to use them without the full Person to Person product.

Chapter 18. System Information Tool

The System Information Tool is a tool for aiding you in the configuration of your machine. It shows information about the memory, hard drive, adapters and software in your machine.

The System Information Tool is primarily designed for IBM Personal Systems (PS/1, PS/2, PS/ValuePoint, and ThinkPad). However, many of the features work on systems from other vendors.

18.1 Installation

The System Information Tool can either be installed with the BonusPak Install Utility or with its own install program (See 13.1, "BonusPak Install Utility" on page 272 for details).

During installation, a Program Reference icon is put in the System Setup folder. The System Information Tool can be started from this icon or from the command line (See 18.5, "Running from the Command Line" on page 384 for details).

18.2 Supported Hardware

The amount of information available to the System Information Tool depends on which bus architecture is used. The System Information Tool can query information on any of the following architectures. However, some will give more information than others.

- ISA - Industry Standard Architecture
- EISA - Extended Industry Standard Architecture
- MCA - Micro Channel Architecture
- PCI - Peripheral Component Interconnect
- PCMCIA - Personal Computer Memory Card International Association

Note

The help text for PCI bus architecture is not as detailed as for the others. The user is expected to have some knowledge of PCI to be able to understand the help text.

Architectures such as MCA that report information about adapters installed in the slots, will have an Adapter Information option to select and view. If any adapter isn't recognized by the System Information Tool, then the System Information Tool can be updated with the .ADF file from the options diskette for the adapter or the reference diskette for your system.

To update the System Information Tool:

1. Select **Adapter Information** from the main window.
2. Select **Unknown adapter**.
3. Select **Update** from the menu bar.
4. Select to update the adapter file (update the adapter name allows text entry only).
5. Insert the option/reference diskette with the .ADF file for the adapter.
6. Select **Update**.
7. The System Information Tool must be stopped and restarted for the adapter to be recognized (as all the information is gathered as System Information Tool starts).

18.2.1 Device Protocols

System Information Tool will identify the following device protocols:

- ESDI - Enhanced Small Devices Interface
- SCSI -Small Computer Systems Interface (including support for RAID adapters)
- IDE - Integrated Drive Electronics

Limited information is also available on LAN-attached devices which you have access to.

18.3 System Information Tool on Other Manufacturer's Systems

How much information the System Information Tool can get from a non-IBM system depends on how strictly the manufacturer sticks to the design standards for each part of the system.

The System Information Tool has bitmaps and titles of all IBM systems and will show these on the logo screen while it gets the rest of the system information. The System Information Tool will not be able to recognize

non-IBM systems in the same way as IBM systems, so a default bitmap of a PC is shown.

Note

Some non-IBM Micro Channel systems followed IBM's Micro Channel standards so closely that they used the same model, sub-model and planar ID as the PS/2 they were copying. If this is the case with your system, the System Information Tool may report that you have an IBM PS/2. This will not affect the rest of the information System Information Tool gives you.

18.4 Using the Tool

Starting the System Information Tool will bring up a screen as in Figure 99.

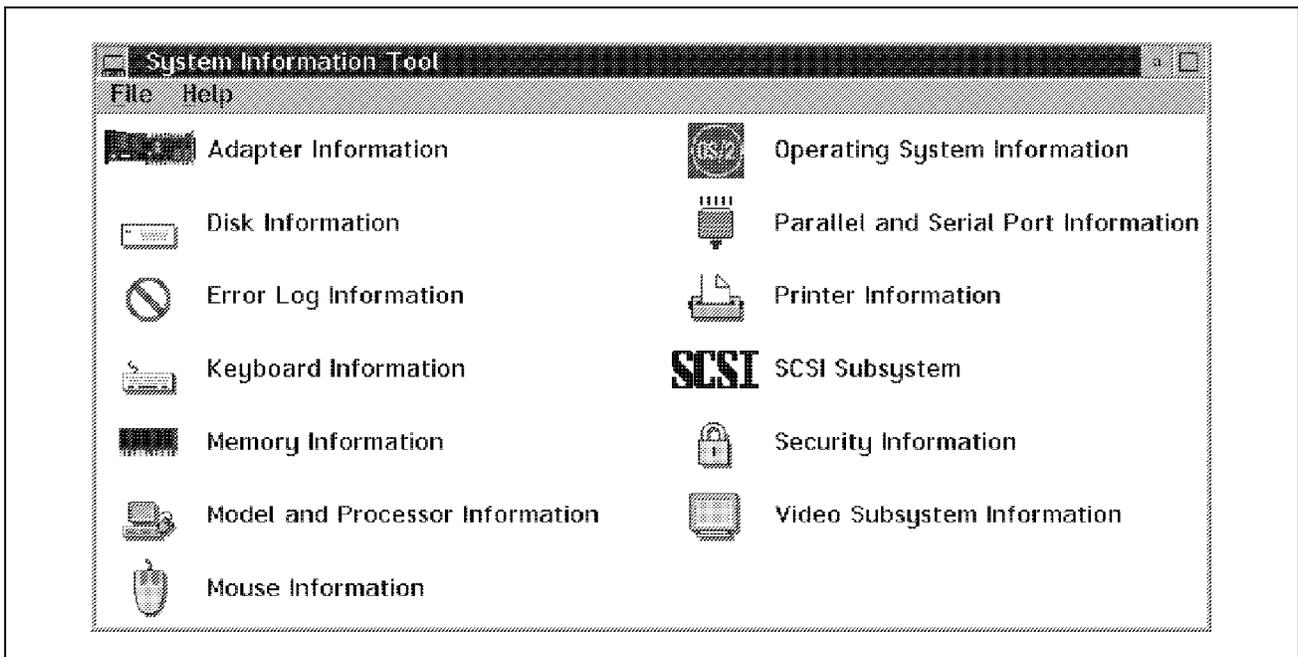


Figure 99. The System Information Tool Main Selection Screen

Once the System Information Tool has been started, simply select the area you want to view. It is worth going through all of it if you have time and you have not used the System Information Tool before, so you can see what information is available. The online help gives detailed descriptions of the information the System Information Tool gives you. From each screen you have the option to make a printout of the information you can see or

generate a history file for the system. These options are available from the File menu on the menu bar.

18.4.1 Making a Printout

If you select to make a printout from the System Information Tool main window, you will get all of the information about the system. If you select print from a subwindow (Adapter Information, for example) you will only get information about that subsystem. You can send the output to a file as well as a printer.

18.4.2 Making a History File

When you select to generate a history file, all of the information about the system is stored in a binary file. This could then be stored somewhere for reference. When you want to view this configuration again, you start the System Information Tool with the /F parameter (for details of the /F parameter see 18.5, "Running from the Command Line" below).

18.5 Running from the Command Line

System Information Tool can be run from the command line by typing:

```
SYSIGUI
```

However, there are several parameters which can be used to adjust how the System Information Tool runs:

Parameter	Function
/P:<target>	The information collected by System Information Tool will be written in a textual format to the target. The target can either be a file or a logical printer like LPT1. The logo screen will be shown while the information is collected.
/H:<filename>	This will create a history file of the information collected by System Information Tool. See 18.4.2, "Making a History File" for a description of history files.
/F:<history file>	This will make the System Information Tool take the information from a history file instead of gathering it from the machine. This allows you to review the configuration of someone else's machine if they can't boot up to use the System Information Tool themselves (they can still create

a history file by booting from the OS/2 install diskettes and running System Information Tool with the /H and /NOLOGO parameters).

- /NOLOGO** This stops the logo screen from being displayed. This parameter can be used in conjunction with any of the other parameters.
- /B** Bypasses warning messages. This is useful if you are running the System Information Tool unattended. This parameter can be used in conjunction with any of the other parameters.

18.6 Extending System Information Tool

The System Information Tool is a part of the IBM Netfinity product. Netfinity allows you to use the System Information Tool across a network, so you can look at other users' configurations. You are also able to see a screen shot of their screen, and send line commands for the other system to run. A flexible security system will allow you to limit the access of these functions (to network administrators, for example). Netfinity would extend the use of System Information Tool from a configuration tool for the user, to a problem determination tool for the system administrator.

18.7 Known Problem Areas

Below is a list of known problem areas. These are not errors in the System Information Tool, though this may be how they first appear to look.

Note that the System Information Tool has been tested for OS/2 2.0 or later. However, it is advised that you do not run it on OS/2 2.0 without at least ServicePak 1 (XR06055) installed.

18.7.1 DOS Settings

For the System Information Tool to get information about PCI adapters, it queries the adapter through a DOS session running SYSDOSDT.EXE. The DOS session closes once it has got its data, so if it is working, you will not even notice the DOS session happen. Otherwise, System Information Tool appears to hang while gathering the data.

Users who had reported this problem with the System Information Tool before found that it was because either they did not have DOS support installed or had changed the path or settings for the standard DOS session.

If you are seeing problems with the above, the first thing to check is if you can start a DOS window or full-screen session without problems.

18.7.2 DCF/2

There are known problems running System Information Tool with DCF/2. You should not try to run these two products at the same time.

18.7.3 TRAP Errors

This has been most prominent on machines with CD-ROMs installed. The System Information Tool makes a *GetGeometry* call through its SYSIOS2.SYS driver to the adapters .ADD drivers. The .ADD should be able to handle this call. However, some manufacturers have not included it in their driver, or have only included it when the CD is in the drive. This results in the System Information Tool hanging at the gathering information stage. Running System Information Tool from the command line with this problem may result in a TRAP 000E rather than a hang in System Information Tool.

If you suspect this is the case, then REMark out the line:

```
DEVICE=C:\OS2\APPS\SYSIOS2.SYS
```

from your CONFIG.SYS and the trap should not occur. In case you have more than one adapter driver installed and you want to determine which of your adapter drivers is causing the error, you will need to REM them all out and add them back in one at a time until the problem reoccurs.

18.7.4 SYSIBASE.EXE

This file name appears in the window list while the System Information Tool is running. SYSIBASE.EXE is the background process that gathers the information about the system. SYSIBASE.EXE will close when System Information Tool is closed.

Chapter 19. Multimedia Viewer

Multimedia Viewer is a tool for managing and viewing multimedia objects such as images, video, animation, audio, and text files. Multimedia Viewer uses *thumbnails* to represent the objects and shows your image in a high-quality 256 color small size image. The central object of the Multimedia Viewer is the *Light Table* folder.

Multimedia Viewer shows video, audio, and text files with special graphical representation that identifies the file type. The media objects can be dragged and dropped to execute other tools associated with the use of media objects, such as story editors, image editors and drawing programs.

Multimedia Viewer is an object manager, offering desktop management capabilities that simplify the challenging task of organizing, looking for and displaying images, video clips and audio files.. Multimedia Viewer makes it possible to display all of an application's media objects simultaneously as icons, as if they are photo slides on a photographer's light table.

Slides are created when Multimedia objects are moved, copied or referenced into a Light Table folder.

Double-clicking on the slide frame of one object, Multimedia Viewer allows you to see/watch/listen to the image/video/audio object.

Double-clicking on the center of one object, Multimedia Viewer brings you the Workplace Shell application associated with that object.

19.1 Installing Multimedia Viewer

Multimedia Viewer installation requires from 2.5 to 2.9 MB, depending upon the chosen features. The Multimedia Software Support provided by OS/2 Warp Version 3 must be installed before installing Multimedia Viewer.

Warning!

As Multimedia Viewer is a subset from the Workplace/2 software, both products cannot be installed in the same personal computer. If in you have Workplace/2 installed, when you install Multimedia Viewer, Workplace/2 will be automatically de-installed.

19.1.1 Multimedia Viewer Installation Steps

To install Multimedia Viewer follow the steps listed below:

1. Open an OS/2 window.
2. Insert the BonusPak Installation Utility diskette in the appropriate drive and change to that drive.
3. Now type `INSTALL` and press Enter.
4. When the BonusPak Installation Utility shows you a number of applications which you can install, select `MMVIEWER` and click on Install.
5. Insert the Multimedia Viewer/Video IN for OS/2 diskette.
6. Click on OK or press Enter to continue.
7. Choose the features you want to install. If the feature is grey, your features will be installed. To see other features available, click on the down arrow on the right side of the screen. The available features are:
 - Multimedia Viewer
 - PCX Support
 - GIF Support
 - Targa Support
 - TIF Support
 - AIF - Apple Interchange File Format Support
 - IFF - Amiga File Format
 - AU/SND - Sun/Next File Format Support
8. Click on Install.
9. You will be asked if you want the installation program to change the `CONFIG.SYS` file automatically (it is recommended to do so, otherwise you have to change it by yourself). If you do not want the automatic change, it will create a file named `CONFIGCH.NEW` on the `\MMOS2` directory with the changes you have to make to the `CONFIG.SYS` file later. This file is a copy of the `CONFIG.SYS` file that would have been generated if the installation program had made the changes.
10. When the installation completes, click on Cancel to exit the installation program.
11. For the changes to take effect, shut down your system and restart.

19.2 The Light Table Folder

The idea of the Light Table comes from a photographer's light table, where you can see a slide, but to view it properly, you must put it in a slide projector.

In this case, pictures have *thumbnail* size images as icons, with *frames*, like a photographer's slide frames, around them. Audio recordings have a microphone icon, and video recordings have a clapper board icon. Both of these also have frames around the icon image. Selecting the frame with the mouse causes the Multimedia Viewer browsers to be used to view the object. Selecting the icon causes the normal OS/2 function to be run on the object.

For example, you may have selected for .BMP files to start your favorite drawing package so you can edit them. Selecting the frame causes the relevant Multimedia Viewer browser to be started. The exception to this is the Text Browser. As the text object in the Light Table looks much the same as a text object outside of the Light Table, it has no frame. When you double-click on the text object, the text browser is started. Browsers will be discussed in more detail later in the chapter.

19.2.1 Creating a Light Table Folder

As part of the installation of Multimedia Viewer, a Light Table folder template is put in the templates folder.

Light Table folders are created in the same manner as standard OS/2 folders and can be created using the Light Table template from the templates folder. This will allow you to create new light folders, so you can manage your multimedia files in the same way as your other data files. That is, separate them out into manageable groups rather than store them all in one place.

19.2.2 Adding New Files to a Light Table

There are three ways to add files to a Light Table:

1. Dragging a multimedia object from a OS/2 folder to the Light Table
2. Copying a multimedia object from another OS/2 folder to the Light Table
3. Making a reference from a multimedia object to a Light Table

The preferred method of adding multimedia data objects to a Light Table is to create a *Light Table Reference*. In this case, Multimedia Viewer makes a reference from a multimedia data object to the Light Table. It doesn't copy the full file, it just copies a reference to the file to the Light Table directory.

19.3 LT References

Part of Multimedia Viewer is a new object reference called an LT reference. LT references can only be put into Light Table folders. They contain all the normal information about the object, plus the additional information used when you select the frame. For example, it stores an association to the Image Browser for .PCX files, so the Image Browser is started when you double-click on the frame.

LT References can be made to any multimedia (audio, video/animation or image) files.

Follow the steps below, to create Light Table references:

- Open the **Light Table** where you want to insert the object.
- Find the data object you wish to use by opening its folder.
- Use mouse button two to select the data object to bring up the object's pop-up menu.
- Select **Create LT Reference** from the pop-up menu.
- Select the Light Table you want the data object to appear in. This looks like the choice you get for copying or shadowing objects, except the OK button is not selectable until you have selected a Light Table folder. When you click on **OK**, the icon is put in the Light Table folder you selected.

You can also create an LT reference by dragging a multimedia file to a Light Table folder.

- Dragging with no keys pressed down will move the object to the Light Table and convert it to a LT reference.
- Dragging with Ctrl pressed down will create a new LT reference in the Light Table, and also leave the original object in its folder. This is equivalent to a normal OS/2 copy object.
- Dragging with Ctrl+Shft pressed down performs a normal OS/2 shadow object action. You cannot create a LT reference by shadowing a multimedia file to a Light Table folder, as extra information is needed to create the LT reference.

19.3.1 Light Table Considerations

Light Table Reference objects are similar to Shadow objects. They are a reference to another object or file. Unlike Shadow objects:

- References provide storage for slide images.
- References are preserved when the parent object is not present.

These features allow Light Table References to display slides in a Light Table even when the parent object is removed. For example, if a CD-ROM containing an image is removed, the image slide will remain in the Light Table.

19.4 Setup Multimedia Viewer Audio and Video

If you want to work with audio and video files in Multimedia Viewer additional hardware may be required. For audio, an audio capture/playback card supported by OS/2 is needed, for example:

- IBM Audio Capture and Playback Adapter

For a high-quality motion video full screen (p to 30 fps), you need an adapter card. For example:

- For DVI digital video, an IBM PS/2 Actionmedia II Display Adapter card

To play Ultimotion digital software video file, you do not need any additional hardware.

19.5 Supported Media Browsers

This section will discuss the following media browsers for Multimedia Viewer:

- Audio browser
- Image browser
- Video/animation browser
- Text browser

Multimedia Viewer automatically associates the appropriate media browser to a multimedia object based on its file type or file extension. The media browsers can be invoked by positioning the mouse pointer anywhere over the slide frame and double-clicking the mouse button one. If the mouse is positioned over the middle of the object (not the border) double-clicking

mouse button one will behave as it normally does in a standard OS/2 folder and will start the related Workplace Shell application.

The text browser can be invoked by double-clicking on the text object (text files on a Light Table don't have slide frames).

The browsers will work with any file type supported by the OS/2 Multimedia system.

19.5.1 Audio Browser

You can browse audio files from a variety of sources. With the appropriate software and hardware, you can record your own music and speech files, or you can look for prerecorded sound track libraries of music covering a wide range of beats and moods. Short sound effect clips are also available from many sources.

In Table 33 you will find which audio types are supported by Multimedia Viewer.

Extension	Description
._AU	IBM AVC digital. 1
.MID	MIDI and RIFF MIDI (not AVC MIDI). MIDI files are stored in a format used by musical equipments, such as synthesizers and drum machines, and enable computers and electronic musical instruments to communicate with each other. 2
.WAV	WAVE Digital default. 2
.AIF	APPLE sound file.
.IFF	AMIGA sound file.
.AU	SUN sound file.
.SND	NEXT sound file.
Note: 1 Any ._AU file must have a corresponding ._AD file with the same name in the same directory or it will not play.	
Note: 2 MIDI files can play much longer and yet are smaller than .WAV files. That is because MIDI files contain commands for playing the audio rather than the actual audio data. The commands represent musical events, such as turning a note ON or OFF, as well as timing commands that specify the duration of the note sound.	

Storage Requirements:

The amount of storage an audio file uses is directly related to the type of the audio file. Each audio file has its own storage requirements. You may need to consider a trade-off between storage needs and sound quality.

Each mode has increasing storage requirements:

- Voice - 5.5 KB/s, single channel
- Music - 11 KB/s, single channel
- Stereo - 22 KB/s, two channel
- Hi-Fi - 22 KB/s, single channel

Storage required by audio file can be large, for example: an AVC story that uses 15 minutes of voice quality and 2 minutes of stereo quality music segments would expect to use:

$$(15 \text{ min} * 5.5 \text{ KB/s} * 60 \text{ s/min}) + (2 \text{ min} * 22\text{KB/s} * 60 \text{ s/min}) =$$

$$4,950 \text{ KB} + 2,640 \text{ KB} = 7,590,000 \text{ bytes of total storage.}$$

19.5.2 Image Browser

The Image Browser can browse image files from a variety of sources. To create these images you can use several different tools from the Ultimedia Tools Series and non-IBM products. Depending on the installed hardware in your PC you can capture, scan or draw images.

Table 34 contains details of image types supported by Multimedia Viewer.

Type	Extension	Description
AVC	._IM and !.IM	IBM AVC digital.
Builder/2	._IM and ._ID	Ultimedia Builder/2.
Bitmap	.BMP	OS/2 1.x, OS/2 2.x, WIN 3.x.
Icon	.ICO	OS/2 2.x.
PCX	.PCX	Used by draw, paint, image processing, desktop publishing and scanning software.

<i>Table 34 (Page 2 of 2). Image File Types and Extensions</i>		
Type	Extension	Description
TIFF	.TIF	Tagged Image File Format - Used by draw, paint, image processing, desktop publishing and scanning software.
TARGA	.TGA	Used by draw, paint, image processing, desktop publishing and scanning software.
DIB	.DIB	Device-Independent bitmap. The format used by OS/2 and Windows bitmaps.
GIF	.GIF	Graphics Interchange Format - CompuServe general interchange file format.
PCD	.PCD	Photo CD Files.

Storage Requirements:

The amount of storage an image file uses is related to the type, number of pels and colors of the image file. Each image file has its own storage requirements.

19.5.3 Video Browser

The Video Browser supports a number of different video types. Table 35 details which video types are supported by Multimedia Viewer.

<i>Table 35. Video File Types and Extensions</i>		
Type	Extension	Description
Actionmedia II	.AVS and .DVI	DVI-Digital Video Interactive video is digital video you can play directly from your hard disk. To play DVI video files, you need an Actionmedia II adapter in your system.
MPEG	.MPG, .VBS and .DAT	MPEG-Motion Picture Experts Group is a international standard for data compression. You need a ReelMagic video playback adapter to play a MPEG file.
Ultimotion or Indeo	.AVI	Software Motion Video is digital video you can play from your hard disk. You do not need any additional hardware to play Ultimotion video clips.
Animation	.FLI and .FLC	Autodesk animation file formats is recognized as the industry standard for animation on personal computers.

Storage Requirements:

DVI video will take approximately 6MB for every minute of video. Using the default settings, Ultimotion video needs approximately 10MB of hard disk space for every minute of video.

19.5.4 Text Browser

The text browser can be invoked by double-clicking on the text object and will load the text editor. Text objects on a Light Table folder don't have Slide Frame representation. Table 36 gives a summary of some supported file formats for the text browser.

Type	Extension	Description
Plain text	.DOC and .TXT	ASCII text files.
C program	.C and .H	C source files and C header files.

Chapter 20. Video IN/2

The primary purpose of the Multimedia Video IN/2 Version 1.0 is to provide support for capturing and editing digital motion video. The Multimedia Video IN/2 supports a number of different digital motion compression/decompression algorithms. The video objects created with the Multimedia Video IN/2 can be played back using OS/2 Version 2.1 and/or OS/2 Warp Version 3.

Compression algorithms supported in Version 1.0 are Indeo and Ultimotion using the Audio/Video Interleaved (AVI) file format. This video can then be played back using the software-only digital motion video player delivered with the enhanced multimedia functions provided in OS/2 Version 2.1 and OS/2 Warp Version 3.

Multimedia Video IN/2 provides the capture capability and new MPPM/2 APIs for developing nonlinear editors. Multimedia Video IN/2 allows end-users and developers to take advantage of the conducive multimedia environment that comes with OS/2 Version 2.1 and OS/2 Warp Version 3.

20.1 Functions of Video IN/2

Multimedia Video IN/2 includes the following functions:

1. Provides a framework for software motion video compression, recording, and playback, and includes standard video compression technologies.
2. Supports device drivers for prevalent capture cards. (Refer to the Video Capture Cards matrix Table 37 on page 400 for further details.)
3. Supplies a software Motion Video recorder/editor application.
4. Includes a utility program for viewing and manipulating AVI files.
5. Complements Ultimedia Builder/2, Perfect Image/2 and Workplace/2.
6. Pluggable CODEC architecture for the easy addition of new video compression standards as they become available.

These functions are grouped into three main areas:

1. Software Motion Video Capture

Capture is accomplished by a digital video Media Control Driver (MCD) working in conjunction with hardware video capture adapters and allows support for different data compression types and formats.

2. Video IN/2 Recorder Application

Creates movies from bitmaps, files and video capture adapters.

Provides a way to invoke and control the capture/compression software for recording digital motion video. Also provides editing, conversion, review capabilities and bitmap capture.

3. AVI File Utility

The AVI file utility can perform operations on the Audio Video Interleaved (AVI) file. The AVI format, which is the standard format for software motion video, interleaves video and audio tracks in the file to improve access time during playback. It can do the following:

- Create an uncompressed movie from a series of images.
- Split the AVI file into an audio file and an AVI file without audio.
- Merge an audio file with an AVI file.
- View information about the AVI file.
- Change the interleave ratio of audio and video frames.
- Change the skew between the audio and video.
- Add and remove chunks and an index from the AVI file.

20.2 Hardware Requirements

Multimedia Video IN/2 requires the following at the minimum: IBM Personal System/2, IBM Industrial Computer, IBM ValuePoint, IBM Personal System/1 or a non-IBM personal computer with a 386-SX compatible or higher processor. Also 4MB system memory and 20 to 40MB of hard disk space available to the operating system, depending upon installation options selected is needed. IBM recommends 6MB or greater system memory and an 80MB or greater hard disk for most application scenarios.

For better performance and production of videos in a professional environment, we recommend a 486 system minimum for real-time recording. 12MB of system memory for the capture environment is recommended. Also add 10MB to your existing hard disk; this is required to save captured movies (generally using 10MB/minute).

One of the following audio capture adapters is needed:

- IBM Audio Capture and Playback Adapter
- Media Vision Pro, AudioSpectrum 16

- Creative Labs, Sound Blaster
- ESS Technology, AudioDrive
- IBM, Audiovation Adapter
- ESS Technology, ESS-688
- Media Vision, Jazz 16
- DSP Solutions, Portable Sound Plus
- Aztech Systems, Sound Galaxy Nova-16
- IBM, Business Audio
- Toshiba, BS Aud
- Chrystal Semi, ThinkPad Audio

An audio capture adapter is recommended but not required for video capture.

One of the following video capture adapters is required:

- Creative Labs Video Blaster
- Samsung Video Magic
- New Media Graphics Super Video Windows
- Omnicomp Graphics M&M Basic
- Sigma Designs ReelMagic
- CEI Video Clipper
- AI Tech Wavewatcher
- Hauppauge Computer Works WinTV
- IBM Video Capture Adapter/A
- Jovian Logic SuperVIA
- Sigma Designs WinMovie
- Jovian Logic QuickVIA

Refer to the video capture cards matrix in Table 37 on page 400 for further details on all the current video capture adapter cards supported. Refer to IBM bulletin boards for other device drivers available.

Table 37 (Page 1 of 2). Video Capture Cards Supported

Adapter	Bus	NTSC	PAL	Inputs	Overlay
VCA/A	MC	NTSC		C S R	
VCA/A	MC		PAL	C S R	
SuperVia	MC	NTSC		C S	
SuperVia	ISA	NTSC		C S	
SuperVia	ISA		PAL 1	C S	
QuickVia	ISA	NTSC		C S	
QuickVia	ISA		PAL	C S	
QuickVia	MC	NTSC		C S	2
WinMovie	ISA	NTSC		C S	
WinMovie	ISA		PAL	C S	
WinMovie	MC		PAL	C S	2
Video Blaster	ISA	NTSC	PAL	C3	3
Video Magic	ISA	NTSC	PAL	C3	3
Super Video Windows	ISA	NTSC	PAL	C3	3
Super Video Windows	MC	NTSC	PAL	C3	4
M&M Basic	ISA	NTSC		C3 S3	
ReelMagic	ISA				5
Video Clipper	ISA	NTSC	PAL	C3	
Wavewatcher	ISA	NTSC	PAL	C3	

Table 37 (Page 2 of 2). Video Capture Cards Supported

Adapter	Bus	NTSC	PAL	Inputs	Overlay
WinTV	ISA	NTSC		C3 S TV	

Note:

- 1 Card no longer made.
 - 2 First MC card not available yet (should work with ISA code).
 - 3 Card requires a VGA feature connector and VGA mode display.
 - 4 Requires VGA mode display.
 - 5 Uses MPEG format.
- C Composite input.
 C3 Three different composite inputs.
 R RGB (red, green and blue) input.
 S S-VHS or Y/C input.
 S3 Three different S inputs.
 TV Television tuner.

The following sources can be used to create movies:

- Video tape
- Camcorder
- Bitmap files
- AVI files using Indeo or Ultimotion
 AVI files are recorded with supported Video IN/2 codes.
- Videodisc
 Video IN/2 provides Videodisc support for Pioneer laserdisc models LD-V4200, LD-V4300D, LD-V4400, and LD-V8000.

20.2.1 Installing Video IN/2

Before you install Video IN/2 it is recommended that you disable System Sounds if you have them installed on your PC, as they can interfere with video recording.

To disable System Sounds:

1. Open the **OS/2 System** icon.

2. Open the **System Setup** icon.
3. Open the **Sound** icon.
4. The Sound - Setting screen is displayed. Click mouse button one on the **Enable system sounds** check box to disable system sounds.
5. Close the windows.

Descriptions of all installation options can be found in the README.VIN file located in the root directory of the Multimedia viewer diskette. This file includes descriptions of your installation options and last-minute information not included in the documentation.

20.2.2 Installation Steps

Use the BonusPak Installation Utility or complete the following steps to install Video IN/2:

1. Put the BonusPak Multimedia viewer diskette in drive A:.
2. Open an OS/2 command window.
3. Type `MINSTALL /F:CONTROL.VIN`.
4. Change the Source Drive to A: if it is not already A:.. The target default drive is C:.. Change the target drive if your target drive is not C.
5. Select the features you want to install in the Features field.

Only install the features that support your video hardware. For example, if you install a feature that supports a video capture device you do not have, the feature can not be used, and it takes up space on your machine.

If you change your mind about a feature selection, you can deselect it by clicking on its name again. To see all of the features, use the down arrow key or the mouse to scroll through the list. Notice that the Features to Install field shows the current number of features selected.

6. Select **Install** and follow the instructions in the subsequent windows to complete the installation.

If you have an ISA video capture device, you will be asked to supply certain information about the device during installation.

During installation you can have your CONFIG.SYS file automatically updated. If you choose not to have the file updated for you, the installation program creates a file called CONFIGCH.NEW and places it in the \MMOS2 directory of the target drive. Use this file as a reference for modifying your CONFIG.SYS file before you can use Video IN/2.

A window is displayed prompting you for how many video capture devices you have in your computer. If it is more than one, change the number. Select **OK** when the number is correct.

7. To activate Video IN/2 support after installation, shut down your computer and then restart it.

20.3 Software Motion Video Capture

Software Motion Video Capture includes the following functions:

- Software implemented digital video Media Control Driver (MCD).
- Motion video software works in conjunction with one of numerous hardware capture adapters. (Refer to the Video Capture Cards matrix Table 37 on page 400 for further details.)
- Uses either Indeo or Ultimotion compression algorithms.
- Supports a wide range of frame rates and frame sizes.
- Capture is in real-time or from frame accurate devices.

Software Motion Video Capture is accomplished by a digital video Media Control Driver (MCD), which works in conjunction with hardware video capture adapters and allows support for different data compression types and formats. The digitizing and compression of motion video using Indeo or Ultimotion 1 software technology enables video to be treated like any other multimedia data object. The Indeo and Ultimotion 1 AVI files created are used in the software for motion video playback only. UltiMotion 1 offers the highest quality playback without hardware. The video recorder provides end-user access to these functions, as well as editing operations.

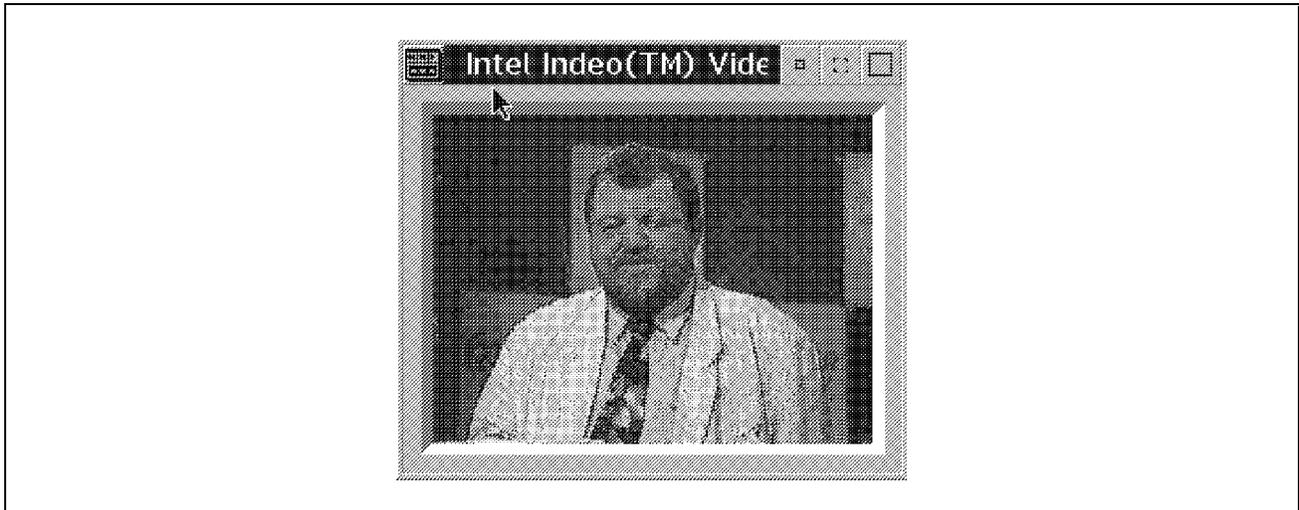


Figure 100. Video Movie Displayed

Digital video can be combined with digital audio and still images then stored on standard peripheral devices such as CD-ROM drives or hard disks.

20.3.1 Capturing/Recording

During capture audio and video are recorded separately, and then interleaved when the file is saved to form an AVI file. With this utility the audio can be split from the video; audio can be merged into the video ; the interleave ratio of video to audio chunks can be modified; and the skew between audio and video can be changed. Splitting audio from video and merging audio into video can be used together or separately to create silent movies or sound tracks to modify or change the audio associated with a movie.

An ideal movie has one chunk of video to one audio chunk, a 1:1 interleave ratio. If a movie has a 1:1 interleave ratio, the skew between audio and video chunks can be changed so that the audio is stored before the corresponding video in the AVI file. This helps to ensure that the audio buffers will remain full as the movie plays, and that frames are not dropped as a result of trying to maintain audio continuity.

In addition to AVI manipulations, the AVI File Utility enables the creation of "raw" AVI movie files, or animations, from a series of images. These images need to be equal size, and can be any combination of the supported images types. This includes the image types supported by MMPM/2 in OS/2 Version 2.11 and OS/2 Warp Version 3 and those supplied by Perfect Image/2. The images and any pauses are placed in order to be recorded, and the frame rate is specified. From this source information, a "raw" AVI file is generated.

Compression can be achieved by bringing this raw file in as source input for the record-from=file capability in the Video In Recorder. If desired, a sound track can then be added by using bitmaps that are output from animating packages, bitmaps created from the Video In Recorder, bitmaps altered using Perfect Image/2, or from any number of other places.

20.3.2 Recording

Before recording you should set up Video IN/2 for recording.

Recording from a VCR:

1. Open **Video IN/2 Recorder** icon.
2. Indicate that you will record from a line device:
 - a. Select **Options**.
 - b. Select **Device Selections**.
 - c. Select **Line in**, in the Video Source Device field.
3. Select the recording profile:
 - a. Select **Options**.
 - b. Select **Record** setup.
 - c. Select **Real-Time**.
4. Open a monitor window to view the incoming video image:
 - a. Select **Options**.
 - b. Select **Monitor video**.
5. Use the controls on the VCR for example, use the play and stop buttons on video player, to select where you want to start recording from.
6. Cue the Video IN/2 Recorder for recording, so recording can begin immediately:
 - a. Select **Control**.
 - b. Select **Recording**.
 - c. Select **Cue for Record**.
7. Record your movie:
 - a. Press the Play button on the VCR.
 - b. Press Record to begin recording.
 - c. Press Stop when the recording is complete.

8. After recording has finished, save the recording as a movie file:
 - a. Select **File**.
 - b. Select **Save as**.
 - c. Type a file name with an AVI extension.

While recording, the video and audio source may be monitored to ensure that the correct video sequence is being captured. The video monitor can be used to reflect adjustments in brightness, color, contrast and tint to be made to the recorded video. It is also possible to isolate a rectangular portion of the monitor video for video capture, by drawing this region directly on the monitor video window. This image-cropping can also be useful during bitmap capture. Here, the Video IN Recorder captures the image in the monitor window, or inside the monitor window's crop region, into the 24-bit RGB OS/2 bitmap format.

After recording, the Video IN Recorder can be used to edit the video, by marking regions to be cut, copied or pasted in to the same video or other video files.

You can record from other devices such as Videodiscs and files.

20.3.3 Recording from a File

Recording from a pre-recorded AVI file can be done using only the frame-step recording method. Using an existing file as the video source enables you to change some of the settings made when the file was created. Settings that can be changed include the compression type, maximum data rate, reference frame interval, video quality and an indicator that determines whether or not the audio track is included in the file.

When an AVI digital video file is selected as the video source, the Video IN Recorder appears with two sections. Each section has a group of controls: one for managing the video recording object, and another for managing the AVI source file.

Using a file as the video source enables you to change the compression type of the data, decompress the data, or compress an uncompressed file. You can select a **Compression type** or **No compression** from the Record Setup notebook and then record the file. Using this technique you can modify the following types of video data:

- Uncompressed RGB5-6-5
- Uncompressed YUV4-1-1

- Compressed IBM Ultimotion Real-Time
- Compressed IBM Ultimotion Asymmetric
- Compressed Intel Indeo 2.1 Video
- Compressed Intel Indeo R3.1 Quick
- Compressed Intel Indeo R3.1 CD-ROM

20.3.4 Capturing Bitmaps

To capture a bitmap of a marked region in the monitor window:

1. Mark the region if you do not want the whole picture.
2. Select **Options**.
3. Select **Record Setup**.
4. Select either **Real-Time** or **Frame-Step**.
A settings notebook is displayed.
5. Close the notebook window
6. Select **Bitmap Capture**.
7. Select **Capture** now.

The Video IN Recorder emits a beep to let you know the image has been captured and saved. The video image is saved in OS/2 bitmap format (24-bit RGB true color).

20.4 Data Compression

OS/2 Warp Version 3 and OS/2 Version 2.11 software motion video uses a standard Audio Video Interleaved (AVI) file format. This format arranges audio and video data within a file. To conserve file space, this data can be compressed, and then rapidly decompressed for playback.

Algorithms that do this type of compression/decompression are called **CODECs**. While the Digital Video Player can play movies, it cannot create, capture or modify them. To do this, Video IN/2 provides the Video IN/2 Recorder and the AVI file utility.

The frame rate is the number of frames per second (FPS) that are captured for playback. The actual rate of playback depends, however on the processing capabilities of the system, as well as on the complexity of the CODEC used to create the movies.

The data rate of a movie is the number of kilobytes used by one second (KBS) of the movie. This value is composed of the amount of KBS used by both audio and video.

For example; data rate of 100 KBS may consist of 22 KBS of audio and 78 KBS of video. The data rate needed for single-speed CD-ROMs, 150 KBS, is the data rate achieved when recording a 320 x 240 pel movie at 15 FPS with 64K colors.

Movies can be recorded in two ways, frame-step or real-time.

20.4.1 Frame-Step

Since frame-step capture steps through the video source frame-by-frame, the CODEC can spend more time analyzing the data. Therefore, better quality, compression, and data rate are achieved. Source input for Frame-Stepped capture must be either a computer controlled device (such as a laserdisc) or an AVI file.

Frame-step recording from a source AVI file makes it possible to change the compression type of the data. Changing the compression type allows the conversion from one CODEC to another; that is, from Indeo to Ultimotion. Furthermore, it enables the compression of a "raw", or uncompressed, video file, as well as the creation of a raw file from an existing movie. This capability is useful for editing movies together of different types, and for creating high-quality compressed movies from raw video animation.

20.4.2 Real-Time

Real-time capture is done from a live video source (such as video tape or camcorder) via line in, and it compresses the image immediately. Since less time is spent analyzing the source, the frame size and frame rate are typically smaller, in order to achieve the same data rate as a video made using frame-step compression. This type of compression is ideal for situations that require video content to be captured in real time for immediate playback.

While recording, the video or audio source may be monitored to ensure that the correct video sequence is being captured. The video monitor can be used to reflect adjustments in brightness, color, contrast, and tint to be made to the recorded video. It is also possible to isolate a rectangular portion of the monitor video for video capture, by drawing this region directly on the monitor video window.

This image cropping can also be useful during bitmap capture. Here, the Video In Recorder captures the image in the monitor window, or inside the monitor window's crop region, into 24-bit RGB OS/2 bitmap format.

20.5 AVI File Utility

The AVI File Utility is also included in the Video IN/2 product. This utility provides the ability to browse AVI file information, to manipulate the interrelation of audio and video within the AVI file, and to compose an animation from a series of images.

As an AVI file browser, the AVI File Utility can view information within the file, such as the header, the chunk ID and length, the index and status. The utility enables viewing all these things at once, or isolating the view to just those items of interest.

An ideal movie has one chunk of video to one audio chunk, a 1:1 interleave ratio. If a movie has a 1:1 interleave ratio, the skew between audio and video chunks can be changed so that the audio is stored before the corresponding video in the AVI file.

This helps to ensure that the audio buffers will remain full as the movie plays, and that frames are not dropped as a result of trying to maintain audio continuity.

In addition to file manipulation, the AVI File Utility enables the creation of "raw" AVI movie files, or animations, from a series of images. These images need to be of equal size, and can be any combination of the supported image types. This includes the image types supported by the Multimedia Software Support in OS/2 Warp Version 3. The images and any pauses are placed in the order to be recorded, and the frame rate is specified. From this source information, a "raw" AVI file is generated. Compression can be achieved by bringing this raw file in as source input for the record-from-file capability in the Video IN/2 Recorder. If desired, a sound track can then be added by using the AVI File Utility. Thus, a full animation could be created using bitmaps that are output from animation packages, and bitmaps created from the Video IN/2 Recorder.

20.5.1 Editing Images

After recording, the Video In recorder can be used to edit the video, by marking regions to be cut, copied or pasted into the same video or other video files.

The AVI File Utility is also included in Video IN/2. This utility provides the ability to browse AVI file information, to manipulate the interrelation of audio and video within the AVI file, and to compose an animation from a series of images.

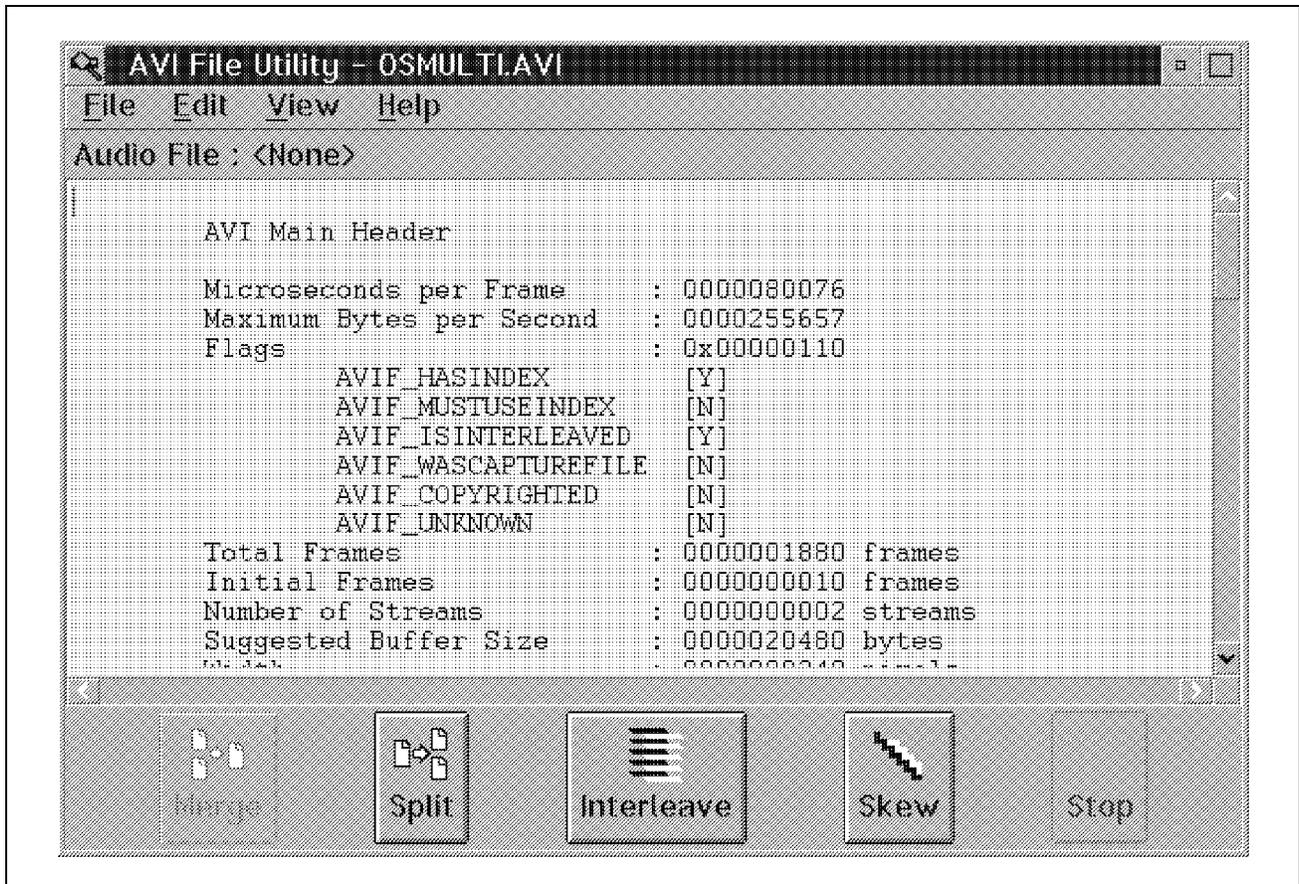


Figure 101. AVI Main Header Browse

Figure 101 and Figure 102 on page 411 show how the AVI file Utility may be used as an AVI file browser to obtain information about a particular file, such as the header, the chunk ID, the length, and the index.

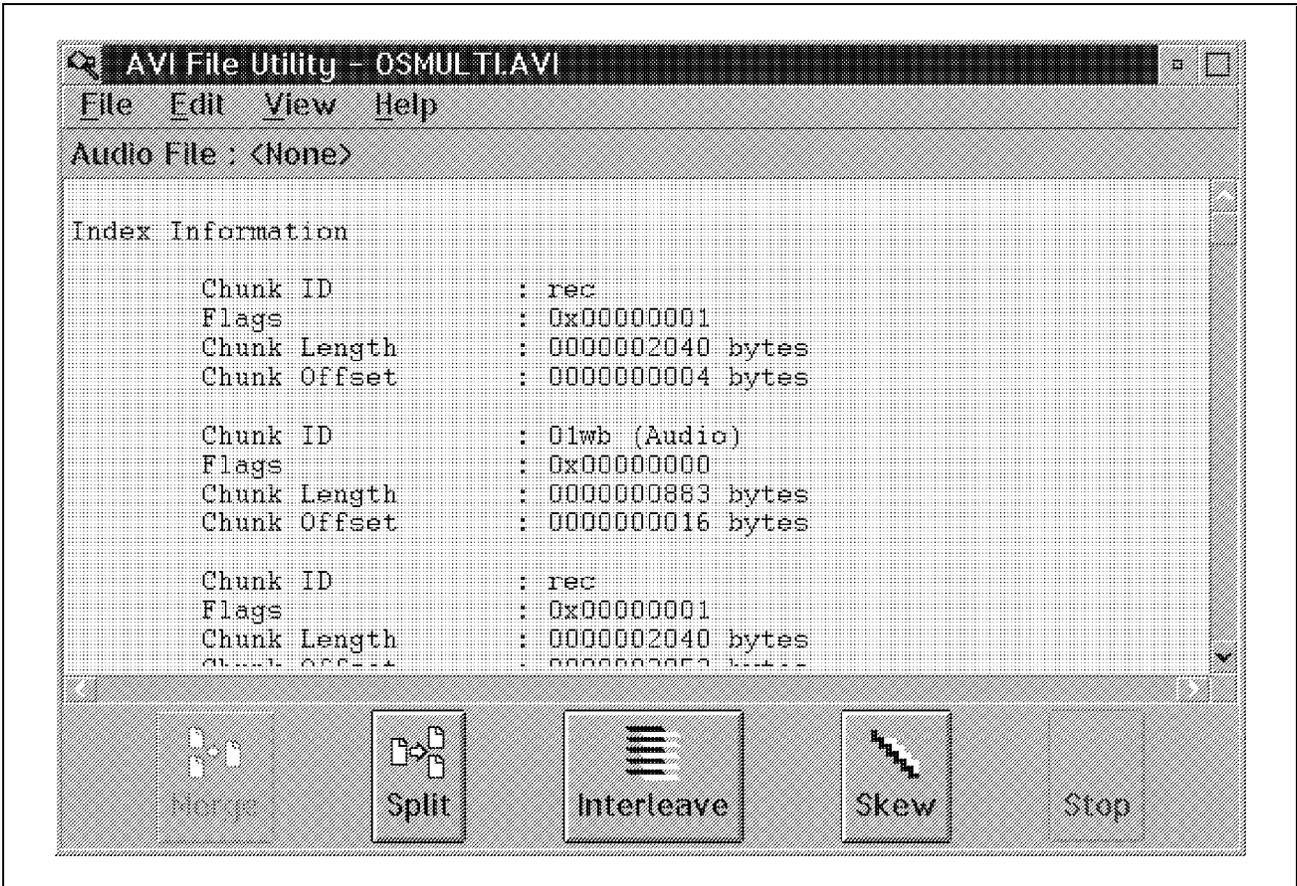


Figure 102. AVI Index Browse

When using the AVI File Utility as a browser the user can also obtain status information about the file, as shown in Figure 103 on page 412.

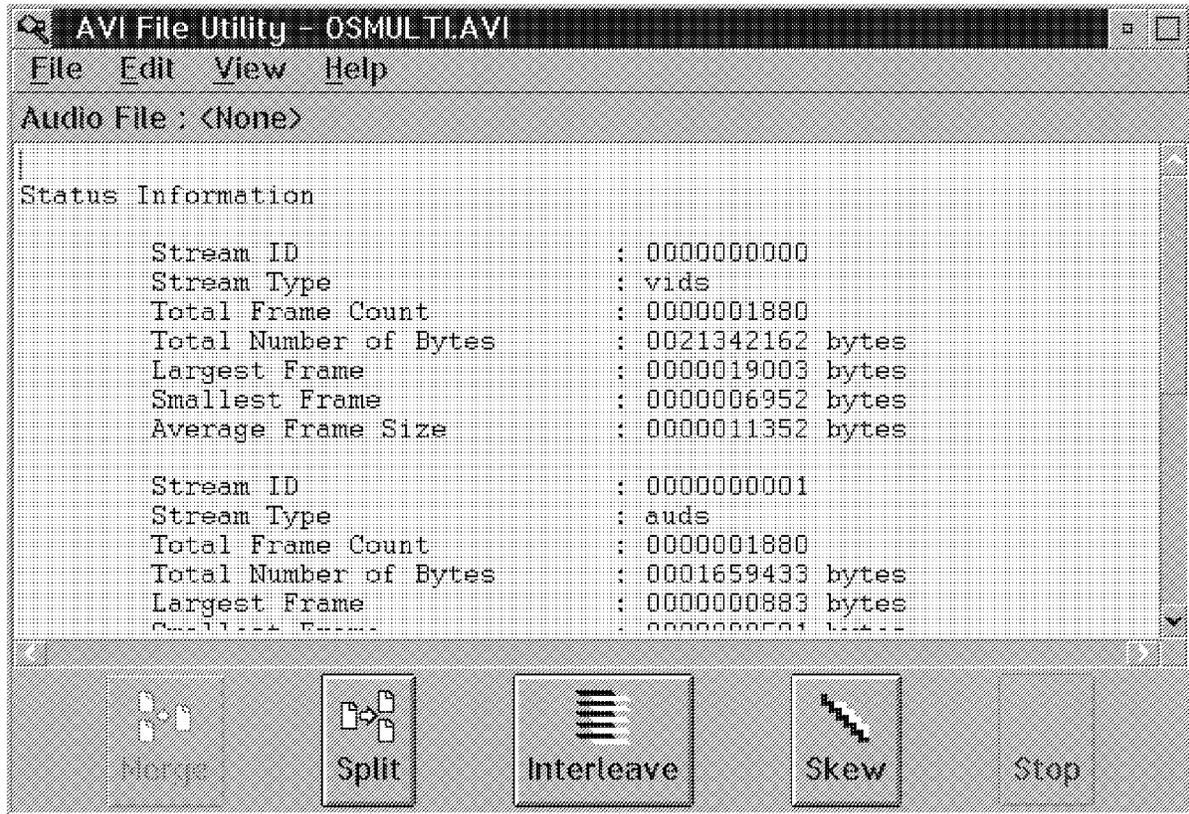


Figure 103. AVI Status Information

The utility enables all this information to be viewed at once, or you can isolate the view to just those items of interest.

Chapter 21. HyperAccess Lite

HyperACCESS Lite is a Presentation Manager-based terminal emulation program, designed by Hillgraeve Inc. for inclusion in the BonusPak for use over standard telephone lines using a modem-to-modem connection.

HyperACCESS Lite provides the following features:

- Easy installation and setup.
- Object-oriented design.
- CommSense to set parity, data bits and stop bits.
- Call bulletin board systems (BBSs), Internet, CompuServe, or remote systems of all kinds.
- File transfer using the most popular file transfer protocols:
 - Zmodem
 - Ymodem
 - Xmodem
 - Kermit
- ANSI terminal emulation including:
 - VT52
 - VT100

HyperACCESS Lite is designed to make it very easy for you to communicate by modem with another computer or computer system. A variety of modems are supported and a variety of modem speeds. HyperACCESS Lite supports modems with speeds ranging from 300 to 115,200 baud, or bits per second (bps). The majority of computer systems and bulletin board services run at 2400 baud or higher.

The online help provided with the product provides full details on how to use and configure the product to meet your requirements.

21.1 Upgrade of HyperACCESS Lite

The HyperACCESS Lite product supplied in the BonusPak is an entry level version. This does not imply that it is not full featured. You may wish to upgrade the product to an enhanced-featured version. The following are some of the enhanced options:

- Record and play back logons and other repetitive steps.
- Define your own keys and buttons with text or bitmap labels.
- Automate communications with a powerful script language.
- Make the backscroll buffer as large as you want. It will even retain its contents from one call to the next.
- Be protected from computer viruses in files you download.
- Additional terminal emulators, file transfer protocols, and connectivity (more modems, network interfaces).

Please check the HyperACCESS Lite online help for details of how to upgrade to HyperACCESS.

21.2 Getting Started

When you start HyperACCESS Lite the first thing that is displayed is the phone book. HyperACCESS Lite is supplied with a number of U.S. telephone numbers for the most commonly used systems in the U.S. The CommSense feature of HyperACCESS Lite automatically sets up your modem with the appropriate parity, data, and stop bit information for these numbers. To connect to any of the systems that have default settings, you only need to double click on the icon.

If default settings are not available for some of the systems you want to communicate with, contact the system administrators for information about telephone numbers, baud rates, and modem settings. The telephone numbers for common bulletin boards are listed in Appendix J, "Worldwide Bulletin Boards" on page 545.

All connections using HyperACCESS Lite are achieved using the graphical phone book. Phone book entries need to be configured for all the remote hosts you will be accessing, unless a default entry is available.

To start communicating, double click on the icon of the system you wish to communicate with.

Disconnecting from a communications session is done by pressing the disconnect button on the tool bar or selecting the option from the File menu.

21.3 Using the Phone Book

To add a new entry to the phone book, you can either double click on the New Connection icon in the phone book, or select New from the File menu. This causes a pop-up menu to be displayed that asks you to name the service and select an icon to use for its entry in the phone book. Once entered, the Communications Settings menu is displayed. This menu is used to store the specific details about the service that you are adding to phone book such as:

- Phone number - Enter the telephone number your modem should call to reach this system.
- Settings (data-parity-stop) - You have three options:
 - Select auto-detect, which means that the CommSense feature of HyperACCESS Lite will try to figure out which data, parity, and stop bit settings to use.
 - Select one of the predefined settings from the drop-down list.
 - Select Custom setup to enter the specific settings to use for this entry.
- Baud rate - Select from the drop-down list a baud rate for your modem to use as the maximum transmission speed.
- Port name - Select communications port that you will be using for HyperACCESS Lite
- Modem - Select the name of your modem. If your modem is not listed, select the modem that is compatible with the modem you are using.

Three submenus are available:

Custom setup

Port setup

Modem setup

These submenus allow you to set the specifics that you wish to use for the data bits, parity bits, stop bits, hardware or software handshaking, pulse or tone dialing, modem setup commands, and timeout values.

To change an existing phone book entry, open the entry in the phone book and then select the properties option from the menu bar.

21.3.1 Phone Book Context Menu

Clicking with the right mouse button opens up a context menu with three options:

Menu Option	Description
Open	This option opens the selected Icon as the current dial object.
Connect	This option will dial using the configuration for the phonebook entry. If the entry has not been configured, the configuration panel will be displayed.
Delete	Deletes the entry.

These same options are also available under the **File** pull-down menu option.

21.4 File Transfer

This section discusses how to send and receive files using HyperACCESS Lite.

21.4.1 Receiving Files

When you are going to receive a file from a remote system:

1. Tell the remote system to send the file. The command used here will be specific to the system being called.
2. Click on the **Receive** button on the tool bar or select **Receive** from the transfer menu.
3. Fill in the path and file name for the file to be received.
4. Select the protocol to be used.
5. Click on the Receive button.

21.4.2 Sending Files

When you are going to send a file to a remote system:

1. Tell the remote system to receive the file. The command used here will be specific to the system being called.
2. Click on the **Send** button on the tool bar or select **Send** from the transfer menu.
3. Fill in the path and file name for the file to be sent.
4. Select the protocol to be used.
5. Click on the **Send** button.

21.5 Terminal Emulation

HyperACCESS Lite supports terminal emulation and the following terminal emulators are provided with the product:

- ANSI.

ANSI is the method that is often used by bulletin boards as it offers support for graphics characters and color codes.

- VT52.

This is an emulator standard developed by DEC to provide specific support for functions, such as cursor memory, cursor reporting, tab stops, scrolling regions, and host-controlled printer operations.

- VT100.

This emulator standard was also developed by DEC and provides many of the same features as VT52 and also offers a 132-column mode.

To help users HyperACCESS Lite provides a feature called Auto-detect. Auto-detect allows HyperACCESS Lite to determine the best terminal emulation to use the first time a connection is made. This is the default used by the system and saves the user having to find out what terminal emulator should be used.

21.6 Support Details

HyperACCESS Lite is supported by IBM through the normal support channels, but Hillgraeve can be contacted for upgrade details by E-mail at the following addresses:

- hillgraeve@aol.com
- hillgraeve@mcimail.com
- 75226,2411 at CompuServe

Their address is:

Hillgraeve Inc.
111 Conant Avenue
Monroe
MI 48161
United States of America

Tel 313-243-0576

Fax 313-243-0645

Chapter 22. FaxWorks for OS/2

FaxWorks for OS/2 is a full 32-bit Workplace Shell application especially designed for inclusion with BonusPak. This fax software allows you to create, send, receive, and edit fax documents using a computer and fax hardware. This version includes the following functions:

- Send and receive faxes using the OS/2 FaxWorks for OS/2 device driver
- Send and receive DOS and Windows faxes
- True object-oriented drag-and-drop faxing
- Phone book
- Fax logging
- Fax printing
- Normal and fine resolution
- Resend capabilities
- Fax toolbar

Using FaxWorks for OS/2 you get a “paperless” solution for dealing with fax documents on OS/2. It allows you to easily send, receive, view, print and log your fax activity. FaxWorks for OS/2 is designed to exploit the full power of OS/2 and the Workplace Shell and provides a “What You See Is What You Get” graphical interface to paste and edit fax documents, integrated hypertext help, and a fax printer driver for printing and sending fax documents from other programs. OS/2 fonts are supported for text operations so you can type directly onto a fax!

When a fax is received, you can read it, underline key words with your "pen", draw a line to point to an interesting section, add a comment in the margin, attach another memo or figure, add a cover page, fax the modified document, file a copy for future reference, or print it.

For full information on the use of FaxWorks for OS/2, refer to the online help.

22.1 Installation and Configuration

FaxWorks for OS/2 can be installed either using the BonusPak install utility or with the install program on the FaxWorks for OS/2 diskette. See 13.1, "BonusPak Install Utility" on page 272 for installation information.

Before starting FaxWorks for OS/2, look at the README file. It contains important information on configuring the application for use with different types of modems. Fax protocols supported for use with the various modem types are SendFax, Class-1, and Class-2.

When starting FaxWorks for OS/2 for the first time, you will be asked to specify a default port for the modem. Select the port that your modem is connected to.

You will next need to configure "modem" and "modem type" under the Settings menu option.

If you intend sending faxes from Windows applications you should send them via the Windows IBM Proprinter X24 printer driver. To install this printer driver :

1. Open a Windows full-screen session from within the Command Prompts folder.
2. Open up the **Windows Control Panel** from group Main.
 - a. Select **Add** to add the IBM Proprinter and press **Install**.
 - b. Press **Connect** and connect the printer driver to the same port as the OS/2 FaxWorks for OS/2 driver (for example LPT3).
3. Installation of Adobe Type Manager (ATM) fonts for Windows is a recommended option.

You are now ready to send Windows-based faxes simply by selecting the IBM Proprinter as the desired printer.

22.2 Sending Faxes

You would usually send faxes in one of two ways: either printing to the FaxWorks for OS/2 printer driver directly from within an OS/2 application, or by dragging and dropping a document object onto the FaxWorks for OS/2 driver.

When sending a fax, you will get the option to either manually assign a recipient or use the phone book. From the phone book, you can either select an entry or, by opening a context menu with the right mouse button, edit the contents of the phone book.

There is an upgrade to the supplied BonusPak FaxWorks for OS/2 product. This upgraded version allows the use of multiple phone books as well as the use of distribution lists and broadcasting. The upgraded version of the product gives you a variety of editing features, which include the ability to drop bitmaps or copies of received faxes into the fax document. You can, for example, use this method to sign your document with a bitmap image of your signature.

Also for information on upgrading the FaxWorks for OS/2 product, select the **Help** button from the running product and then select the **About** button.

22.3 Phone Book

The Phone Book provides a way to specify the recipient (or multiple recipients) for the faxes. When sending a fax the Phone Book button provides an interface for selecting, entering and editing Phone Book entries. In the Phone Book window, the right mouse button provides a pop-up menu of commands, including commands to edit an entry or add a new entry to the Phone Book.

To select a recipient for a fax, you click with the mouse. You can select one recipient by double-clicking, or you can use extended selection to select a range, or Ctrl+Click to select additional entries or deselect an entry.

If multiple entries are selected, the document will be faxed to each of the selected recipients. The Name and Company fields in the Phone Book entry are used as the recipient's cover sheet. This ensures that each recipient receives a personally addressed cover sheet.

The Phone Book also provides the ability to set up groups to enable you to produce a distribution list. This is done through the Select group option. The Select group option also lets you to specify an alphanumeric string, to select all Phone Book entries that contain that string in their Group field. The ability to select all entries is also provided.

Multiple Phone Books can be set up. Each Phone Book will have a unique name.

To create a new Phone Book, simply type its name in the Phone Book field and then add Phone Book entries. Phone Book entries may be added or updated using the Utilities option.

22.4 Workplace Shell Features

Many of the features of the Workplace Shell are supported by FaxWorks for OS/2.

Drag-and-drop printing Allows any OS/2 application that supports printing document files by use of drag and drop onto printer objects; will allow you to drop the document on the FxPrint printer object to create and send a fax.

Drag-and-drop editing Allows you to drop a bitmap or image file on the fax page, or paste text by dropping a text file on the fax page.

Drag-and-drop fax file objects Allows you to double-click on fax file objects to view the fax, or drop on other objects such as:

- A printer object to print the fax
- The fax program object or into the empty fax workspace to view the fax
- The fax document that you are currently viewing to append the fax
- The Send toolbar button to send the fax
- The Print toolbar button to print the fax.
- The View or Orientation toolbar buttons to view the fax in that size or orientation
- The Log toolbar button to add a copy of the fax to the fax log

Resizable windows Allows you to resize the log and Phone Book windows.

Fonts Change the program's fonts by dragging a font from the OS/2 Font Palette.

Pop-up menus Provides a quick method of accessing the FaxWorks for OS/2 options.

A click of mouse button 2 displays the pop-up menu. The contents of the pop-up menu varies based on the mouse position when you press the mouse button.

For example, if you click on button 2 on the fax page, you get a different menu than you do if the mouse is in the program workspace outside of a fax page.

22.5 Receiving Faxes

By default, FaxWorks for OS/2 is set up not to receive faxes. This is because once you turn on receive mode, the COM port is requisitioned, and no other application is allowed access it. To turn on receive mode, select the **Fax** pull-down menu option, select **Receive**.

You can then elect to receive the current call, the next call, or receive all calls.

22.6 Utilities

The Utilities menu contains the following commands:

- **Settings** - displays the Settings notebook.
- **Tool accessories** - advanced editing commands.
- **Print log** - prints the fax log.
- **Maintain log** - cleans up the fax log.
- **Edit Phone Books** - creates and edits Phone Books.

The Print log prints a fax log report to the printer. Use Fax Printer setup to select a printer and set the printer options before printing your log. You can print the log to any OS/2 printer, including the fax printer driver if you want to send the log information as a fax document.

The Maintain log helps you clean up your fax log.

After sending and receiving numerous fax documents, you will find that your log has many log entries and fax documents that you no longer need. This option helps you tidy the fax log and remove any unwanted entries.

22.7 FxPrint

The fax printer driver allows other applications to create fax documents using their standard print commands. If the fax printer driver is installed, you tell your OS/2 application to use the fax printer device when printing.

When you print to the fax printer driver, a pop-up dialog box allows you to send the fax document.

Part 3. OS/2 Warp Connect

Chapter 23. Overview of OS/2 Warp Connect

OS/2 Warp Connect designed for business, mobile and PC users who wish to share or use data in a LAN environment. It is a 32 bit operating system that combines OS/2 with connectivity functions using OS/2 Warp Version 3 that provides support for both 16-bit and 32-bit applications. With OS/2 Warp Connect, networking function is integrated into the OS/2 Warp Version 3 base system to enable you to share files and printers among workstations and to connect to IBM, Microsoft, and Novell servers.

The following communication protocols are supported by OS/2 Warp Connect:

- NetBIOS
- IBM IEEE 802.2
- IPX
- TCP/IP

In addition you can now connect to the Internet across LANs and over phone lines and to your LANs from a remote site across the phone lines.

OS/2 Warp Connect combines the capability of a 32-bit operating environment provided by OS/2 Warp with a set of networking components.

OS/2 Warp Connect also comes with a BonusPak, which is the same one that is shipped with OS/2 Warp Version 3.

In addition, the OS/2 Warp Connect package includes a CD-ROM with Lotus Notes Express Release 3.30 for OS/2 which is a client edition for OS/2 Warp Version 3 users only. We will not cover this product in this book.

This chapter covers OS/2 Warp Connect only from the point of view of the operating system functions and not the connectivity functions. If you wish to get more information on the connectivity functions, refer to the redbook *OS/2 Warp Generation, Volume 2: Exploring LAN Connectivity With OS/2 Warp Connect*, GG24-4505-00.

23.1 Installation Considerations

OS/2 Warp Connect is shipped in two different versions:

- OS/2 Warp Connect

This version uses your existing Windows to provide support for your existing Windows applications. That means you may install OS/2 Warp Connect on top of an existing DOS/Windows installation, and OS/2 Warp Connect integrates all existing applications into the Workplace Shell of OS/2 Warp Version 3.

- OS/2 Warp Connect with WIN-OS/2

This version of OS/2 Warp Connect provides WIN-OS/2 (Windows built in OS/2), to provide support for Windows applications. WIN-OS/2 is installed as part of the OS/2 Warp Version 3 installation and is integrated into the Workplace Shell of OS/2 Warp Version 3.

Changes have been made to the installation process and the configuration process, to ensure greater ease of installation, more successful installs and improved recovery capabilities in the event that problems do arise.

There are several installation options as in OS/2 Warp Version 3: Easy, Advanced, Individual Product Installation.

1. Easy Installation

The *Easy Installation* is designed to be a “one-button” installation process that provides a default installation. It will install the following features:

- IBM Peer for OS/2 Version 1.0
- NetWare Client for OS/2 Version 2.11
- Internet Access (TCP/IP Version for OS/2 V.3.0)

Note

OS/2 Warp Connect comes with a newer version of TCP/IP than the version shipped in the BonusPak of OS/2 Warp Version 3.

Do not install the BonusPak version with OS/2 Warp Connect since it is not compatible with the new TCP/IP Version 3.0.

2. Advanced Installation

The *Advanced Installation* is designed to allow experienced users to customize their installation. It allows you to install more features

than the _____ method. *Easy Installation*. These additional products are:

- OS/2 LAN Requester V.4.0
- IBM LAN Distance Remote Version 1.11

3. Individual Product Installation

The *Individual Product Installation* allows you to install the components of OS/2 Warp Connect using its set of installation options and configuration panels. However, the advantage of *Easy Installation* or *Advanced Installation* over the *Individual Product Installation* is that all the configuration changes required for interoperability of the components is performed for you.

The Individual Product Installation method additionally offers you the installation of AskPSP. AskPSP is a knowledge-based system that can be used in problem determination.

Chapter 24. Installation Planning for OS/2 Warp Connect

This chapter covers the additional considerations that apply when installing OS/2 Warp Connect, rather than OS/2 Warp with WIN-OS/2. The capabilities of the connectivity parts of OS/2 Warp Connect are discussed in *OS/2 Warp Generation, Volume 2: Exploring LAN Connectivity With OS/2 Warp Connect*. Installing OS/2 and performing a simple LAN install to another machine are the only aspects of OS/2 Warp Connect covered in this volume.

OS/2 Warp Connect is available on CD-ROM only. However, diskettes may be produced from that CD-ROM version for all components of OS/2 Warp Connect.

The OS/2 Warp Connect package consists of the following CD-ROMs:

1. **OS/2 Warp Connect CD-ROM 1 includes:**

- OS/2 Warp Connect or OS/2 Warp Connect with WIN-OS/2
OS/2 Warp Connect based on OS/2 Warp Version 3 with some changes to allow an integrated installation of all networking features.
IBM Peer for OS/2 allows LAN-connected workstations to share resources, such as disk drives, CD-ROM drives, printers and directories.
- IBM LAN Requester 4.0 (from LAN Server V. 4.0)
This feature allows access to other computer devices on the LAN (local area network) such as disk drives, CD-ROM drives, printers and directories.
- IBM LAN Distance Remote V.1.11
This feature provides access to LAN data, resources and applications from a stand-alone workstation.
- NetWare Client for OS/2 V. 2.11
Provides support for access to NetWare 3.x and 4.x servers for OS/2, DOS and WIN-OS/2 sessions.
- IBM TCP/IP for OS/2 V3.0
This is a replacement for the TCP/IP for OS/2 version 2.0 which is included in the BonusPak of OS/2 Warp Version 3. It allows simultaneous dial-up access (through SLIP or PPP) and additionally LAN access.

- AskPSP3.
- Direct installation or creation of product diskettes for the networking products.
- Product publications for viewing or printing.
- OS/2 LAN Server productivity aids.

2. OS/2 Warp Connect CD-ROM 2 OS/2 Warp Version 3 BonusPak:

- BonusPak Installation Utility
- IBM Works and PIM (Program Information Manager)
- HyperACCESS Lite for OS/2
- CompuServe Information Manager
- Person to Person
- Multimedia Viewer
- Video IN/2

3. OS/2 Warp Connect CD-ROM 3 OS/2 Warp Version 3 Lotus Notes Express:

- Lotus Notes Express
- Discussion databases
- Client/Server mail
- Phone book
- Reference databases
- News databases
- Customer tracking
- Service requester

The ability to share a CD-ROM and to perform a redirected install is one of the powerful features of OS/2 Warp Connect. By installing OS/2 Warp Connect on one machine with a CD-ROM, you can create two diskettes and use these to boot another machine on the LAN and install using the remote CD-ROM.

This and the full functionality of OS/2 Warp Connect with all connectivity aspects is explained in detail in *OS/2 Warp Generation, Volume 2: Exploring LAN Connectivity With OS/2 Warp Connect*.

24.1 Hardware Requirements

OS/2 Warp Connect has the same hardware requirements as OS/2 Warp with WIN-OS/2 with the following exceptions:

1. Amount of memory required:
 - Minimum amount of RAM required is 8MB. 12MB or more may be required depending on your application mix and the LAN services you are running.
2. Amount of hard disk required:
 - Minimum amount of disk space required on the hard drive is 90MB to 120MB.
3. LAN Adapter card:
 - Token Ring
 - Ethernet
4. CD-ROM drive:
 - Any OS/2 supported CD-ROM drive. If you have installed OS/2 Warp Connect on one machine you can use the CD-ROM on this machine to install to another machine across the LAN. See 24.4, "OS/2 Warp Connect Installation Changes" on page 436 for details.

Table 38. Hard Disk Space Requirements for OS/2 Warp Connect Components

Feature	Components	DASD
OS/2 Warp Connect	OS/2 Warp Connect - OS/2 Warp Connect with WIN-OS/2	45MB-56MB
IBM Peer for OS/2		15MB
IBM LAN Requester 4.0		20MB
Novell NetWare Client 2.11		3MB
IBM TCP/IP for OS/2 V3.0	TCP/IP IBM Internet Access Kit	29MB
IBM LAN Distance Remote		13MB
Network SignON Coordinator		1MB

Note that depending on the amount of memory installed on your system, additional hard disk space of 5 to 10MB is used during installation for swap space and temporary files that are stored during installation.

The OS/2 Warp Connect installation program takes 4MB of extra disk space which can be deleted after OS/2 Warp Connect is installed.

24.2 Software Requirements

OS/2 Warp Connect has no software requirements to enable the full functionality of the product. WIN-OS/2 support is included in the package.

Several *upgrade* installation packages are also available to allow you to upgrade from:

- OS/2 2.0
- OS/2 2.1
- OS/2 2.11

As with OS/2 Warp with WIN-OS/2 you can only upgrade from *with Windows* versions of OS/2 unless you format the installation partition.

24.3 Upgrade Matrix

The version of OS/2 Warp Connect that you select depends upon what operating system is currently installed on your machine. OS/2 Warp Connect supports upgrading from many different operating systems. The following upgrade matrixes should help you determine onto which operating system you may install either of the two versions.

<i>Table 39. Migration Scenarios for OS/2 Warp Connect (without Windows)</i>					
Existing Operating System	OS/2	VDM	WIN-OS/2	Windows	Dual Boot
No system	√	√			
DOS 3.3 or later + Windows 3.1 or 3.11	√	√	√	√	√
DOS 3.3 or later + Windows for Workgroups 3.1 or 3.11	√	√	√	√	√
OS/2 2.1 for Windows	√	√	as before	as before	√
OS/2 Warp Version 3	√	√	as before	as before	√

OS/2 Warp Connect can be installed on a system with no other software loaded. You can install OS/2 Warp Connect on a system with DOS/Windows

3.1 or 3.11 installed or with with DOS/Windows for Workgroups 3.1 or 3.11 installed.

If you have a previous OS/2 version installed, you may install OS/2 Warp Connect over any OS/2 version without Windows.

You can install OS/2 Warp Connect on a system with any other OS/2 system already installed, but you must format the installation partition before or during installation.

Table 40. Migration Scenarios for OS/2 Warp Connect with WIN-OS/2

Existing Operating System	OS/2	VDM	WIN-OS/2	Windows	Dual Boot
No system	√	√	√	√	
DOS 3.3 or later	√	√	√	√	√
OS/2 Version 2.x	√	√	√	√	
OS/2 2.1 for Windows	√	√	as before	as before	√

OS/2 Warp Connect with WIN-OS/2 can be installed on a system with no other software loaded. You can install OS/2 Warp Connect on a system with DOS 3.3 or later versions. WIN-OS/2 support can be installed wether or not DOS and Windows is already installed.

If you have a previous OS/2 version installed, you may install OS/2 Warp Connect with WIN-OS/2 over *only* over OS/2 versions including WIN-OS/2 support.

You can install OS/2 Warp Connect with WIN-OS/2 on a system with any other OS/2 system already installed, but you must format the installation partition before or during installation.

Note

Do not install both IBM LAN Requester 4.0 *and* IBM Peer for OS/2.

Do not install both the BonusPak Internet Access Kit *and* IBM TCP/IP for OS/2 V3.0.

IBM Peer for OS/2 is a similar function of IBM LAN Requester 4.0, installing both products is not supported.

IBM TCP/IP for OS/2 V3.0 contains a version of the IBM Internet Access Kit designed to use TCP/IP across the LAN and across dial-up lines. This version replaces the version in the BonusPak which uses TCP/IP across dial-up lines.

24.4 OS/2 Warp Connect Installation Changes

The installation procedure for OS/2 Warp Connect has changed to allow the connectivity components to be installed. It is now a three phase install. Phases one and two are the same as OS/2 Warp Version 3, or OS/2 Warp with WIN-OS/2, except that there are extra dialogs (see 24.5.1, "Installation Dialogs" on page 439), that ask you if you want to install networking support, and how you want the networking support configured.

The base features are the same as OS/2 Warp with WIN-OS/2, you should refer to 2.4, "OS/2 Warp Version 3 Installation Changes" on page 19 and 4.4, "Installation Changes" on page 79 for more details.

Once the base features have been installed, the connectivity components are installed during phase three.

As in OS/2 Warp Version 3 and OS/2 Warp with WIN-OS/2 there are two installation paths:

- Easy Installation
- Advanced Installation

Easy Installation asks the minimum of questions, and gives you the option to install IBM Peer for OS/2, Novell NetWare Client 2.11 or TCP/IP with the Internet Access Kit. It will automatically detect and install support for your LAN adapter.

Advanced Installation allows you to select:

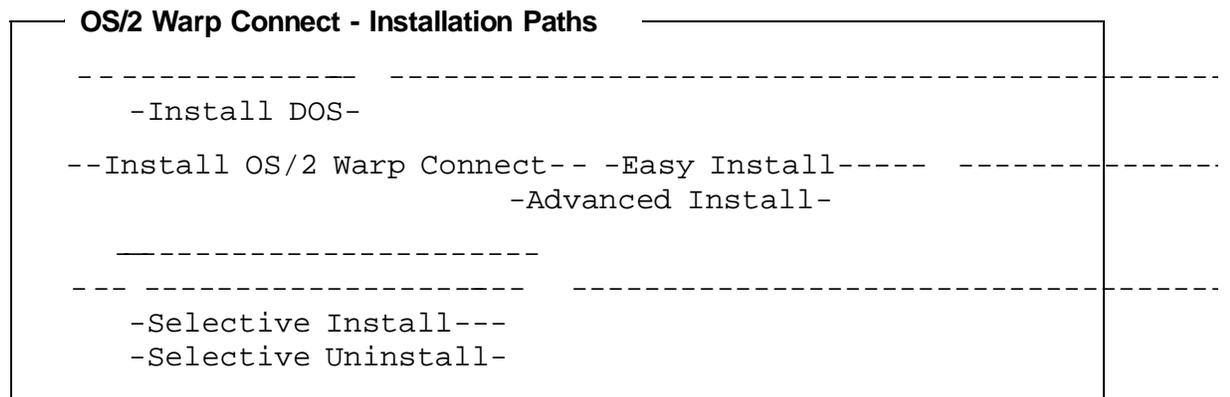
- One of the supported LAN requesters:
 - IBM LAN Requester 4.0
 - IBM Peer for OS/2
 - Novell NetWare Client 2.11
- IBM TCP/IP for OS/2 V3.0 with Internet Access Kit
- IBM LAN Distance Remote
- The LAN adapter type

The Easy Installation and the Advanced Installation will install directly from the CD-ROM to the hard disk.

24.5 Installation Paths

The OS/2 Warp Connect installation path is enhanced from OS/2 Warp Version 3 and OS/2 Warp with WIN-OS/2 to include extra dialogs to control installing the connectivity features.

The overall path is shown below:



If you are using the OS/2 Warp Connect Remote Installation Service to install on one system using the CD-ROM in another system, then the installation path is much simpler:

OS/2 Warp Connect - Remote Installation

```
--Installation Diskette--IBM Logo--Disk 1-----  
--OS/2 Warp Connect remote install--Copy / install products-----  
--Setup Complete--(Reboot)--Desktop-----
```

The Easy Installation of OS/2 Warp Connect allows a limited choice of:

- IBM Peer for OS/2
- Novell NetWare Client 2.11
- Internet Access via modem

This is shown schematically below:

OS/2 Warp Connect - Easy Installation - Phase 3

```
--Easy Installation-----  
--IBM Peer for OS/2 Workstation Name--Domain Name-----  
--Novell NetWare Client 2.11-----  
-----  
--Adapter-- -----Copy--(Reboot)--  
-Internet modem access-
```

The Advanced Installation allows for more choices. If you choose to take the Advanced Installation to the local system, the paths are:

OS/2 Warp Connect - Advanced Installation - Local

```
--Advanced Installation--This Workstation-----  
-- -IBM LAN Requester 4.0--Novell NetWare Client 2.11-----  
-IBM Peer for OS/2-----  
-----  
-IBM TCP/IP for OS/2 V3.0--IBM LAN Distance Remote-  
-----  
--Adapter-- ---Copy--(Reboot)--
```

24.5.1 Installation Dialogs

If you want to start the installation of OS/2 Warp Connect you need to insert the Installation Diskette for OS/2 Warp Connect and boot your system (for details on the basic installation, refer to the user's manual that is being shipped with OS/2 Warp Connect). In the course of the installation you will be asked to insert your OS/2 Warp Connect Disk 1 and the CD-ROM with all OS/2 Warp Connect products on it.

```

                                     Welcome!

Congratulations on your purchase of IBM's OS/2 Warp Connect.
OS/2 Warp Connect contains OS/2 Warp Version 3 *, BonusPak,
and the following powerful networking products:

    - IBM Peer for OS/2
    - IBM LAN Requester 4.0
    - Novell NetWare Client 2.11 for OS/2
    - TCP/IP for OS/2 3.0
    - IBM LAN Distance Remote 1.11
    - IBM LAN Network SignON Coordinator/2 1.20

The following panels guide you through the installation of
OS/2 Warp and networking products.

* "OS/2 Warp" or "Operating System/2 Version 3" or "Operating System/2"
references throughout these programs refer to the OS/2 Warp Version 3
Operating System product, which is included in OS/2 Warp Connect, plus
the BonusPak, plus IBM and other networking products.

Enter  F3=Command Prompt
```

This is the new "Welcome" screen for OS/2 Warp Connect you will see after inserting the Installation Diskette and after booting your system. If, for example you wish to save some files before continuing the installation, or if you wish to create some extra space on your hard disk, you should press F3 at this point. This will take you to a command prompt where you may perform these tasks. After you have finished, type:

```
EXIT
```

at the command prompt to return to this dialog.

Installing OS/2 Warp Connect

Welcome to OS/2!

Use the cursor keys to select an installation method and press Enter.
Press F1 for more information.

1. Easy Installation

- Non-technical users; simple install of OS/2 Warp on drive C
- You choose IBM Peer for OS/2 (includes access to IBM LAN servers)
- You choose Novell NetWare Client for OS/2
- You choose Internet access using your modem

2. Advanced Installation

- Experienced technical users; installs OS/2 Warp to any available drive
- You choose additional options such as formatting your drive
- You can also choose:
 - IBM Peer for OS/2 or IBM LAN Requester
 - Novell NetWare Client for OS/2
 - IBM LAN Distance Remote
 - IBM TCP/IP for OS/2 (includes Internet access)
- You specify additional setup and configuration options

Enter F3=Command Prompt F1=Help

This is the new dialog that allows you to select the Easy or Advanced Installation paths. The Easy Installation is described in the user's manual shipped with OS/2 Warp Connect. If you select Advanced Installation you will get guided through the same dialogs as for OS/2 Warp Version 3, as described in 3.2, "Installation Procedure" on page 43.

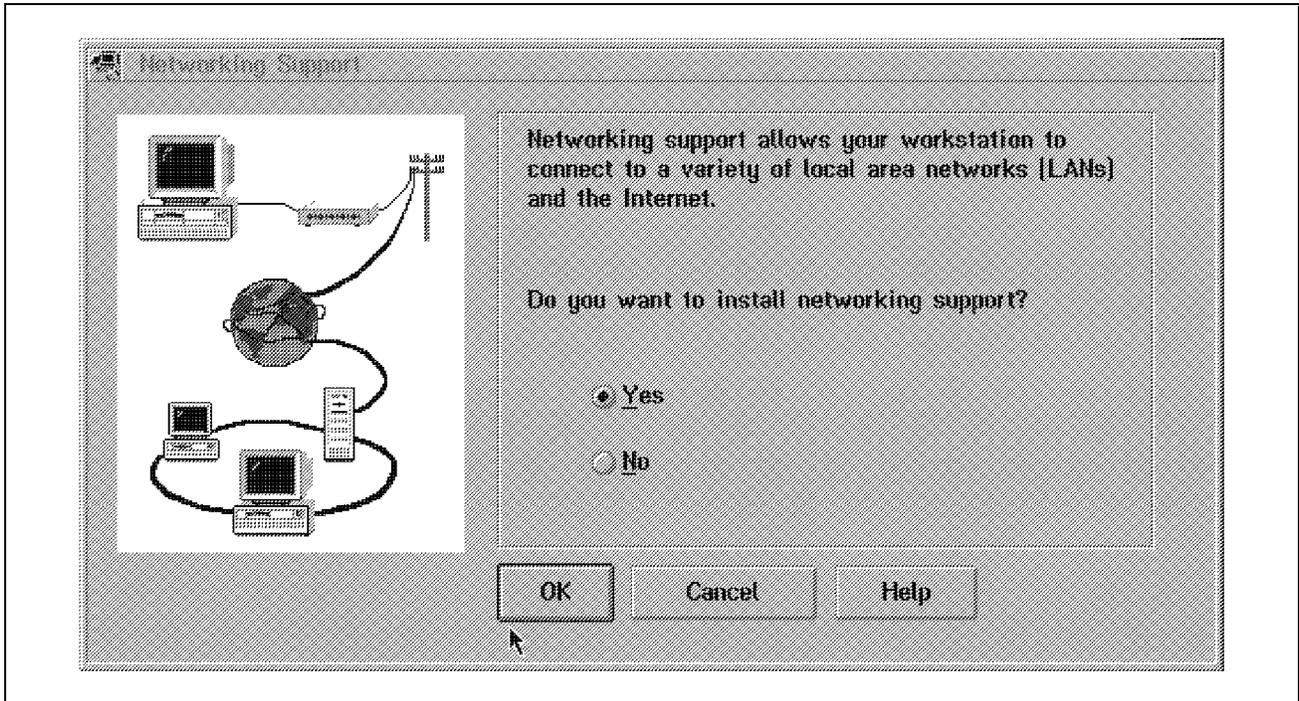


Figure 104. Networking Support

The last of these dialogs is the Advanced Options dialog as shown in Figure 15 on page 64. Following that the first of the networking dialogs of OS/2 Warp Connect is displayed as shown in Figure 104.

If you select **Yes** then the dialogs below are also displayed.

If you select **No** then the installation proceeds as if you were installing OS/2 Warp Version 3, or OS/2 Warp with WIN-OS/2.

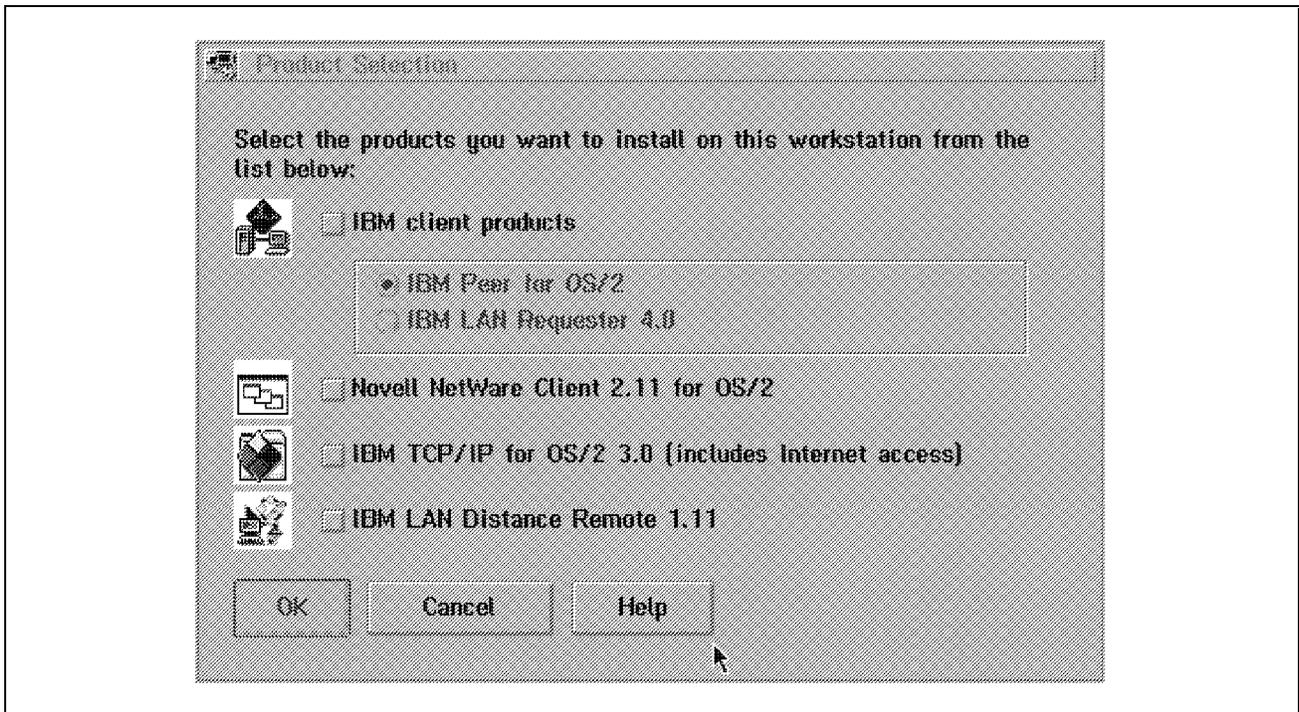


Figure 105. OS/2 Warp Product Selection Dialog

The dialog shown in Figure 105 is displayed to allow you to select which networking products you wish to install. Refer to the OS/2 Warp Connect documentation if you wish to install OS/2 Warp Connect over an existing IBM LAN Requester 4.0 installation.

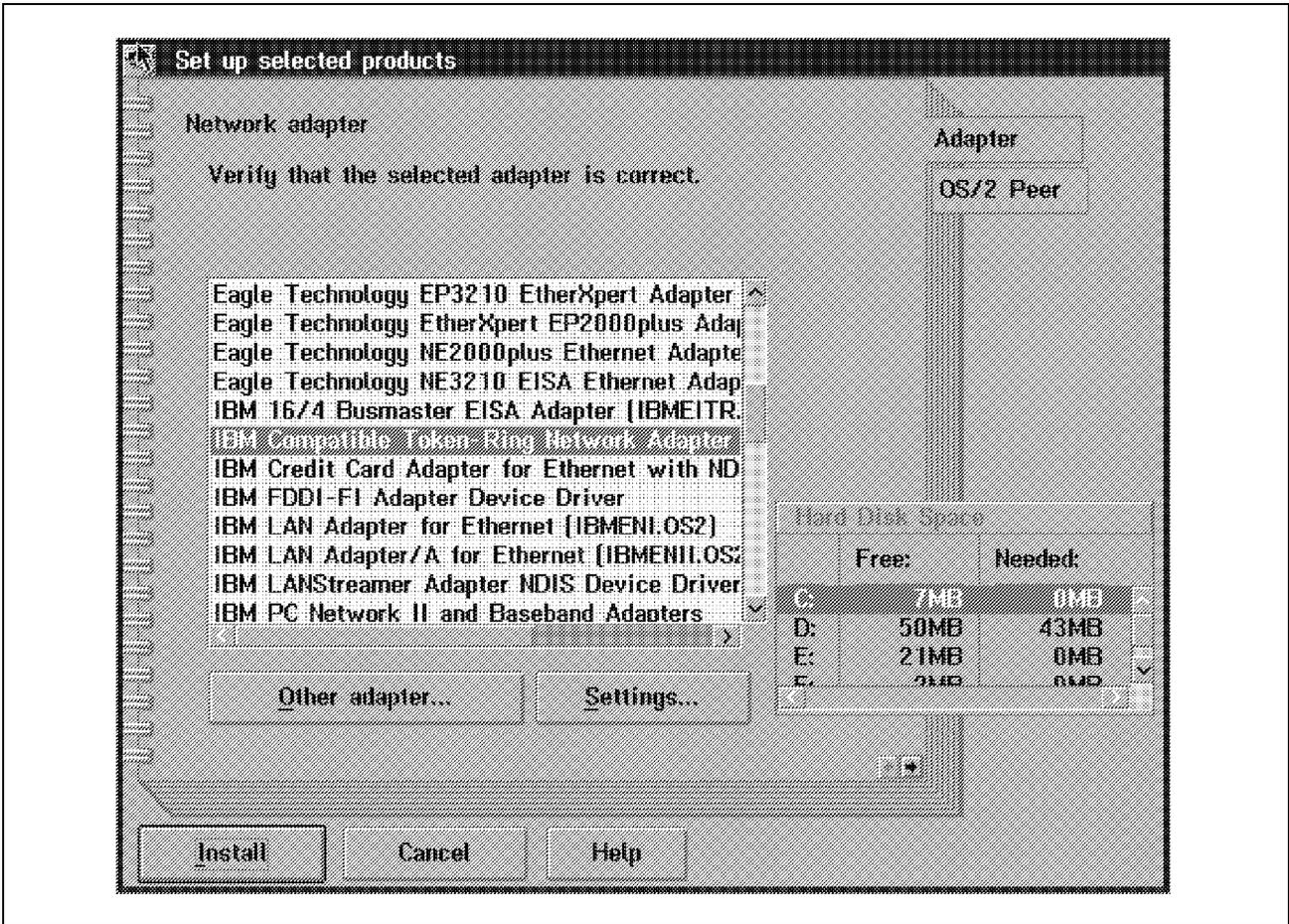


Figure 106. Set up Selected Products - Adapter

If you select IBM client products (IBM Peer for OS/2) then the dialog shown in Figure 106 is displayed to allow you to configure the products you have selected to install. Each product will have one or more pages in the notebook. Be sure to review all the pages in the notebook to see they contain the correct settings.

For further installation details concerning networking features refer to *OS/2 Warp Generation, Volume 2: Exploring LAN Connectivity With OS/2 Warp Connect*, GG24-4505-00.

Part 4. Appendixes

Appendix A. Hard Disk Partitioning Considerations

OS/2 provides the capability to support multiple operating systems on the same machine by providing an operating system-independent boot utility known as Boot Manager.

For example, OS/2, DOS and AIX may be installed on the same physical machine, using separate fixed disk partitions and/or disks as supported by Boot Manager.

Setting up your hard disks is covered in the *Users Guide to OS/2 Warp* in the chapter, "Setting Up Your Hard Disk." This book is one of the books in the OS/2 Warp Version 3 box. This appendix is an extension to that chapter and provides additional hints and tips and information about partitioning a disk. We will also be looking at a tool that can help you changing partitions and format types after the partitions have been created.

A.1 Partitions

Before you can use your personal computer's physical disk (also called hard disk, or hard file) you have to prepare it in order to put data on it. To prepare your hard disk you first have to partition the disk and format it before you may install your operating system. This chapter will cover some important terms and how to partition your hard disk to get the best performance of your system, using OS/2 Warp Version 3 as the example operating system.

Each hard disk in a personal computer may be divided into one or more partitions. Each disk can be partitioned into one or multiple primary partitions and/or one extended partition.

A partition is recognized by the operating system as one disk drive which it can access as long as the disk drive has been formatted in a format supported by that operating system.

All partitions are managed by a program called Boot Manager. Boot Manager allows a user to boot from any selectable partition through a menu panel.

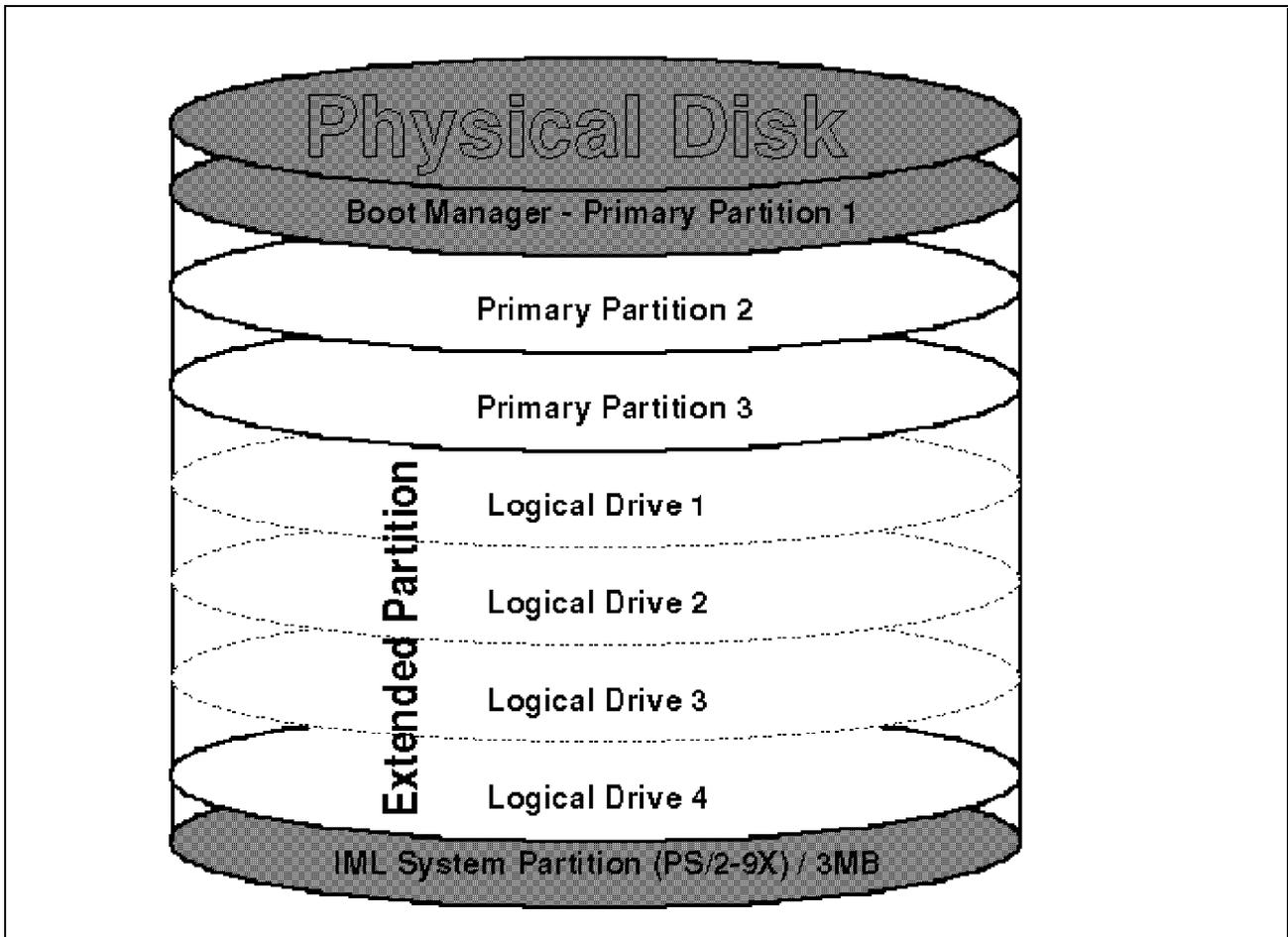


Figure 107. Typical OS/2 Disk Partitioning

Since OS/2 Version 2.0 there are two programs to create and maintain partitions on fixed disks. These programs provide substantially similar functions and differ primarily in their presentation support requirements:

- FDISK operates in character mode in a full-screen session, and supports command line parameters and options, but does not support pointer device (mouse) input. FDISK is provided for use during the initial installation of OS/2, before the Presentation Manager components are loaded. It is also useful in the case when it is not possible to load Presentation Manager or a command line parameter-driven interface is required.
- FDISKPM operates on the Presentation Manager desktop and supports pointer devices, but does not support command line parameters and options.

A.1.1 Primary Partitions

A Primary partition is the *first* partition on a disk. The operating system usually boots from primary partitions such as DOS. With OS/2 you can have up to four primary partitions per disk drive.

Only one primary partition on each physical disk drive is accessible at any one time. The other primary partitions on the drive are hidden. You can use Boot Manager to select which primary partition you want to be active. Figure 108 shows you an example setup for primary partitions.

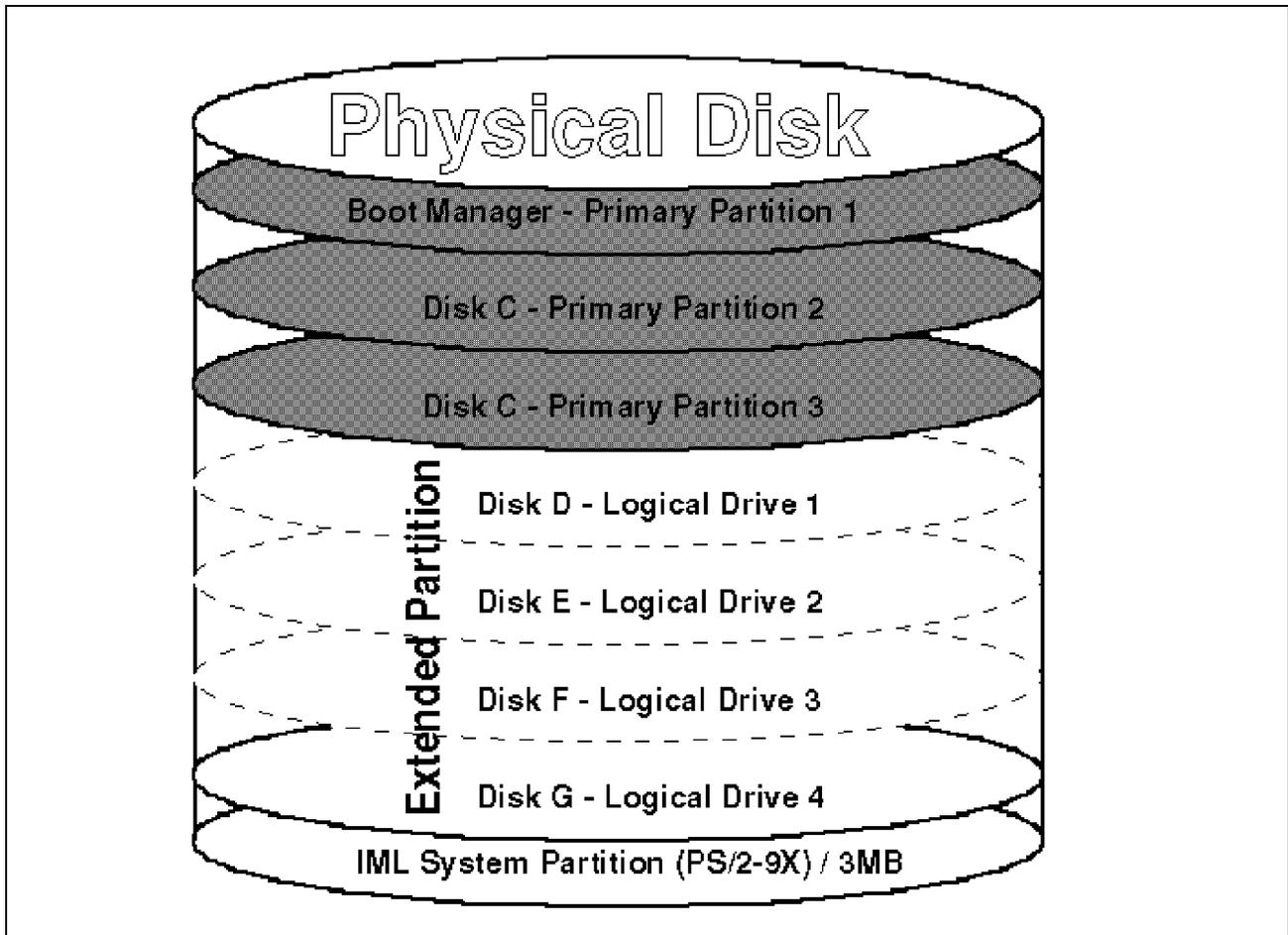


Figure 108. Boot Manager and Primary Partitions

As shown in this Figure 108, Boot Manager will use one primary partition on the first physical disk. This is at the beginning of the free space. The second primary partition will be used as drive C, which will be the boot disk, either for OS/2 or for DOS. You can assign a second primary partition for an

additional operating system. Then you can create an extended partition under which you may assign one or more logical drives.

To prevent the loss of usable disk space, create all the primary partitions contiguously, at the beginning or end of the disk free space area.

We recommend that you create the Boot Manager at the end of the free space.

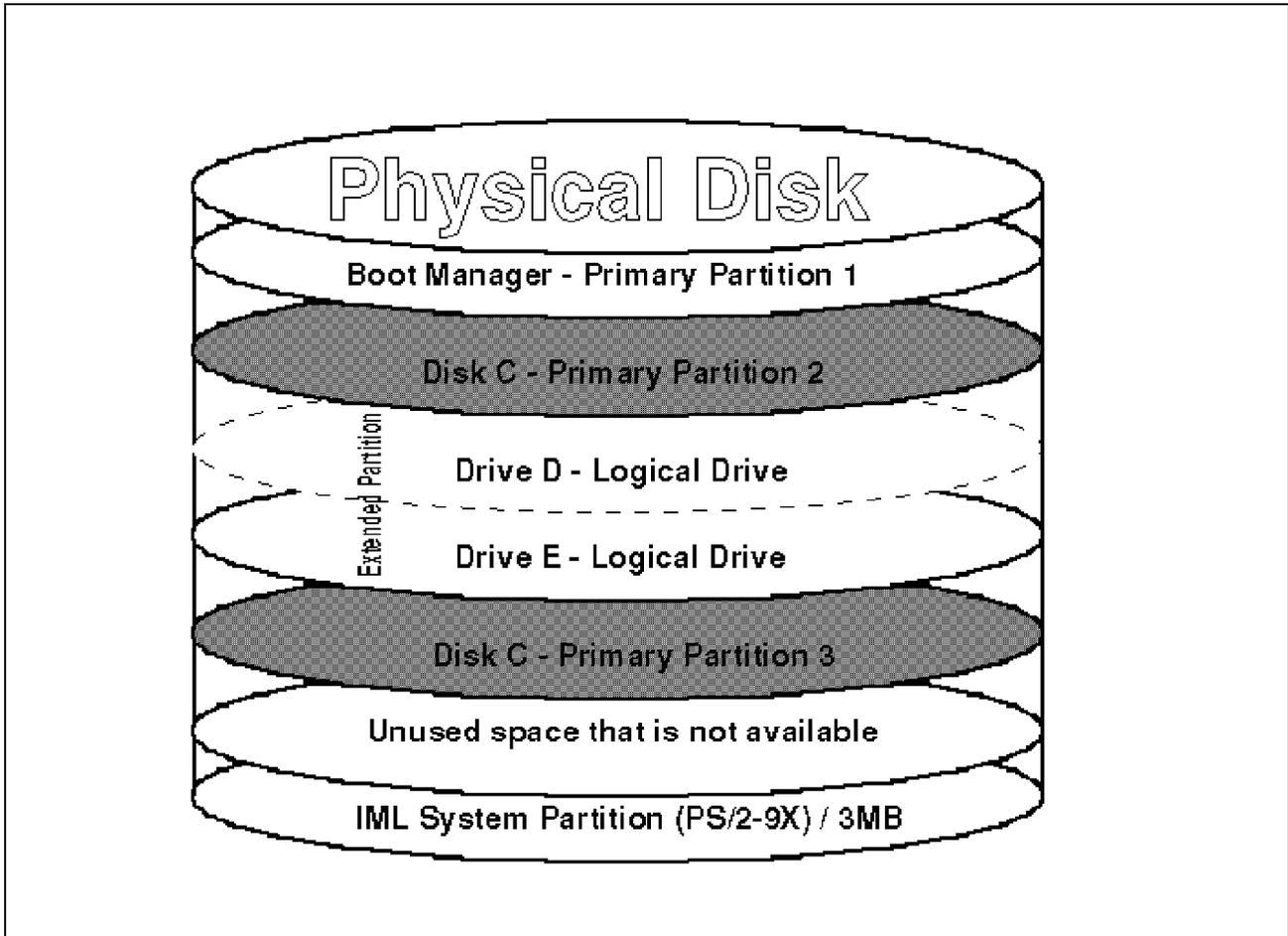


Figure 109. Non-Contiguous Primary Partitions.

Figure 109 shows you an example of non-contiguous partitioning of primary partitions.

Be aware of specific operating systems restrictions on the hard disk. For example, to run properly DOS 3.3 must be installed in a primary partition that is within the first 32MB of the hard disk. DOS can only be installed on a

primary partition. You can install both DOS and OS/2 in the same primary partition if you want to use the Dual Boot feature.

On some PS/2 Model 9X machines, the IML partition is selected as a primary partition. The IML is the system reference partition, where the system configuration is stored. When the IML is set as another primary partition, then you have lost another partition. This means that on these types of systems you can have, for example, Boot Manager, primary partition drive C and an extended partition for your logical drives. The IML partition will then take up the last primary partition left on the disk. A machine that has this type of setup is an IBM PS/2 Model 9577 with a Future Domain SCSI controller.

A.1.2 Extended Partition and Logical Drives

Operating systems typically access partitions through logical drives, each of which is assigned a logical drive letter, for example D or E. These logical drives are in one partition called the *extended partition*. There can only be *one* extended partition per physical disk. This means that all the logical drives must be in one contiguous space. You can have 24 drives in one extended partition, from C-Z. (A: and B: are reserved for diskette media). Drive C can be a logical drive although this is not recommendable.

A primary partition contains only one drive, but an extended partition may be subdivided into one or more logical drives. Logical drives can only be placed inside the extended partition. This means that if you have a logical drive *between* two primary partitions, you can *not* create another logical drive on that physical hard drive. This is illustrated as the “Unused space that is not available” in Figure 109 on page 450.

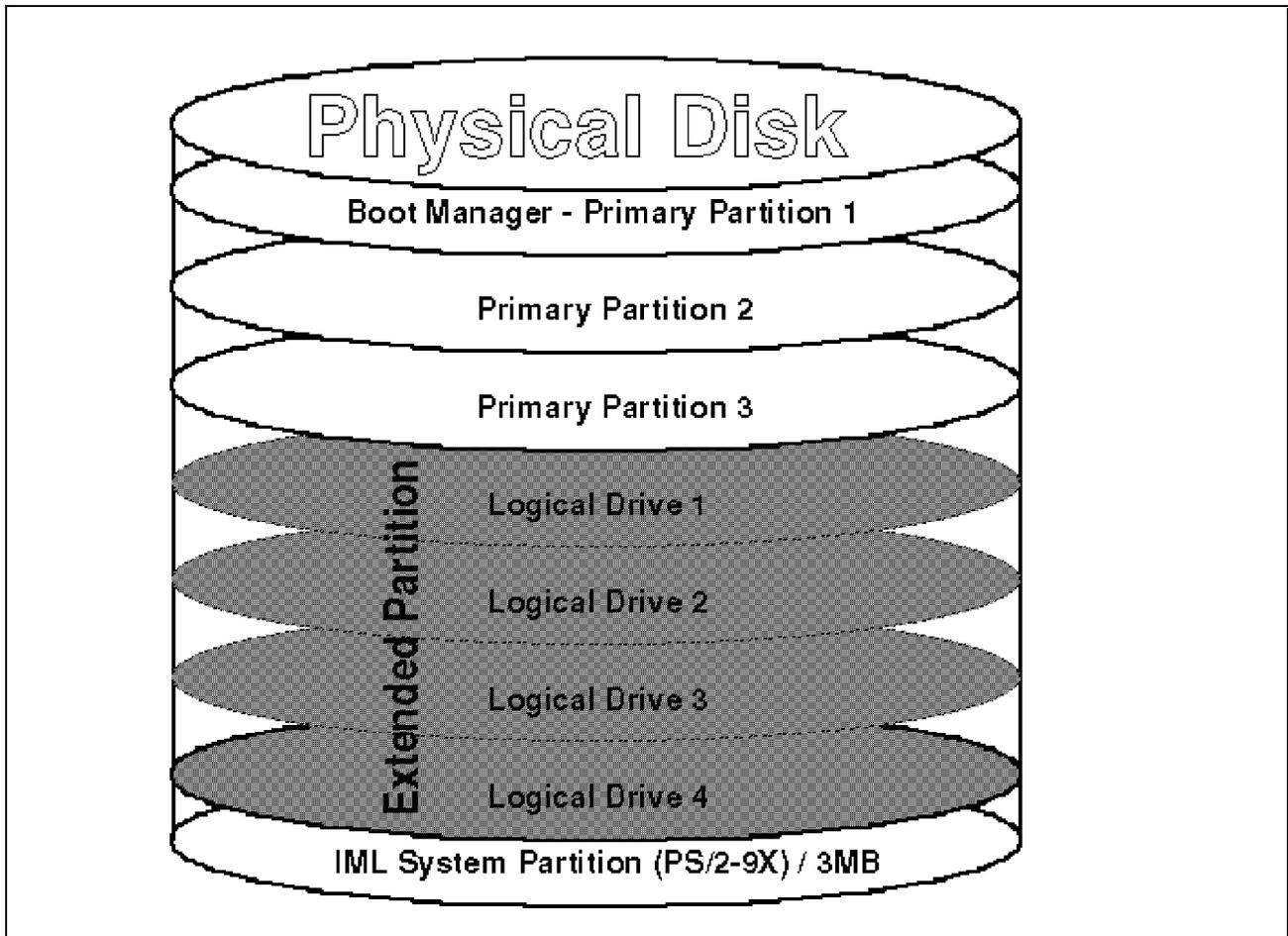


Figure 110. Extended Partitions and Logical Drives

An operating system only assigns logical drive letters to those partitions with a recognizable format, that is, supported by the operating system. Logical drives in extended partitions are shareable. Any data installed on these logical drives can be used by an operating system running from any other logical drive in the system, provided the partition formats are compatible.

If you do select the first drive to be a logical drive in the Boot Manager, then a 1MB primary partition will be created as the first partition on the hard disk. This is done automatically and the partition is not accessible to the operating system.

If you create a logical drive as the first partition and then a primary partition after that, the primary partition will then be drive C. The rest of the free space after that will only be available as primary partitions, as illustrated in Figure 111 on page 453.

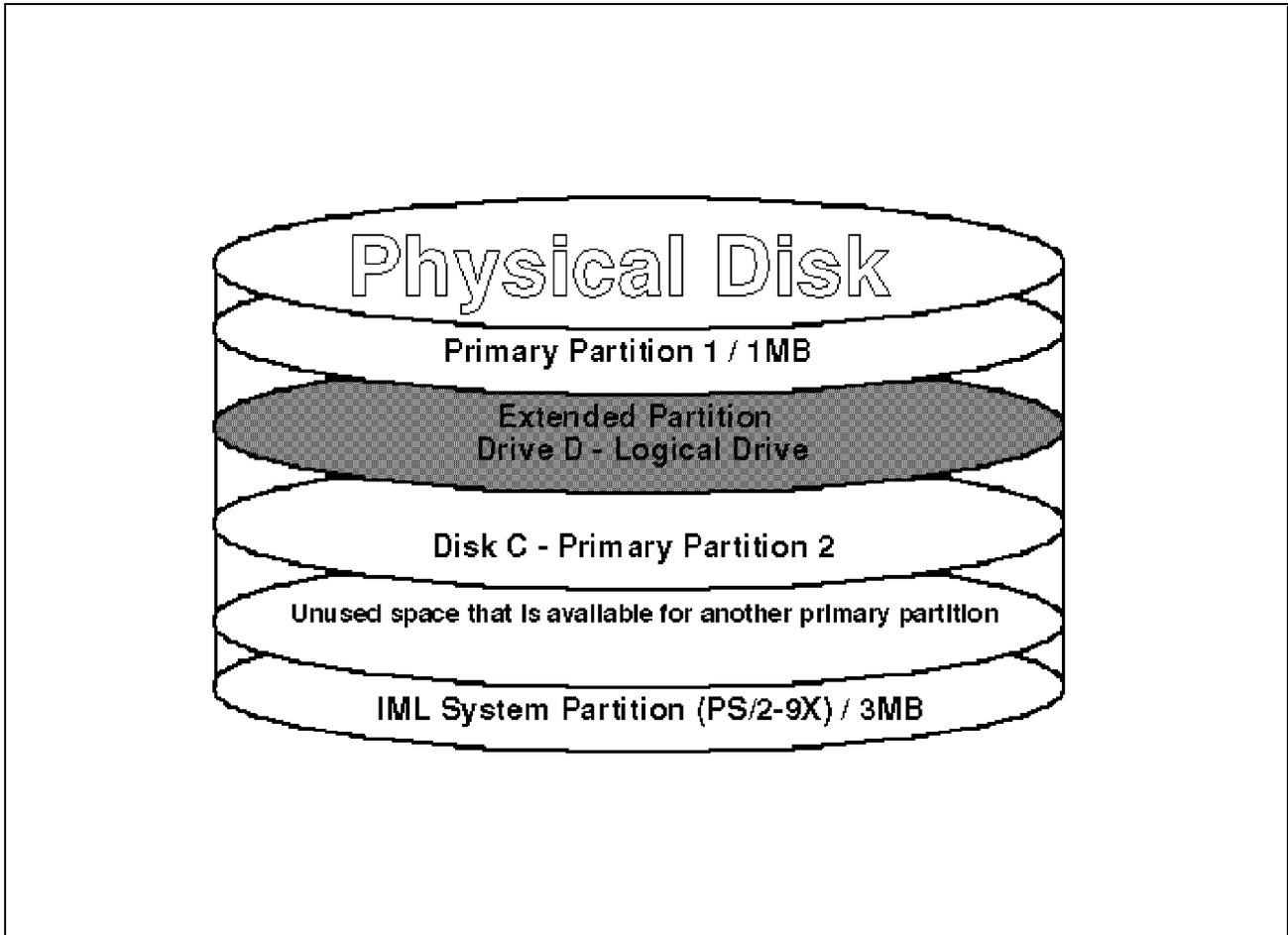


Figure 111. First Drive as a Logical Drive

It is recommendable to make the extended partition the last partition on your hard disk. When you create a logical drive make sure that it is created after you have created all your primary partitions. This will ensure that the least amount of hard disk space is lost.

A.1.3 Boot Manager

The Boot Manager is a tool that allows you to access your partitions on your PC's hard disk(s) during startup. When you install multiple operating systems on your computer, you can use the Boot Manager feature to manage the selective startup of those systems. The Boot Manager startup menu lets you select which operating system you want to be active each time you start your system. Each of these operating systems are on different drives that are identified with logical drive boot names.

Figure 112 on page 454 is an example of what the Boot Manager startup menu would look like if you installed the Boot Manager and three operating systems. Boot Manager in this example is set up in Advance mode, where it shows the physical drive, the drive letters and type of partition, the size of the drive and the format type of the drive. In **Normal mode** only the drive names are displayed.

```

                                Boot Manager
                                Menu

DOS          Disk1    C:Primary    50M    FAT
OS/2WARP     Disk1    C:Primary    200M   HPFS
OS/2 2.1     Disk2    D:Logical    200M   HPFS

-----
No selections within 30 seconds boot DOS
Press ESC to disable times
Use or to select. Press Enter to BOOT
```

Figure 112. Boot Manager Menu

Boot Manager will use one primary partition of 1MB on the hard disk. Therefore if Boot Manager is installed, it allows up to three primary partitions on each physical disk (if they are the only partitions on the disk). If you have logical drives and Boot Manager then you will only have two primary partitions left, because the extended partition uses the place of a primary partition.

A.1.4 Logical Drive Boot Names

You may assign a boot name to a logical drive, to simplify its identification. A boot name is a unique name which identifies the logical drive for booting, and is independent of the logical drive letter assigned to the drive by the currently active operating system. The boot name is only recognized by the Boot Manager.

Boot names are useful in the event of a hardware reconfiguration where additional fixed disks are added to the machine. Boot names assigned to logical drives on the original fixed disk will not change and will still identify

the same area on the disk, unlike the logical drive letters which may change due to the reconfiguration.

A.2 Partitioning Hard Disks

Partitioning of your hard disk is a matter of individual taste. Our intention is not to tell you how to partition your hard disk, but rather to give you some hints and tips and to mention a few items to help you in partitioning hard disks.

One of the most common ways of setting up your hard disk is to have three drives:

- C: Primary partition
- D: Logical drive for applications
- E: Logical drive for data

An example of such an FDISK screen creating these partitions is shown in Figure 113.

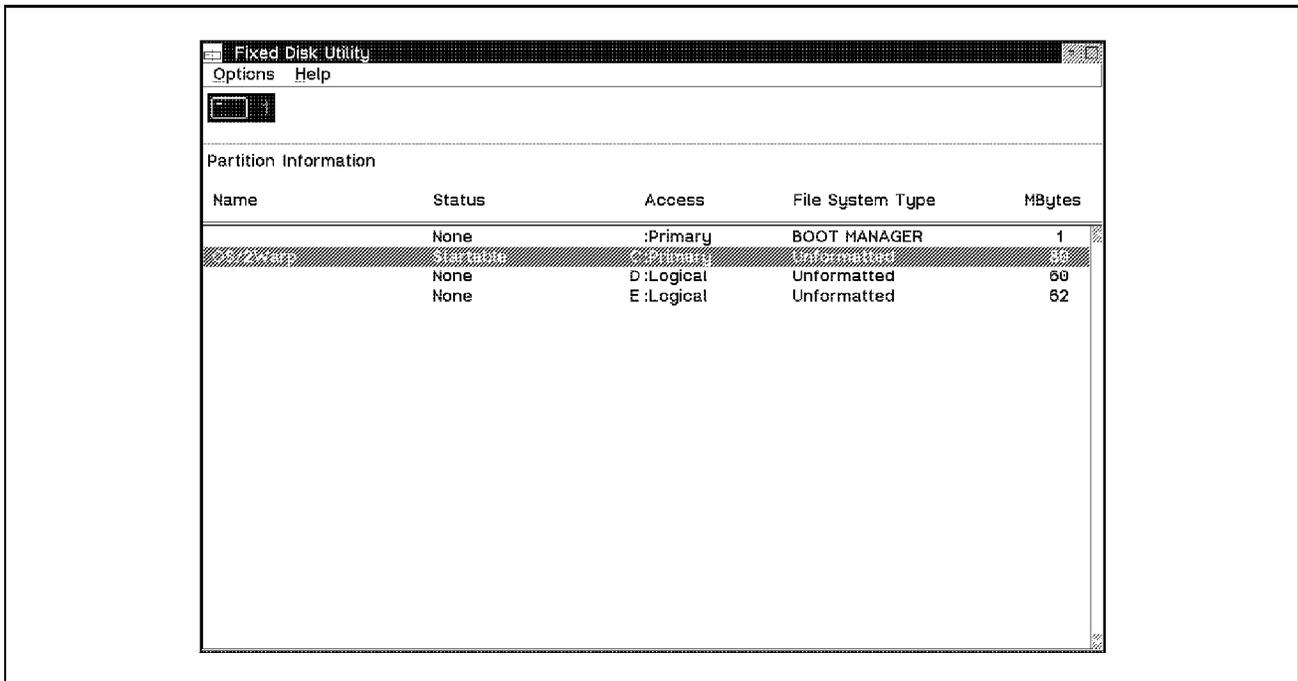


Figure 113. Sample Hard Disk Partitioning

In this example we recommend that you have a primary partition assigned as drive C, which contains the operating system and related programs, such as

LAN requesters and communication programs. Some of these programs can be installed on the second drive, depending on how easy they are to reconfigure if you need to reinstall your operating system.

The files on drive C are those files that you rarely would make a backup from. If you have a system or hard disk failure, these are the files that you would install from disk or the original source rather than from a backup, as the backup may also be corrupted.

Drive D and E are logical drives in an extended partition.

On drive D you would have applications that are not as tightly integrated into the operating system and are fairly easy to reconfigure if you had to reinstall the operating system. These files and/or applications may change once in a while and it is easier to install them from a backup source than to reinstall them. Typical applications like these would be spreadsheet and word processor applications. Another advantage is that this helps to cut down on fragmentation of your partition.

Drive E is your data drive. Here you would store your data. On this drive data will change daily and frequent backups are necessary. The data that is stored here is data that cannot be reinstalled or recreated except from backups.

Following this example, you separate the data from the applications and backup and recovery is made easier. Of course, you can have more partitions for different applications or processes. For example, if you have a specific application that creates its data linked within the application, you can put that application on a separate partition and make a backup of the whole drive, including the application and its data.

There are many ways of setting up your hard disk. None of them is wrong, but we do suggest that you plan ahead before you start partitioning your disks. These are some of the major points you have to consider before you do any partitioning:

- Should you use FAT or HPFS? See A.3, "FAT versus HPFS" on page 459.
- Which operating systems are you going to use? Do they need primary partitions, or can they boot from a logical drive?
- For OS/2 did you leave enough space for the swapper file? Where are you going to place the swapper file? See A.5, "Swapper Considerations" on page 468.

- What type of applications are you going to use? Can they be installed on other drives than drive C? Do they need special drives, or a certain file system such as HPFS?
- Are you connected to a LAN, and which drives are assigned on the LAN? You might have drive letter conflicts.
- Are you going to add additional drives at a later stage or external devices? For a laptop or a removable hard disk, are they partitioned so that the system does not change the current drive letters when you insert the drive or dock the laptop? See A.2.2, “Removable Hard Disks and Docking Stations” on page 458.

If you do plan your partitioning correctly, the chance of having to re-partition later again will not be likely. There are some new products on the market that allow us to change your partitions and our file systems without the pain of making backups first and then to reinstall and restore our files. One of these products is PartitionMagic by PowerQuest.

A.2.1 Partitioning with Multiple Hard Disks

Some computers have second hard disks, or even more than two hard disks. With OS/2 you don't need to have a primary partition on your second hard disk. You can create logical drives as the only drives on a second hard disk. Because there must be one physical partition as the first partition on a disk, OS/2's FDISK will automatically create a 1MB primary partition, which will not be active. Although you lose 1MB on your disk it does have the following advantages to have only logical drives on the second hard disk.

If you have a primary partition on a second hard disk it will be assigned as drive D. The drive letters of primary partitions are always assigned first. This means that drive C is always on the first disk, and drive D is always on the second disk, if the first partition on the second disk is a primary partition. The logical drives on the first disk continue naming with drive E and then the rest of the logical drives on the first disk will be assigned alphabetically. Then all the logical drive letters for the second disk drive will be assigned alphabetically. This is illustrated in Figure 114 on page 458.

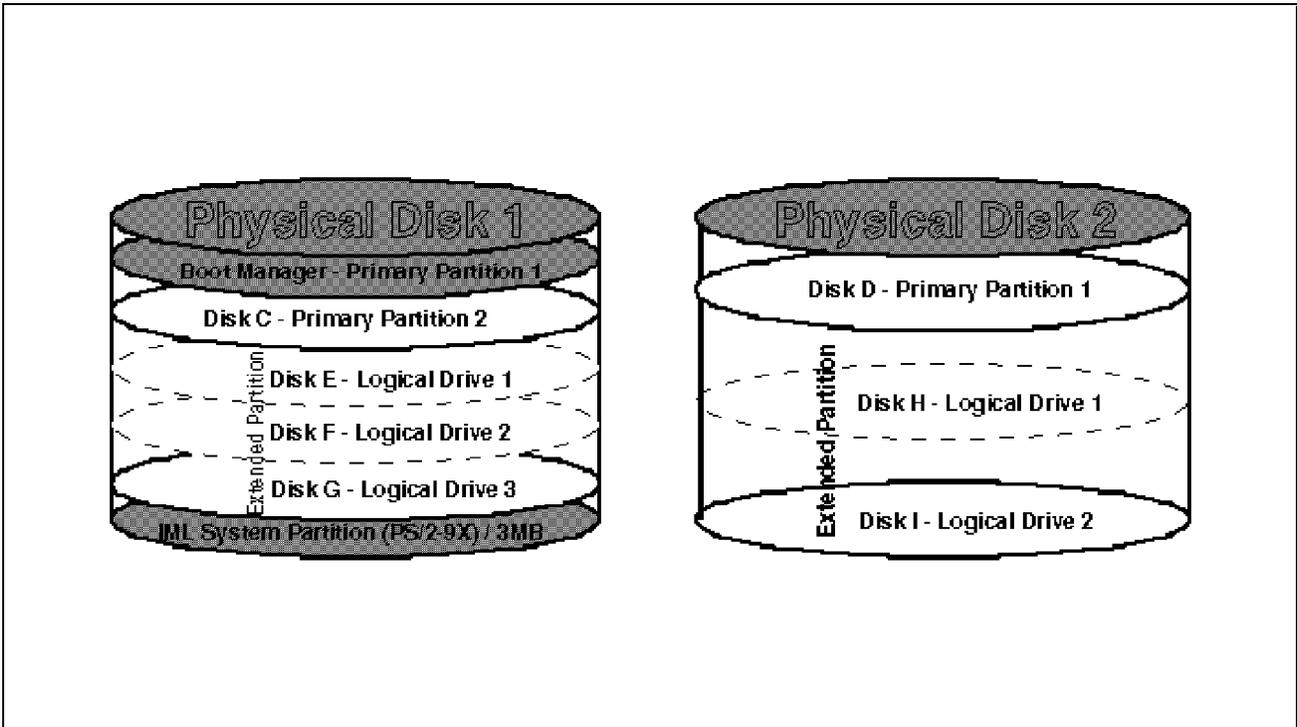


Figure 114. Two Hard Disks with a Primary Partition on the Second Disk

If the second hard disk is removed from the system, all drive letters will be re-assigned on the first disk, as the original drive D is no longer present. This will have an impact to the applications on the logical drives if there are references to them in the CONFIG.SYS. For example, if an application has LIB PATH statements in the CONFIG.SYS, and this application was on drive E, with the removal of the second hard disk, drive E now becomes drive D, and the statements in CONFIG.SYS are incorrect.

If you had only logical drives on the second hard disk, removing the hard disk will have no impact on the drive letters that are on the first disk.

A.2.2 Removable Hard Disks and Docking Stations

What we've just discussed in A.2.1, "Partitioning with Multiple Hard Disks" on page 457 is even more true for removable hard disks and disk drives in docking stations. The hard disk in a docking station is similar to a removable hard disk. The only difference is that you remove the laptop from the hard disk in the docking station, instead of the hard disk from the PC.

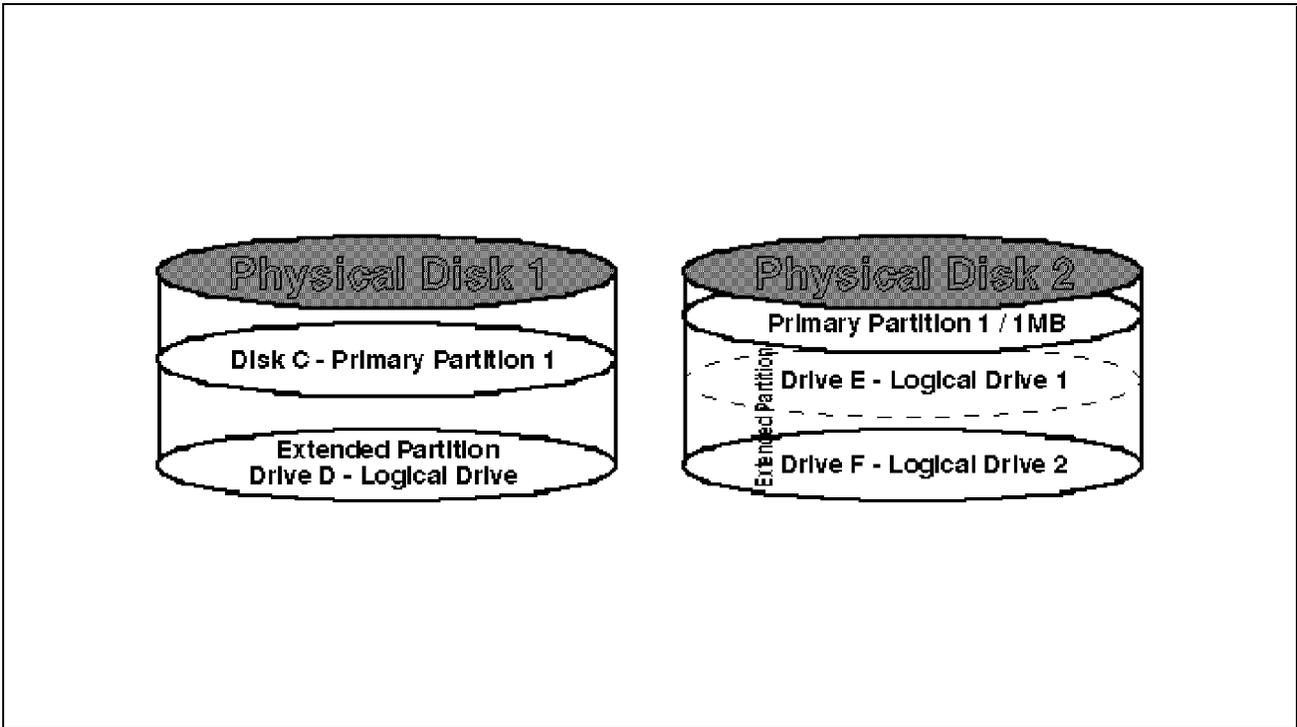


Figure 115. Two Hard Disks Configured for Removable Disks

By partitioning all the drives on the removable hard disk as logical drives you will always keep your disk drive letters synchronized. If you remove the disk or the laptop from the docking station, all the drive letters on your hard disk that are left in your machine will not change their assigned drive letters. If you put the drive back, or dock the laptop, the drives of the second hard disk will be added to your existing list of drive letters without changing the order or the drives.

A.3 FAT versus HPFS

If you choose to format a partition you will be asked to select a *file system*. You can either select the FAT (File Allocations Table) file system or HPFS (High Performance File System).

You should consider the following when making the choice:

- Select the FAT file system if you intend to share data in the partition with a version of DOS that is running independently of OS/2 (also true for AIX and Novell). DOS uses the FAT file system, and does not recognize files created by HPFS. Although DOS does not recognize HPFS, this is not the case for DOS sessions that are part of OS/2. If you plan to run your DOS

programs under OS/2, you can use either file system. The only restriction for DOS programs running in these DOS sessions is that they will not recognize the longer file names in the HPFS partition.

- For large hard disks, HPFS has features that make it a better choice. It puts the directory at the seek center of the partition and is designed to allocate contiguous space for files. This feature helps prevent file fragmentation.
- HPFS supports file names up to 256 characters in length.
- If you format an OS/2 partition for the FAT file system and the system memory is less than or equal to 6MB, support for HPFS is not automatically installed. You can add this support later.
- HPFS takes at least 200KB of system memory. If your system has 6MB or less memory, your system performance will be adversely affected.
- On LAN servers we suggest that you use HPFS, as it can deliver better access control to your files. For large servers (50 users or more) use HPFS386 that is supplied with LAN Server Advance, as it will improve performance and security.

Table 41 (Page 1 of 2). FAT versus HPFS

FAT	HPFS
Places the root directory at either the beginning or the end of the partition. This directory is used by the operating system to locate information on the disk.	Places the root directory at the seek center of the partition. This improves the access time on very large partitions. This directory is used by the operating system to locate information on the disk.
Searches the file sequentially.	Uses a B-tree search algorithm to improve the speed of the file searches.
Fragments files.	Allocates contiguous space for files to prevent fragmentation.
Does not require extra system memory to run.	Requires a minimum of 200KB of system memory. If your computer has less than 6MB of memory, performance will be adversely affected.
Does not recognize drives formatted as HPFS.	Can recognize drives formatted with FAT and HPFS.
Supports all versions of DOS and all versions of the OS/2 operating system. They can be installed on disks that use the FAT file system.	Does not support versions of DOS and Versions 1.0 and 1.1 of the OS/2 operating system. DOS and OS/2 1.0 and OS/2 1.1 cannot be installed on disks that use HPFS.

Table 41 (Page 2 of 2). FAT versus HPFS

FAT	HPFS
<p>Supports conventional file names. File names can have up to 12 characters, with a maximum of 8 characters, a period, and a maximum of a 3-character extension. The period and extension are optional. Blanks and some characters are not supported. Long name can be placed in extended attributes.</p> <p>Example: MYNEW.SCR, MYFILE are both valid file names.</p>	<p>Supports conventional file names and long file names. File names can have up to 254 characters and blanks.</p> <p>For example: PROGRESS.REPORT, MY NEW FILE and MYNEW.SCR are all valid file names.</p> <p>Notes:</p> <ol style="list-style-type: none"> 1. Files whose names violate the 12 character convention used by the FAT file system will not be visible from DOS sessions. 2. File names that contain blanks must include double quotation marks around the name whenever a command is specified. For example: ERASE "THIS IS MY FILE" 3. Files with long file names or blank spaces can be copied only to a diskette or a disk formatted with FAT using the direct-manipulation method. (All disks are formatted with FAT regardless of the file system on the computer.) 4. The system shortens the long file name when the file is copied to a diskette or a disk formatted with FAT. The long file name is saved as an extended attribute until the file is copied back to an HPFS disk using the direct-manipulation method and the Workplace Shell.

The main decision to use either file system lies in two factors. If you are going to use DOS natively on your system, use FAT. If you have 6MB or less memory, use FAT. Although HPFS use 200KB of system memory, you will have to take into account the cache size for HPFS. If you have 2MB of HPFS cache, it will be 2MB of system memory that is used.

Also consider the following:

When an HPFS partition is being accessed, 200KB goes to 400KB. 200KB is the basic support regardless of whether you have an HPFS partition or not.

You don't need HPFS on your local system to access a drive located on a server drive that is formatted in HPFS.

A.4 RAID Drives

The term *RAID* (Redundant Array of Independent Disks) was first phrased in 1987 when David A. Patterson, Garth Gibson, and Randy H. Katz, all from the University of California at Berkeley, published a paper entitled "A Case for Redundant Arrays of Inexpensive Disks(RAID)," in which they defined five disk array models, known as RAID Levels 1-5. These original five RAID levels are all disk array architectures which store redundant information about user data and can regenerate the data in the event of a single disk drive failure. However, it's important to understand that the data redundancy provided by these RAID architectures is only one part of a total fault-tolerant disk storage solution.

Note

The term RAID was originally defined as "Redundant Array of Inexpensive Disks." However, the authors of the paper recently changed "inexpensive" to "independent" to acknowledge that high-performance, high-reliability disk drives are much better suited for this application than generic, inexpensive disk drives.

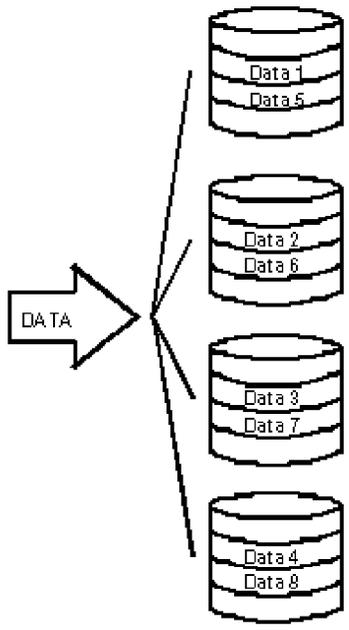
RAID provides a range of price/performance and high availability options. For example RAID 1 (also known as mirroring) provides the highest performance with data redundancy, but at the highest cost, since all data is duplicated, requiring twice the disk space. Levels 1-5 provide continued data availability in the event of a single disk drive failure by regenerating the data from the redundant data. However, because of the extra I/O operations required to regenerate the data stored on the failed disk drive, performance is lower during data recovery operations.

A.4.1 RAID Definitions

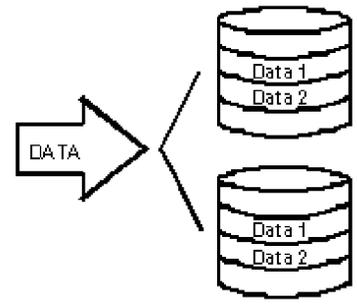
RAID technology is being used more and more in the PC environment, especially on larger servers. Although only RAID Levels 0,1 and 5 are used in the PC environment, we will give a summary of what each RAID level does.

Note: In the following illustrations, *data* means a chunk of data, not necessarily an entire file.

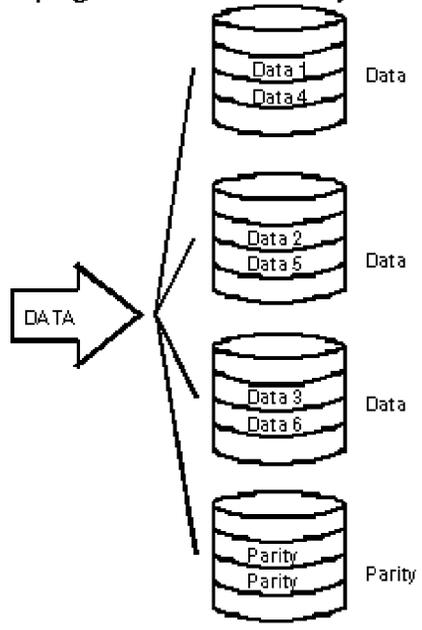
RAID "0" - Striping



RAID 1 - Mirroring



RAID 3 Striping with Dedicated Parity



RAID 5 Striping with Distributed Parity

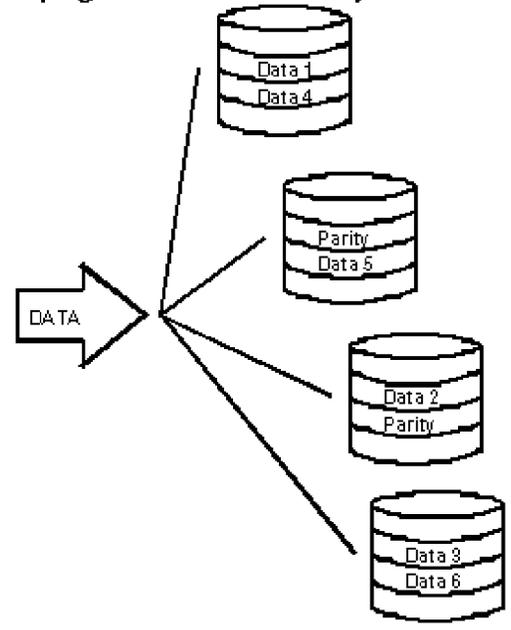


Figure 116. RAID Levels

Raid Level Description

- RAID "0"** RAID "0," also known as data striping, is not a true RAID architecture because there is no data redundancy. RAID "0" stripes data sequentially across multiple disks to allow parallel read or write I/O operations. Some RAID "0" implementations use this striping technique to achieve very high effective data transfer rates to enhance effective performance. All RAID "0" implementations spread the data and workload across the disks in the array, which will often give higher throughput than with non-arrayed disks. However, RAID "0" does not provide redundancy along with the performance boost. In the event of a single disk failure, the data residing on the disk cannot be regenerated.
- RAID 1** The RAID 1 implementation employs data mirroring to achieve redundancy. Two copies of the data are created and maintained on separate disks, each containing a mirror image of the other. RAID 1 provides an opportunity to improve performance for reads because the read requests will be directed to the mirror copy if the primary copy is busy. In the event of a disk failure, RAID 1 provides the highest performance and because the system can switch automatically to the mirrored disk with no impact on performance and no need to rebuild lost data. RAID 1 is the most expensive of the array implementations because the data is duplicated. However, it provides the best data availability - from a disk failure standpoint - because it uses the fewest number of disks in its array configuration. The fewer disks in an array, the lower the probability of multiple disk failures.
- RAID2** RAID2 and RAID 3 distribute data across several disks with striping at the bit or byte/multibyte level. The data is written or retrieved in one parallel movement of all of the access arms. At a conceptual level, RAID2 and RAID 3 are similar. RAID 2, however, uses such an encoding technique called the Hamming error correction code to provide error detection and correction. This encoding technique requires multiple disks for the error detection and correction information, making the RAID 2 parity implementation more complex and more expensive for general use than the RAID 3 design. Therefore, RAID 2 has been of little interest in a commercial environment.
- RAID 3** Unlike RAID 2, RAID 3 uses a single dedicated disk to store parity information. Let's use an array of five disks as an example. Four of the disks are used to store data, and the fifth is used to store

parity information for the four data disks. If one of the data disks should fail, the parity disk can be used to reconstruct the data. Because the access arms move in parallel, only one I/O can be active across the arrayed disks at any one time. This constraint yields excellent performance data transfer rates for sequential data, but renders RAID 3 impractical for transaction processing or other high throughput applications characterized by random access data.

- RAID 4** Like RAID 2 and RAID 3, RAID4 and RAID 5 stripe data across several disks, but the striping increment is a block or record. There is only one parity disk in the RAID 4 design; in all other aspects RAID 4 is identical to RAID 5. Because the parity disk is involved in every write operation, it can become a bottleneck for transaction throughput. Therefore RAID 4 is viewed as impractical.
- RAID 5** RAID 5 does not have a dedicated parity disk. Instead, RAID 5 mixes both data and parity information on all disks. In RAID 5 the access arms can move independently from one another. This enables multiple concurrent access to the array devices, thereby satisfying multiple concurrent I/O requests and providing higher transaction throughput. RAID 5 is best suited for small block size, random access data. One important difference between RAID 3 and RAID 5 is that in RAID 3 every transfer involves all of the data disks. The segment size is one sector, and the unit of transfer is one sector for each data disk. In RAID 5, the segment size is larger, and most transfers involve only one data disk, thus allowing operations in parallel and giving higher throughput.

A.4.2 Configuring RAID Disks

We did all our tests on an IBM PC Server 500 with the IBM SCSI-2 Fast/Wide Streaming RAID Adapter/2 controller card. Most of the other PCs that use the RAID technology should work similar to the IBM PC.

You can have RAID 0, RAID 1 and RAID 5 all on the same system, sharing the same drives or any combinations of the different RAID levels. For example, on a 3GB RAID system you can define a 500MB RAID Level 0 disk and a 1250MB RAID Level 1 disk. When you create a RAID disk, the operating system will see it as a physical disk. This means that, if you have defined levels RAID "0," and RAID 5 disks, according to the operating system you have two physical disks. You can now use FDISK to partition these two disks.

The first RAID disk that you've created will be the first physical disk, and will then be the first bootable hard disk. If you create a primary partition on the second RAID disk it will be the D: drive, and behave similar to a second hard disk in non-RAID machine.

RAID capable machines add another step in planning how to partition your hard disks, as you now can decide on the type of RAID level that you want and the size of the physical disks. Some factors that come into consideration are:

- The level of RAID that you would need for data protection.
- The amount of hard disk space that you can sacrifice for redundant data
- The size of each disk so that you can still use your normal backup media. (This could be a problem if you have a 500MB tape drive and a 6GB RAID disk.)

Then you can start planning partitioning your hard disks.

A.4.3 RAID Device Drivers

OS/2 does not contain any device drivers for RAID controllers. Some RAID controllers can be accessed using the IBMINT13.I13 base device driver. We recommend that you replace this device driver with the correct RAID device driver.

- After you have installed OS/2 (any OS/2 from version 1.3 upwards) run the "*Device Driver Install*" program in the System Setup folder.
- Insert the RAID option disk in drive A.
- Select the RAID driver and shut down the system.

The Device Driver Install program will install the RAID device driver and the RAID Controller Administrator and Monitor program.

On the machines where IBMINT13.I13 does not work use the following workaround:

1. Copy the OS/2 device driver for the RAID system to OS/2 Warp Version 3 Disk 1.
2. Edit the CONFIG.SYS on Disk 1 and list the OS/2 device driver in CONFIG.SYS.

(If it has a .SYS, .BID, .VSD, .TSD, .ADD, .I13, .FLT, or .DMD extension it usually is a BASEDEV=FILE.EXT line that needs to be inserted. If you

get an error on the statement and it is a .SYS file, try
DEVICE=NAME.SYS.)

For example, the IBM PC Server 500 use IBMRAID.ADD device driver.
The statement in CONFIG.SYS is:

```
BASEDEV=IBMRAID.ADD
```

3. After installation, you have to boot first with the installation diskettes and at the Welcome screen, press F3 for a command prompt.
4. Copy the RAID device driver from Disk 1 to the root directory of the OS/2 boot drive, for example:

```
COPY A: IBMRAID.ADD C:
```

5. Edit CONFIG.SYS and insert the same line as you did for step 2:

```
BASEDEV=IBMRAID.ADD
```

6. Copy the RAIDADM.EXE program to the OS2 directory and the RAIDADM.HLP file to OS2 HELP directory. These files are on the RAID option disk, for example:

```
COPY A: OS2 RAIDADM.EXE C: OS2  
COPY A:\OS2\RAIDADM.HLP C:\OS2\HELP
```

To edit CONFIG.SYS you can use the editor that is on the OS/2 Warp Version 3 Disk 1. It is called TEDIT and to edit CONFIG.SYS type at the command prompt:

```
TEDIT CONFIG.SYS
```

The RAIDADM program is required to rebuild the system if you do have a single disk failure. This program allows you to recover when you've replaced the failed disk on RAID 1 and RAID 5 disks, or to switch to a Hot Swap disk. (A Hot Swap disk is a disk that is part of the RAID disks but will only be used is a single disk fails.)

Warning!

Always make sure that you are on the latest level of RAID BIOS and using the device drivers that are compatible with the RAID BIOS.

A.5 Swapper Considerations

Many users prefer to have their swapper file on a separate, dedicated drive. There are a number of factors to consider when you do this in order to gain better performance. If the system does a lot of memory swapping, you could consider having the swapper on a separate drive. If the drive that contains the swapper file is on a second physical disk, you will get a performance increase, as the write and read of the swapper file to disk will be done by the second disk and the first disk is free for other tasks.

A.5.1 Swapper on its Own Drive

If you are going to put the swapper file in a separate drive on the same disk as where all your other files are located, you will have to put more planning into it.

If the swapper is rarely used, then it should be placed at the end of the disk. But if it is accessed frequently, you can achieve better performance if it is physically in the center of the disk. This will minimize the time for the hard disk read/write heads to reach the location where the swapper is. This means that you have to plan the partitions in such a way that the swapper partition is physically in the center of the disk.

If the swapper file is on its own drive, it has the advantage that it will not run out of space because of other files taking up the space. This means that the swapper file would be the only file on that drive and that no other files would be written to the drive.

Using SCSI devices has the advantage that a SCSI drive can be accessed through two channels. This means that data can be accessed through one channel and the swapper file through the second channel. This will give a performance increase.

There are some disadvantages though. If your swapper file does grow beyond the size of the partition you have a problem. If your swapper hardly ever fills more than half of that partition then you waste disk space.

A.5.2 Swapper in its Default Path

If you know what type of applications you are going to use, and you know the memory requirements of those applications, you can build that amount of hard disk space that the swapper is going to require into your partitioning plan. If the amount of memory required is not much more than the system memory, there won't be enough extra memory available for swapping. In

that case we recommend that you leave the swapper in the default partition. OS/2 handles the swapper file in a very unique way and it always gets priority.

If you know that your swapper size is usually 10MB, you can set the initial size of the swapper to that value. This is done by changing the second value of the SWAPPATH statement in the CONFIG.SYS (remember that the first value reserves the swapper space at the startup). In the example of 10MB we would then set the value to:

```
SWAPPATH=C: OS2 SYSTEM 2048 10240
```

Another improvement concerning the increase of performance has been incorporated in OS/2 Warp Version 3. The value of the buffer statement in CONFIG.SYS has been increased to improve performance on reading information into memory. If you run many programs in OS/2 sessions, you can increase the speed of your system by increasing the value specified for BUFFERS. For example in OS/2 Warp Version 3 you may increase the BUFFERS from the default value BUFFERS=90 to BUFFERS=110.

However, remember that when you increase the number of disk buffers, you decrease your available memory by 512 bytes for each buffer specified. Additional buffers might cause some programs to run more slowly because there is less memory available for the program to keep information. This can result in more frequent memory swapping, which will have an effect on performance.

A.5.3 Swapper File on a Separate Hard Disk

If the swapper file is going to be frequently larger than 50MB, then there are advantages to having it on a separate physical hard disk dedicated only to the swapper file. Small hard disks of 60-80MB will be ideal for this type of scenario. Because the size of the swapper file is so large, the seek time of loading the swapper file and applications on the same disk will have performance impacts. If the swapper is on its own disk drive the disk drive, is dedicated to the swapper file and it will improve performance. Of course, if your swapper file is so large, additional memory will make a significant difference in improving performance.

A.6 Partitioning Tools

The only tool that will modify partitions after you have written data to the disk, that we were aware of, is PowerQuest's PartitionMagic. What this means is that after you've formatted the drive and have written data on it, you can still modify the partitions and logical drives without losing data. It is also the only tool that is capable of converting existing FAT partitions to HPFS partitions. This is an important feature if you want to install Boot Manager on an existing system. You don't have to make backups if you want to change the partitions. However, it is recommended.

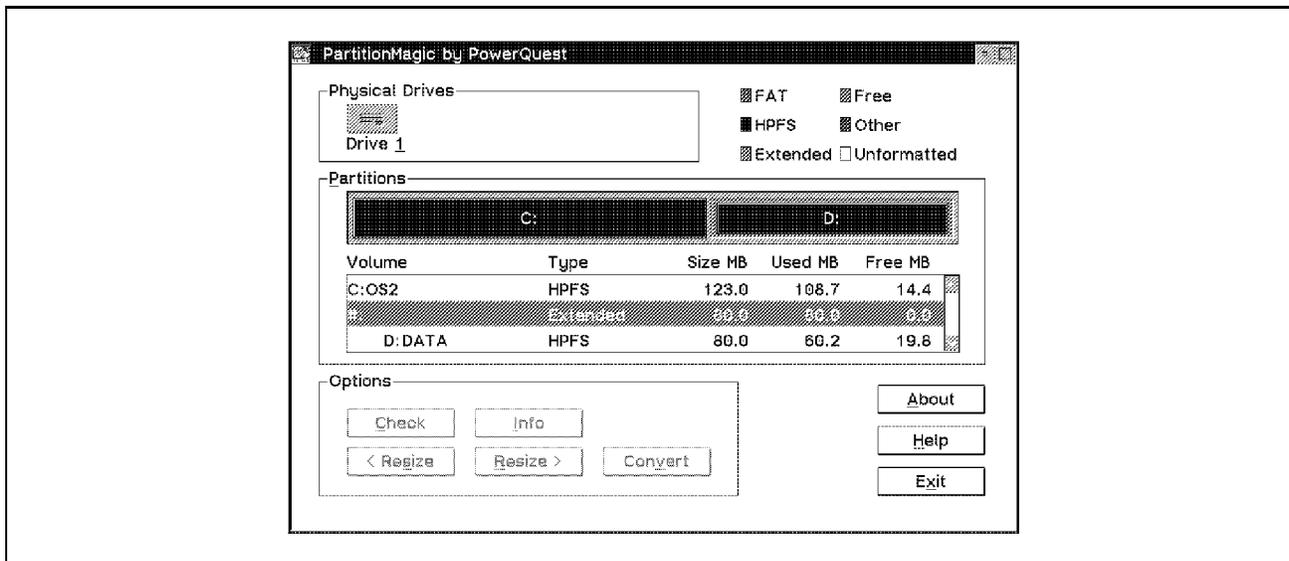


Figure 117. PartitionMagic's Main Screen

Besides other features, PartitionMagic allows you to resize partitions or logical drives within the limits of free space that you have available. This means that if you have a drive with 23MB of free space and you want to make the drive smaller, then you can shrink the drive from 1MB up to 23MB. It will not allow you to change drives on which you have open files.

If you want to change your boot drive, you have to boot the system either from the OS/2 installation disks and use a character-based OS/2 program to change the partitions, or boot with DOS and use the graphic DOS program to change the partitions. The DOS program looks similar to the OS/2 Presentation Manager program and does recognize drives that have been formatted with the HPFS file system.

PartitionMagic shows in different colors the primary and extended partitions. You can change the size of the logical drives within the extended partition

and if there is free space change the size of the extended partition, in the same way as you would change the primary partition.

PartitionMagic has some other utilities. One of its unique features is that it can dynamically convert a drive formatted with the FAT file system to an HPFS file system. The check disk facility gives more information than OS/2's check disk does and it has an information window that shows information about the physical characteristics of the disk such as the number of cylinders, heads and sectors.

Appendix B. Considerations for Preloaded Systems

OS/2 Warp Version 3 is preloaded on a variety of machines to allow the user to use the system right away without having to go through the installation process. This saves the user time and is good for users who do not want to customize their systems.

With OS/2 2.11, a Preinstalled Essentials folder on the Desktop includes an Essentials Quick Tour, a Tutorial folder, a Features folder, an Application folder and a Configuration Tools folder.

B.1 OEM Preload

When an OEM wishes to preload OS/2 Warp Version 3 on his systems, a preload toolkit is supplied to the OEM which includes: a “ready to run” image that an OEM can use straight out of the box. This allows him to start preloading without having to know anything about OS/2. The images can be transported under DOS, which means that the OEM does not need to worry about OS/2's extended attributes. Utilities that are supplied take care of extended attributes.

The “ready to run” images that are supplied are available in all languages and feature:

- OS/2 Warp Version 3 installed and tuned. Great care is taken with the Workplace Shell setup.
- The components of the BonusPak that are not hardware specific and do not affect system performance are installed:
 - IBM Works
 - MultiMedia Viewer
 - Faxworks
 - CompuServe Information Manager
 - System Information Tool
 - HyperAccess Lite

The following components are not installed by default:

- Internet
- VideoIn

- Person to Person
- The Diskette Factory is installed and set up to enable the user to rebuild the OS/2 Warp Version 3 and BonusPak diskettes.
- Documentation is provided with a fast path to allow a user to get up and running in under an hour. The preload specific documentation details how to create, save and restore OS/2 preload images.

B.2 Packaging

For preloaded systems, depending on the preference, you will get one of the following:

- The system unit and OS/2 Installation diskettes
- The system unit with preinstalled OS/2, including Diskette Factory

B.2.1 Diskette Factory

Diskette Factory is a new feature in OS/2 Warp Version 3 that allows the user to create OS/2 Warp Version 3 product diskettes. It requires a new utility (SETINI.EXE) to update the REINSTALL.INI file to point to the proper directory containing the product Install Diskette tree used by Selective Install.

Diskette factory is able to do a specific set or a reset of the default path for the source directory used by Selective Install. It supports the following parameters:

- /S:XXXXXXXX

Sets default for the source directory.

For example: SETINI /S:C:\DISKETTS\OS2V3 where C:\DISKETTS\OS2V3 is the directory.

Note

Parameters 2 and 3 MUST be used together.

- /C:XXXXXXXX

Current path value is XXXXXXXX

- /N:YYYYYYYY

New value is YYYYYYYY

For example: SETINI /C:C:\DISKETTS\OS2V3 /N:A:\ where C:\DISKETTS\OS2V3 is the current directory and A:\ is the new directory.

Note

If either parameter is missing, nothing will be done.

If the current directory doesn't match the /C: parameter, nothing will be done.

If the /N: parameter is not a valid drive or directory nothing will be done.

At Diskette Factory installation time, the default directory will be set to the product directory identified in the control file (OS2_30.CTL); for example: SETINI /S:C:\DISKETTS\OS2V3. This will be done by the DFSETUP utility that installs Diskette Factory.

When Diskette Factory deletes the OS/2 product diskette tree, it sets the default source directory back to drive A, if the current default is the same as the product being removed.

The following steps are involved:

1. Diskette Factory deletes the OS/2 product diskettes.
2. Reset the default directory from C:\OS2V211 to A:\.
3. Do not reset if current default is something else.
4. SETINI /C:C:\OS2V211 /N:A:\.

Diskette Factory will delete itself and the SETINI utility when it has deleted the final diskette product diskettes.

B.3 Features on OS/2 Warp Version 3 Preload

There are no special folders created on preloaded systems. All the special features and applets that were previously put only on preloaded systems have been incorporated into OS/2 Warp Version 3. All users (using a preloaded system or one installed with the OS/2 diskettes or CD) share the same tutorial, which is shadowed in the Startup folder.

Rather than have a separate Configuration Tools folder, the Create Utility Diskettes option and the Selective Uninstall option are in the System Setup

folder. Documentation on how to use these utilities is in the standard OS/2 Warp Version 3 publications.

- Create Utility Diskettes

The Backup and Restore function on the Utility diskette continue to support a full Restore of a bootable OS/2 system partition.

- Selective Uninstall

Advanced Installation is used for preloaded systems and all the components are installed by default. In some cases, you may not require all the components and to save disk space, you can select this option to remove operating system files, programs, and device drivers from the hard disk.

Preloaded systems have an additional option on the Selective Uninstall menu called Preinstalled System Files and Utilities, which is not available if you install your system by diskettes or CD.

Appendix C. CID Install

This appendix lists the new and changed *keywords* that exist to assist users when performing a CID installation in OS/2 Warp Version 3. Systems that already have OS/2 Warp Version 3 installed have a sample response file SAMPLE.RSP, which can be found in the \OS2\INSTALL directory. This file lists all of the available keywords and their options.

For full details on CID Install, please refer to the OS/2 Installation Techniques: CID Guide, GG24-4295.

C.1 AdditionalPrinters

This is a new keyword that allows additional printers, other than the default printer, to be installed.

Valid Parms:

0=None

m1:n1,m2:n2,...

where m1,m2,....etc. are port numbers as defined under the "PrinterP keyword.

n1,n2,....etc. are indices into PRDESC.LST as in "DefaultPrinte keyword.

Example: AdditionalPrinters=2:150

In the US version of OS/2 Warp Version 3 this would put an IBM 2380 PPS II on LPT2:. The 2 specifies LPT2 and the 150 specifies entry 150 in the PRDESC.LST file. This same example could yield different results for different country versions of PRDESC.LST.

You can have multiple port/printer specifications on this line and also have multiple AdditionalPrinters Statements.

C.2 CDROM

This keyword has been updated to include support for additional CD ROM devices. This specifies which, if any, CDROM devices you wish to install support for.

Valid Parms:

0=None
1=Autodetect
2=CDTechnology T3301, T3401
3=Chinon431, 435
4=Chinon535
5=CompaqDual Speed
6=CreativeLabs OmniCD
7=Hitachi1650,1750S,3650
8=Hitachi1950S,3750,6750
9=IBMCD-ROM I
10=IBMCD-ROM I rev 242
11=IBMCD-ROM II, Enhanced CD-ROM II
12=IBMISA,Panasonic 562,563
13=MitsumiCRMC-LU002S,Tandy CDR-1000
14=MitsumiCRMC-LU005S
15=MitsumiCRMC-FX001
16=MitsumiCRMC-FX001D
17=MitsumiCRMC-FX001DE
18=NECIntersect 25,36,37,72,73,74,82,83,84
19=NECMultiSpin 4Xe,4Xi,3Xi,3Xe,3Xp,38,74-1,84-1
20=NEC2Vi,260
21=Panasonic501,LK-MC501S
22=Panasonic521,522,523
23=PhilipsLMS CM-205, CM-225
24=PhilipsLMS CM-205MS,206,225MS,226
25=PhilipsLMS CM-215
26=PhilipsLMS CM-207
27=PioneerDRM-600
28=PioneerDRM-604X
29=PlextorDM-3028,DM-5028,4PLEX
30=SonyCDU-31A,33A,7305,7405
31=SonyCDU-531,535,6150,6201,6205,6251,7201,7205
32=SonyCDU-55D,55E
33=Sony541,561,6211,7211,7811
34=Sony6111
35=Texel3021,5021
36=Texel3024,3028,5024,5028
37=Toshiba3201
38=Toshiba3301,3401,4101
39=WearnesCDD-120
40=Non-listedIDE CD-ROM
41=OTHER

Autodetection is enabled only when all SCSI device drives are loaded.

C.3 Windows Support for OS/2 Warp Version 3

The following keywords only apply to OS/2 Warp Version 3.

C.3.1 WindowsSupport

This keyword specifies whether or not to support Windows 3.1. This support is not limited to Windows 3.1 and can also be specified for Windows 3.11, Windows for Workgroups 3.1 and Windows for Workgroups 3.11.

Valid Params:

0=Do not support Windows 3.1

1=Support Windows 3.1

Example: WindowsSupport=1

C.3.2 ExistingWindowsPath

This keyword has changed from OS/2 2.1 for Windows and specifies the path to an existing Windows system. If WindowsSupport is selected and this value is NULL, Install will search all partitions for existing Windows system and the first valid Windows 3.1 system will be selected. If a Windows 3.1 system is not found, an error will be displayed and Response File Install will be aborted.

Valid Params:

This is a string that specifies the path to the existing Windows system.

Example: C:\WINDOWS

C.3.3 WindowsInstallSourcePath

This is a new keyword and it is used to specify the path to a set of Windows Diskettes on a CID tree.

Valid Params:

A string that specifies the path relative to the source path where the Windows diskettes reside of the CID tree.

Example: \WIN31\DISKETTES and
sourcepath=Z:\CURRDRVR

This would cause the install program to look for the Windows diskette 1 in the Z:\CURRDRVR\WIN31\DISKETTES\DISK_W1 directory.

C.4 Windows Support for OS/2 Warp with WIN-OS/2

The following keywords only apply to OS/2 Warp with WIN-OS/2.

C.4.1 WIN-OS/2Support

This keyword specifies whether or not to install the WIN-OS/2 environment. If you do select this option you must install DOS support.

Valid Params:

```
0=Do NOT install WIN-OS/2
---- Followings INSTALL WIN-OS/2 -----
1=All available groups and components (DEFAULT)
2=WIN-OS/2 Readme File
3=WIN-OS/2 Accessories Group
4=WIN-OS/2 Screen Save Utility
5=WIN-OS/2 Sound Utility
6=WIN-OS/2 Main and Startup Group ONLY (Minimum support)
```

Example:

```
WIN-OS/2Support=3,4
would install WIN-OS/2 Main Group, StartUp Group and
WIN-OS/2 Accessories and Screen Save Utility.
```

C.4.2 WIN-OS/2Desktop

With this keyword you specify what the WIN-OS/2 desktop should look like. It can be the standard WIN-OS/2 desktop, a copy of an existing Windows desktop that is on the system, or the existing WIN-OS/2 desktop if you are upgrading.

Valid Params:

```
0=Install standard WIN-OS/2 desktop (DEFAULT)
1=Copy existing Windows** desktop and use as the
  WIN-OS/2 desktop (two related options follow)
2=Preserve WIN-OS/2 desktop currently installed
```

Example:

```
WIN-OS/2Desktop=0
```

C.4.3 ExistingWindowsPath

This keyword specifies the path to an existing Windows system. This option is valid only when option 1 is selected for the WIN-OS/2Desktop keyvalue.

Valid Params:

A string that specifies the path to the existing Windows** system (Example: C:\WINDOWS)

Example:

ExistingWindowsPath=C:\WINDOWS

C.5 FormatFAT

This is a new keyword that specifies which drives to format with the FAT file system.

Note: This keyword cannot be used in conjunction with the BaseFileSystem or FormatPartition keywords.

Valid Params:

A string that specifies the drives to format as FAT.

FormatFAT=C:, D:, E:

This will format drives C, D, and E as FAT.

C.6 FormatHPFS

This is a new keyword that specifies which drives to format with the HPFS file system.

Note: This keyword cannot be used in conjunction with the BaseFileSystem or FormatPartition keywords.

Valid Params:

A string that specifies the drives to format as HPFS.

FormatHPFS=C:, F:

This will format drives C and F as HPFS.

C.7 PCMCIA

This keyword has changed and is used to specify whether or not to install PCMCIA support and which system it should be installed for.

Valid Params:

- 0=Don't install (DEFAULT)
- 1=AMBRA
- 2=ASTBravo
- 3=ASTPowerExec
- 4=CompaqConcerto
- 5=Compuadd425TX
- 6=IBMThinkPad 350
- 7=IBMThinkPad 360
- 8=IBMThinkPad 500
- 9=IBMThinkPad 510
- 10=IBMThinkPad 720
- 11=IBMThinkPad 750
- 12=IBMThinkPad 755
- 13=IBMPS/2 E
- 14=Matsushita
- 15=NCRSafari
- 16=NECVersa
- 17=Panasonic
- 18=ToshibaT3600
- 19=ToshibaT4500
- 20=ToshibaT4600
- 21=ToshibaT4700
- 22=ToshibaT4800
- 23=Zeos
- 24=ZenithZ-lite 425L

C.8 PCMCIAOptions

This keyword is new and is used to specify whether or not to install PCMCIA option support.

Valid Params:

- 0=Don't Install (DEFAULT)
- 1=Install all
- 2=Modem/Fax services
- 3=Hard disk services
- 4=FLASH services

C.9 SCSI

This keyword has changed to include support for more adapter types and specifies which, if any, CDROM adapter support you wish to install support for.

Valid Parms:

- 0=None
- 1=Autodetect
- 2=Adaptec1510, 1520, 1522
- 3=Adaptec1540, 1542
- 4=Adaptec1640
- 5=Adaptec1740, 1742, 1744
- 6=Adaptec2840VL,2842VL,2740,2742,AIC7770
- 7=Adaptec2940,2940W,AIC7870
- 8=BusLogicBusMaster SCSI Adapters
- 9=DPTPM2011, PM2012
- 10=FutureDomain 845,850,850IBM,860,875,885,TMC 9C50/C
- 11=FutureDomain 16xx,1790,1795,MCS600/700,TMC 1800/18
- 12=FutureDomain 7000EX
- 13=IBMPS/2 SCSI Adapter
- 14=IBM16-Bit AT Fast SCSI Adapter
- 15=ProAudioSpectrum 16 with Trantor SCSI

C.10 ToolsAndGames

This keyword has changed to reflect the updated list of tools and games that are provided with OS/2 . The keyword specifies whether or not to install tools and games such as editors and solitaire.

Valid Parms:

- 0=Install none
- 1=Install all (DEFAULT)
- 2=Enhanced Editor
- 3=Search and Scan Tool
- 4=Solitaire - Klondike
- 5=Pulse
- 6=Chess
- 7=Mahjongg Solitaire

Example: ToolsAndGames=2,5,6 would install the Enhanced Editor, Pulse and Chess

C.11 Multimedia Support

This is a new keyword that has been added to OS/2 Warp Version 3. This specifies whether or not to install multimedia file during the installation.

Valid Params:

0=do NOT install multimedia support

1=install multimedia support (DEFAULT)

Once this keyword has been used to install Multimedia support, the files are copied to the target system, but MINSTALL should still be run to complete the installation.

Appendix D. DOS and WIN-OS/2 Settings

This section provides some information on each of the DOS and WIN-OS/2 settings. The information is provided by setting category.

D.1 Keyboard Settings

These settings allow you to have better control of how the system responds to special keystrokes and allows applications to run more smoothly:

D.1.1 KBD_ALTHOME_BYPASS

Registered by: VDD VKBD.SYS as a default VDD.

Use this setting to stop Alt + Home from switching between DOS full-screen and a DOS window.

Using this setting is very important, for example, when using terminal emulators. Many terminal emulators expect to have full control of the keyboard and any unique key sequences, except for Ctrl+Break or Ctrl+C. Since OS/2 Warp Version 3 uses Alt+Home to switch between DOS full-screen and the DOS window, interference can occur with the DOS application's use of this sequence. By disabling the operating system from hooking this sequence, the DOS application is able to process the sequence as if it were running on DOS.

D.1.2 KBD_BUFFER_EXTEND

Registered by: VDD VKBD.SYS as a default VDD.

Use this setting to increase the size of the keyboard type-ahead buffer for a session.

Increasing the keyboard type-ahead buffer enables more keystrokes to be entered into the DOS application before the overflow beeps are sounded from the speaker. When set on, the buffer is increased from 16 to 128 bytes.

D.1.3 KBD_CTRL_BYPASS

Registered by: VDD VKBD.SYS as a default VDD.

Use this setting to have the operating system ignore one of the control-key sequences so that the DOS program can use it. For example, you can specify that Ctrl+Esc works as defined in the DOS program.

Using this setting is very important, for example, when using terminal emulators. Many terminal emulators expect to have full control of the keyboard and any unique key sequences, except for Ctrl+Break or Ctrl+C. Since OS/2 Warp Version 3 uses Ctrl+Esc to bring up the window list, or the WIN-OS/2 task list in a WIN-OS/2 session, interference can occur with the DOS application's use of this sequence. By disabling the operating system from hooking this sequence, the DOS application is able to process the sequence as if it were running on DOS.

D.1.4 KBD_RATE_LOCK

Registered by: VDD VKBD.SYS as a default VDD.

Use this setting to prevent a session from changing the system keyboard repeat rate.

Using this setting can help to keep keyboard repeat-rate continuity among all sessions of the OS/2 operating system. It can be frustrating if a DOS application dynamically modifies the keyboard repeat rate, and you are expecting the same rate among all sessions. Some DOS applications change the rate to enable more processor time to be scheduled for other functions. In the OS/2 operating system, the scheduling of processor time per function is a part of the kernel and not an application-changeable feature. Because OS/2 uses the base device drivers, the operating system primitives have provided more aggregate function than DOS. Therefore, there is no need to slow down one function of the system just to assist another, less capable part of the system.

D.1.5 Memory Settings

The following settings can be used to specify how memory should be allocated for a specific application. This is useful for improving the system performance.

D.1.6 DOS_HIGH

Registered by: VDD VBIOS.SYS as a default VDD.

Use this setting if you want the DOS kernel loaded above the High Memory Area (HMA) above 1MB, allowing more memory for DOS programs and devices.

Sometimes DOS applications assume that DOS will never be loaded high in memory and define a fixed location for the DOS Kernel. Making DOS run in high memory invalidates the assumptions of these DOS applications and can also cause unpredictable results if the area being modified is used by another DOS application. This setting must be changed before the session is started.

D.1.7 DOS_RMSIZE

Registered by: VDD VBIOS.SYS as a default VDD.

Use this setting if you want to set the amount of memory available to a DOS program to less than 640KB. This setting must be changed before the session is started.

Some DOS applications cannot handle having 640KB free, and their calculations for determining segment loading addresses overflow.

For example, there aren't very many applications that have trouble with 640KB free but the application PC/ACL is one of them. It must have less than or equal to 512KB or else its internal segment load calculations will overflow.

D.1.8 DOS_UMB

Registered by: VDD VBIOS.SYS as a default VDD.

Use this setting to load DOS TSRs and devices with LOADHIGH and DEVICEHIGH.

Use this setting if you use a Terminate and Stay Resident program (TSR) or device driver that must own and manage Upper Memory Blocks (UMB). The DEVICEHIGH and LOADHIGH commands in the CONFIG.SYS work only when DOS owns Upper Memory Block. The area can become reduced if Expanded Memory Specification (EMS) and Extended Memory Specification (XMS) are set too high.

D.1.9 DPMI_DOS_API

Registered by: VDD VDPX.SYS as an installable VDD.

Use this setting to control whether DOS API translation is enabled for DOS Protected Mode Interface (DPMI) applications in this session.

This is an important setting that enables Windows 3.1 applications to run. WIN-OS/2 requires the DPMI to be enabled so that the enhanced mode Windows applications can execute protect-mode APIs that they are expecting.

D.1.10 DPMI_MEMORY_LIMIT

Registered by: VDD VDPMI.SYS as an installable VDD.

Use this setting to specify the amount of DOS Protected Mode Interface (DPMI) memory, in megabytes, available for a DOS session. Set the limit to zero to disable DPMI.

If your windows application is running out of resources, it could be because the DPMI_MEMORY LIMIT is set too low. It is best to set the DPMI_MEMORY_LIMIT higher than necessary. Only the amount of DPMI memory that is needed will actually be allocated, so this value cannot hinder your system's available resources.

D.1.11 DPMI_NETWORK_BUFF_SIZE

Registered by: VDD VDPX.SYS as an installable VDD.

Use this setting to control the size, in kilobytes, of the network translation buffer for DPMI applications in this session.

This value should be provided with the network software you are running.

D.1.12 EMS_FRAME_LOCATION

Registered by: VDD VEMM.SYS as an installable VDD.

Use this setting to change the location of the 64KB Expanded Memory Specification (EMS) frame. You need to change the EMS location if it conflicts with device drivers.

Device drivers and hardware tend to consume EMS memory area, so before setting this value it is best to run a hardware reference diskette to know ahead of time the amount of EMS memory available.

D.1.13 EMS_HIGH_OS_MAP_REGION

Registered by VDD VEMM.SYS as an installable VDD.

Use this setting to adjust the amount of memory that a DOS program can add to the Expanded Memory Specification (EMS) region.

This DOS setting allows you to define "another" region of memory to be used as the pseudo banks of memory traditionally found on certain hardware memory cards.

D.1.14 EMS_LOW_OS_MAP_REGION

Registered by VDD VEMM.SYS as an installable VDD.

Use this setting if your program can use remappable conventional memory and you want to set the size of the remappable conventional memory available to a DOS session.

D.1.15 EMS_MEMORY_LIMIT

Registered by: VDD VEMM.SYS as an installable VDD.

Use this setting to adjust the amount of Expanded Memory Specification (EMS) memory, in kilobytes, available to a DOS session.

D.1.16 MEM_EXCLUDE_REGIONS

Registered by: VDD VBIOS.SYS as a default VDD.

Use this setting to specify regions that Expanded memory Specification (EMM) and Extended Memory Specification (XMS) cannot use because they are needed for device drivers or other uses. Some DOS applications and adapters specify areas in the RMSIZE to 1MB region which they reserve for their own use. Specifying regions reduces the chances of dynamic memory contamination and device driver failure.

D.1.17 MEM_INCLUDE_REGIONS

Registered by: VDD VBIOS.SYS as a default VDD.

Use this setting to specify regions that Expanded Memory Specification (EMS) and Extended Memory Specification (XMS) can use between RMSIZE and 1MB.

Specifying regions for EMS and XMS helps to ensure availability of adequate UMB space.

D.1.18 XMS_HANDLES

Registered by: NA

Use this setting to adjust the number of handles needed to identify blocks of Extended Memory Specification (XMS). Reducing the number of pre-allocated handles frees memory space for other uses.

D.1.19 XMS_MEMORY_LIMIT

Registered by: NA

Use this setting to adjust the amount of Extended Memory Specification (XMS) memory, in kilobytes, available to a DOS session.

D.1.20 XMS_MINIMUM_HMA

Registered by: NA

Use this setting to adjust the minimum High Memory Area (HMA) available for use as conventional memory.

D.2 Mouse and Touch Screen Settings

These settings allow you to prevent the conflicts in using the Mouse support in OS/2 and in DOS.

D.2.1 MOUSE_EXCLUSIVE_ACCESS

Registered by: VDD VMOUSE.SYS as an installable VDD.

If you are executing a DOS application and notice two mouse pointers on the screen, that DOS application requires exclusive ownership of the mouse. After you select the setting, click the mouse in the DOS window to remove the extra mouse pointer.

Some DOS applications provide their own mouse support which conflicts with the mouse support automatically provided by OS/2. Enabling the DOS application to manage the mouse means only one visible mouse pointer is available for use.

D.2.2 TOUCH_EXCLUSIVE_ACCESS

Registered by: NA

This setting should be selected if a program you run in a DOS Window does not respond properly when you touch a touch-sensitive display (such as the PS/2 Touch Display, 8516) that is connected to the mouse adapter of a PS/2. For example, if a drawing program does not draw lines when you move your finger across the display screen, you use TOUCH_EXCLUSIVE_ACCESS and select ON. You do not need this setting for a program running in a DOS full-screen session.

D.3 Printer Settings

The following settings allows you to control the behavior of the printer and better allocate the printer resources.

D.3.1 PRINT_SEPARATE_OUTPUT

Registered by: NA

Use this setting to separate printer output, sent to the same output device by two different DOS programs that are running in the same DOS session, into separate spool files.

D.3.2 PRINT_TIMEOUT

Registered by: VDD VLPT.SYS as a default VDD.

Use this setting to adjust the amount of time, in seconds, that the operating system waits before forcing a print job to the printer.

Using this setting can help DOS applications that assume DOS spooling is in use. Most DOS applications when writing to the print device, expect that printing will start when the print buffer is full. OS/2 looks for an end-of-file character as the indicator to close the spool file and make it available to be printed. Most DOS applications do not close the printer, which causes an end-of-file to remain open indefinitely. This PRINT_TIMEOUT value ensures that, if no end-of-file character is seen in the print data stream before the timeout value, then the print data will automatically be sent to the printer upon expiration of the timeout.

If this value is set to 0, the spool file does not close until:

- The DOS program ends.

- The DOS session ends.
- Crtl+Alt+Print Screen has been pressed.

D.4 Video Settings

D.4.1 VIDEO_8514A_XGA_IOTRAP

Registered by: NA

Use this setting to allow controlled access to the video device, to provide faster, unrestricted access for games and graphical applications. Set the value to OFF so that the DOS applications can directly access all functions of the video device for better video performance.

This setting has no effect on DOS windows or a DOS full-screen session running in the background. When this setting is Off, you cannot use the system clipboard in that session.

D.4.2 VIDEO_FASTPASTE

Registered by: VDD VVIDEO.SYS as a default VDD.

Use this setting to speed up input from sources other than the keyboard, such as text pasted from the clipboard.

Using this setting is helpful to ensure that your clipboard operations get a higher boost of processor time to transfer the data quickly. Applications using clipboard functions without this DOS setting enabled may experience delayed transfer of data between Presentation Manager to WIN-OS/2, or WIN-OS/2 to WIN-OS/2.

This setting has no effect on DOS full-screen sessions.

D.4.3 VIDEO_MODE_RESTRICTION

Registered by: VDD VVIDEO.SYS as a default VDD.

Use this setting to extend DOS conventional memory beyond 640KB by limiting the video mode support to text or CGA graphics. If you set this to MONO or CGA, this parameter limits the physical memory set aside for video from 64KB to 16KB for CGA or 4KB for MONO. A DOS text-mode or CGA graphics-mode application can then use the additional memory. Set to CGA available memory is increased to 736KB.

This DOS setting is useful if you always plan to use this DOS session for some application that really does not need any better graphics than are supported with CGA.

An example would be a text editor such as PE2.EXE.

D.4.4 VIDEO_ONDEMAND_MEMORY

Registered by: VDD VVIDEO.SYS as a default VDD.

Use this setting to delay allocation of a video-save buffer, which can free memory swap space for use by a full-screen DOS session.

This setting may slow initial swapping of video memory, but it may provide the fine-tuning needed to give more space to your full-screen DOS session.

This setting has no effect on DOS window sessions.

D.4.5 VIDEO_RETRACE_EMULATION

Registered by: VDD VVIDEO.SYS as a default VDD.

Use this setting to allow simulation of video retrace which improves text scrolling speed. Disabling this setting forces retrace to occur only in the intervals requested by the DOS program.

This DOS setting can free needed processor time that is being consumed to perform the simulated video retrace when your DOS program does not really need it. However, some graphics-intensive DOS applications might experience video corruption with this setting such as intermittent snow at the top or at another area on the screen.

This setting has no effect on DOS windows or DOS sessions running in the background.

D.4.6 VIDEO_ROM_EMULATION

Registered by: NA

Use this setting to emulate some text-based video ROM functions for performance and codepage support. Set OFF if your video ROM adds enhancements to these functions.

This setting has no effect on DOS window sessions.

D.4.7 VIDEO_SWITCH_NOTIFICATION

Registered by: NA

Use this setting to notify the DOS program when the session switches to or from full screen.

This setting has no effect on DOS full-screen sessions.

D.4.8 VIDEO_WINDOW_REFRESH

Registered by: NA

Use this setting to adjust the window update frequency, in tenths of seconds, for a specific DOS session.

This setting has no effect on updates that are a result of keyboard input or scrolling and has no effect on DOS full-screen sessions.

D.5 Other DOS Settings

The following settings allow you to better allocate the resources, both hardware and software and thereby improve the overall performance.

D.5.1 AUDIO_ADAPTER_SHARING

Registered by: NA

Select AUDIO_ADAPTER_SHARING to select access to audio hardware for this DOS session.

Two applications cannot use the same audio adapter at the same time. Also, some DOS programs attempt to use an audio adapter even if one is not required to run the program. This setting allows you to minimize conflicts by defining audio specifications for each DOS session.

- Select **Optiona** to indicate that a program in this DOS session should use an audio adapter if one is available.
- Select **Required** to indicate that a program in this DOS session must have access to an audio adapter. When this setting is selected, you will see an error message if a program attempts to use the audio adapter while it is being used by another program.
- Select **None** to indicate that a program in this DOS session does not require an audio adapter.

D.5.2 COM_DIRECT_ACCESS

Registered by: VDD VCOM.SYS as an installable VDD.

Use this setting to give the program running in this session direct access to COM ports.

Using this setting will help programs that think they are running a version of DOS. Since OS/2 Warp Version 3 provides a solid base level of device driver support, there is good reason to use this support instead of a vendor-written device driver for each application.

For those programs that require control of the COM port hardware to execute, this DOS setting allows them to have it without the OS/2 device support being the arbitrator.

D.5.3 COM_HOLD

Registered by: VDD VCOM.SYS as an installable VDD.

Use this setting to keep a communications resource available (for example, COM1) until the DOS session ends.

Since the OS/2 provides a base level of device driver support, there are built-in, "time-out if no activity" checks that will cause the COM port to shut down cleanly. For those applications that assume ownership of the COM port and assume they are the only one watching the COM port, this is the setting to enable. Since there are standard ANSI asynchronous, control-line protocols that define what is going on at all times, these controls have been built into the base COM port device driver support. This DOS setting tells the base COM port device driver to ignore any error/shutdown conditions. By doing this, you are allowing the application to make all of those decisions. This should keep applications from prematurely crashing due to the base COM device driver shutting down.

Example: Terminal emulator application Procomm Plus (PCPLUS.EXE) when creating a secondary shell or child DOS session can lose its hold on the COM port. This DOS setting will keep the COM port open for the parent DOS session and the child session.

D.5.4 COM_RECEIVE_BUFFER_FLUSH

Registered by: NA

Use this setting to control the content of the received data buffers when the DOS session is switched to the foreground or when the DOS program enables the received data interrupt.

D.5.5 COM_SELECT

Registered by: VDD VCOM.SYS as an installable VDD.

Use this setting to limit access to the selected COM port for this session. For example, if you select COM1, the only COM port available to this session is COM1.

D.5.6 DOS_AUTOEXEC

Registered by: DOSKRNL.

Use this setting to allow an alternate batch file to execute during startup of a DOS session. The default is C:\AUTOEXEC.BAT where C: is the boot drive.

This DOS setting allows the user to set up a unique batch file to start up each DOS session. It also permits you to pass parameters to your AUTOEXEC.BAT file. Leaving the name of the file blank will cause no batch file to be executed including AUTOEXEC.BAT.

D.5.7 DOS_BACKGROUND_EXECUTION

Registered by: VDD VTIMER.SYS as a default VDD.

Use this setting to allow DOS program to run in the background. When set to OFF, the program will be suspended when it is not in the foreground. This setting should be set to ON for communication program and WIN-OS/2 Dynamic Data Exchange (DDE).

Since the OS/2 operating system is preemptive multitasking and multithreaded simultaneously, the system must handle passing out time slices to all tasks in the system. For this reason, most tasks are run at the same priority. It is possible to starve a DOS application if the system becomes tied up too often in servicing another process in the system running at a higher priority. If the VDM becomes starved, it will appear to be hung. If the VDM has a DOS application doing communication using the base device driver shuts down the communication port. If this happens, your communication program may terminate unexpectedly. A setting of ON

increases the chance your application will not lose its needed time slices when switching sessions. Switching away from the VDM as your foreground task will relinquish priority over other tasks running at the same level. Voluntarily lowering your priority can be detrimental to an application that expects to be in total control of the system such as emulator application.

Example: when the terminal emulator application Procomm Plus is running in the background, the COM port can become starved for time slices. This can cause the user to be logged off the host due to a lack of activity just from the background execution scenario. The DOS setting `DOS_BACKGROUND_EXECUTION = ON` will provide additional time slices to the application running as a terminal emulator.

D.5.8 DOS_BREAK

Registered by: VDD VBIOS.SYS as a default VDD.

Use this setting to activate Ctrl+C (or Ctrl+Break) as a break character in your DOS session.

This is the same as `BREAK=ON` or `OFF` in the `CONFIG.SYS` file of native DOS. When `DOS_BREAK = ON`, then the Ctrl+C or Ctrl+Break are looked at during every INT21 call to the file system. This can help if you have a program that consistently seems to ignore the keyboard when you want to stop it running. When `DOS_BREAK = OFF`, then the Ctrl+C or Ctrl+Break are looked at only during I/O INT21 calls to the file system.

D.5.9 DOS_DEVICE

Registered by: VDD VBIOS.SYS as a default VDD.

Use this setting to modify the DOS device drivers loaded for a DOS session. Enter full name and path, excluding `DEVICE=`. Alternatively, specify `DEVICE=` in `CONFIG.SYS` if you want the driver loaded into all DOS sessions.

Only character device drivers and not block device drivers are supported in Multiple Virtual DOS Mode (MVDM). An example of a block device driver is the one which control a hard disk. The `DOS_DEVICE` DOS setting can be used to enable only the device drivers needed for any single DOS session.

Including the network device drivers in more than one VDM `DOS_DEVICE` list or having them in the `CONFIG.SYS` and another `DOS_DEVICE` list will cause a conflict. When a VDM startup device driver conflict occurs, the VDM may be killed by MVDM before the DOS session is started. It is best to include in the

DOS_DEVICE list only the device drivers that are needed for that DOS session.

D.5.10 DOS_FCBS

Registered by: VDD VBIOS.SYS as a default VDD.

Use this setting to specify the maximum number of File Control Blocks (FCB) that can be opened concurrently in one DOS session. This setting affects only file-sharing modules.

Most users will not need to concern themselves with this DOS setting since most applications today do not use FCBs. The use of FCBs primarily relates to applications written to run on a DOS version before DOS 2.0. Most applications today that were written to run on DOS 2.0 or higher use SFT-file-handle-based I/O.

This setting makes MVDM allocate a System File Table entry (SFT) per FCB during MVDM initialization. These SFT/FCBs are set up to be managed by DOSKRNL and the file system. DOSKRNL also sets up the necessary information for each SFT/FCB in the DOSKRNL read-only, lists-of-lists structure that many applications can count on for finding the current file system status.

D.5.11 DOS_FCBS_KEEP

Registered by: VDD VBIOS.SYS as a default VDD.

Use this setting to set aside a number of File Control Blocks (FCB) that the operating system cannot close to make room for opening another file.

Most users will not need to concern themselves with this DOS setting since most applications today do not use FCBs. The use of FCBS primarily relates to applications written to run on a DOS version before DOS 2.0. Most applications today were written to run on DOS 2.0 or higher and use SFT-file-handle-based I/O.

This setting is saved by an MVDM as a control variable for the DOSKRNL in managing FCBs and decides how many FCB/SFTs to close.

D.5.12 DOS_FILES

Registered by: VDD VBIOS.SYS as a default VDD.

Use this setting to specify the maximum number of files that can be opened in a DOS session.

Although this value sets up the maximum number of file handles, it is still up to the program to grow the file-handle table. The program will need to use DOS interrupt 21h function 67h. The BX register needs to be set to a number greater than 20 for the size of the new file handle table to be increased. The BX register number must not exceed the value set in the DOS_FILES setting. This setting overrides the FILES= in CONFIG.SYS. You are given a minimum of 20 open file handles despite the value in the DOS_FILES setting and FILES= in CONFIG.SYS.

Please note that changing this DOS_FILES value does not guarantee that your DOS application will take advantage of growing the file-handle table beyond the minimum. An example is dBASE IV which looks at the DOS_VERSION value and decides if it understands the version. If the version is less than 10.0, then dBASE attempts to grow the file-handle table. If the version number is greater than or equal to 10.0, then dBASE assumes this version of DOS does not support growing the file-handle table. It then executes with the minimum number of 20 default handles available.

D.5.13 DOS_LASTDRIVE

Registered by: VDD VBIOS.SYS as a default VDD.

Use this setting to identify the highest disk-drive letter name available to the DOS session.

Some DOS applications, such as LANs, expect to reserve for private use disk drive letters following the highest disk drive letter. Always having the highest letter of z may cause these types of applications to fail.

D.5.14 DOS_SHELL

Registered by: VDD VBIOS.SYS as a default VDD.

Use this setting to specify a path and file name for the DOS command processor you want to use in the selected session.

In each DOS session, it is possible to have a unique command processor other than the default COMMAND.COM that is standard with OS/2 Warp Version 3.

D.5.15 DOS_STARTUP_DRIVE

Registered by: VDD VBIOS.SYS as a default VDD.

Use this setting to specify the location of the DOS kernel to boot. This is useful if the user wishes to boot a specific version of DOS into a DOS session. This DOS setting allows you to select drive A:, drive C: or a path to a VMDISK-created boot-drive image. Using this setting allows you to have multiple versions of DOS loaded from different hard disk or diskette images.

D.5.16 DOS_VERSION

Registered by: DOSKRNL.

Use this setting to provide compatibility with applications that expect a specific DOS version.

The particular DOS version selected will cause programs to take different paths of execution. Since each DOS evolved and was a superset of the previous version, new methods for accessing the system can be used. The DOS lists-of-lists changed the meaning of its fields and structures; therefore, the programs had to understand and change as needed to run on each new version of DOS. OS/2 defaults to being compatible with DOS 5.0 as possible. Changing the DOS_VERSION field does not make the OS/2 compatible with that version of DOS. This field only informs the program being executed of the selected version of DOS it is running on. An example of an application that changes its execution path due to the version is dBASE IV.

D.5.17 HW_NOSOUND

Registered by: VDD VTIMER.SYS as a default VDD.

Use this setting to prevent the session from generating program-defined sounds.

This setting can be used to deactivate the program sounds when this run-time option is not available. An example would be to deactivate the squeaking keystroke feedback sound when using Procomm Plus.

This setting blocks program direct access to the timer ports for this VDM. This will not block the use of a program writing a hex 07 character to the

console. This console I/O is sent through the file system to through a sequence of virtual device driver requests via VVIDEO, to VBIOS and finally to BIOS where the beep occurs. This setting does not block this virtual device driver to virtual device driver communication.

D.5.18 HW_ROM_TO_RAM

Registered by: VDD VBIOS.SYS as a default VDD.

Use this setting to copy ROM BIOS code to RAM.

This setting is useful if the program has to modify ROM BIOS code while executing. This can also be helpful if you debugging a ROM and want to set breakpoints in the debugger in this area of memory. Most debuggers typically replace any debug point in RAM with some predefined hardware interrupt call, for example INT3. To debug a ROM with breakpoints, you must copy the ROM to RAM so that you can modify the memory area on the fly.

D.5.19 HW_TIMER

Registered by: VDD VTIMER.SYS as a default VDD.

Use this setting to give the program running in this session direct access to hardware timer ports. Set to ON for games and other timing-sensitive applications.

This DOS_setting allows running the DOS application to implement its own timer services instead of using the base operating system primitives to control the timer.

D.5.20 IDLE_SECONDS

Registered by: VDD VKBD.SYS as a default VDD.

Use this setting to select a period of allowable idle time before the operating system reduces the idle program's portion of processor time.

This DOS setting enables a VDM not to yield its time slice to the scheduler. This may be important if you have a DOS application that is waiting for a slow device to do something that should not be interrupted.

D.5.21 IDLE_SENSITIVITY

Registered by: VDD VKBD.SYS as a default VDD.

Use this setting to set a threshold for polling time before the operating system reduces the polling program's portion of processor time. Setting this value to 100 will disable the idle detection.

This setting provides a way to make your DOS applications run faster. If you plan to run multiple VDM sessions, it is best to decide from experimentation your best mix of IDLE_SENSITIVITY settings among the VDMs. All VDM sessions cannot actually run at the maximum value so it is best to decide which application would best take advantage of increased IDLE_SENSITIVITY and which could operate with less IDLE_SENSITIVITY. Since IDLE_SENSITIVITY is registered by the keyboard VDD, it may give you some insight into which application needs more keyboard interaction than do the others. This may be the application to increase the IDLE_SENSITIVITY on.

Another scenario is a hung DOS application that begins to speed up when you press any key on the keyboard. Most likely, this DOS application is hooking the IDLE_SENSITIVITY code Interrupt Request Queue (IRQ). The IDLE_SENSITIVITY code in the VDD will become confused and the application will appear to be hung. Pressing any key on the keyboard returns the IDLE_SENSITIVITY code to synchronize, and the application resumes its normal processing speed. Increasing the IDLE_SENSITIVITY for the session will overcome this problem and your application will run smoothly.

D.5.22 INT_DURING_IO

Registered by: VDD VPIC.SYS as a default VDD.

Use this setting to enable interrupts during file reads and writes. When set to OFF, DOS programs will not receive interrupts until after read/write is done. This setting should be set to ON for MPPM/2 applications.

MPPM/2 applications expect a high rate of interrupt processing when performing full-motion video or high-fidelity sound reproduction. By allowing for this overlapped interrupt I/O processing, a more contiguous, less jerky video and sound reproduction can be accomplished.

D.5.23 SESSION_PRIORITY

Registered by: NA

The setting ranges from 0 to 31 in increments of 1 with a default setting of 0. SESSION_PRIORITY cannot be reset from within a WIN-OS/2 session. To change this setting, you must end the WIN-OS/2 session, reset the priority, and restart the WIN-OS/2 session. Modifications to the setting while the session is running does not dynamically modify the priority.

D.6 WIN-OS/2 Specific Settings

This section details the WIN-OS/2 specific settings that enable the user to configure how WIN-OS/2 applications should be run in the session.

D.6.1 WIN_RUN_MODE

Registered by: NA

Use this setting to specify the mode WIN-OS/2 runs in. Use standard mode for Windows standard mode applications and enhanced for Windows enhanced mode applications.

The default has been changed from standard to enhanced which is the default Windows 3.1 is using and also enhances performance of certain floating-point operations in some applications.

D.6.2 WIN_DDE

Registered by: VWIN

Use this setting to allow WIN-OS/2 to share DDE information between public WIN-OS/2 and OS/2 sessions.

The default has been changed to OFF to prevent wasting memory and to decrease the load time by not loading the PMDDE.DLL.

D.6.3 WIN_CLIPBOARD

Registered by: VWIN

Use this setting to allow WIN-OS/2 to share Clipboard information between public WIN-OS/2 and OS/2 sessions.

The default has been changed to OFF to prevent wasting memory and to decrease the load time by not loading the PMCLIP.DLL.

D.6.4 WIN_ATM

Registered by: NA

This setting enables the ATM (Adobe Type Manager) font support for a WIN-OS/2 session. When this setting is set to OFF, Adobe Type Manager will not be loaded when you start the WIN-OS/2 session. It is important that you set it to OFF if you do not need the Adobe Type Manager Font Support package. Once ATM is started, you are using up memory even if you are not using ATM and the startup time is increased.

If you change the setting to ON while WIN-OS/2 session is still running, ATM is not automatically started. You must do a close and restart the WIN-OS/2 session to make the changes effective. The default is OFF or Disable startup.

Appendix E. CONFIG.SYS

This section explains the structure and contents of the CONFIG.SYS file. It will help you to tune OS/2, and to solve configuration related problems.

Substantial performance gains can be achieved by careful tuning of CONFIG.SYS, especially on relatively low-specification machines.

First of all a word of caution. Always make a backup of your CONFIG.SYS before you modify it. Typing mistakes can be fatal! If you do have a disaster with your CONFIG.SYS, you can restart your system, press Alt+F1 keys when the Recovery Choices prompt is displayed in the top left-hand corner of the screen, then press C to start an OS/2 command prompt. You can then either use TEDIT to repair the damage, or copy your last working backup to CONFIG.SYS.

The default OS/2 installation does nothing to help the novice OS/2 user get to grips with CONFIG.SYS. The default CONFIG.SYS contains almost everything you may need but, quite often, a lot of things you don't. The initial installation will detect the system architecture, and will install either the Micro Channel or ISA versions of device drivers. Where different device drivers are required for the different architectures, ISA ones contain "01" as part of the name and Micro Channel drivers contain "02". For example, PRINT01.SYS and PRINT02.SYS are the ISA and Micro Channel versions, respectively, of the printer device driver.

No discussion of CONFIG.SYS would be complete without describing the way in which CONFIG.SYS is processed. Understanding the way in which CONFIG.SYS is processed during load time will also help in problem determination.

When the system is IPLed an INT 19h instruction is issued and the search for a boot record starts. The boot record must contain enough information to allow the OS/2 loader, CONFIG.SYS and the \OS2\BOOT directory to be found. This is why CONFIG.SYS must be in the root directory as, especially for HPFS partitions, searching through a directory tree is not feasible at this point. Once the CONFIG.SYS has been found then other file system drivers can be loaded, hence the line:

```
IFS=D:\OS2\HPFS.IFS /CACHE:1024 /CRECL:4 /AUTOCHECK:CD
```

being one of the early lines in CONFIG.SYS. The HPFS driver, if present, must be the first IFS driver loaded.

Statements in CONFIG.SYS are not processed in the order they appear. Instead they are processed as follows:

- SET variable= statements.
- BASEDEV= statements.
Even BASEDEV statements are not processed in the order they appear, and additional sorting is performed depending on the file extension of the drivers as below:
 - .PSD
 - .SYS
 - .BID
 - .VSD
 - .TSD
 - .ADD
 - .I13
 - .FLT
 - .DMD
- DEVICE= statements.
- IFS= statements.
- CALL= statements.
- RUN= statements.
- Other statements.

These statements can be grouped into OS/2 and DOS specific. Although there is no documented restriction on the ordering of these statements, It is probably best to leave these lines in the order they are added to CONFIG.SYS by the installation routines, although the example CONFIG.SYS at the end of this article is in daily use.

E.1 SET Statements

The SET statement creates a value in the environment and assigns a value to it. Many environment variables have special meaning to the operating system, while others are created for individual application use only.

```
SET AUTOSTART=PROGRAMS , TASKLIST , FOLDERS , CONNECTIONS , LAUNCHPAD
```

Sets the parts of the Workplace Shell that are automatically started. Parts of the Workplace Shell that are started by default include FOLDERS, PROGRAMS, TASKLIST (the Window List), CONNECTIONS (network connections), and LAUNCHPAD (the LaunchPad). Deleting any of these options means that the deleted options will be disabled the next time the system is started. For example, deleting the FOLDERS option from the AUTOSTART statement means that all folders, including the desktop itself, will not start. Similarly, deleting the TASKLIST option means that no Window List will be displayed. Deleting the PROGRAMS option means that programs, except those in the Startup folder, cannot be started from the Workplace Shell even if RESTARTOBJECTS=YES. Deleting CONNECTIONS means that network connections will not be started. Modifying the AUTOSTART statement is not recommended for general use.

```
SET BOOKSHELF=D:\OS2\BOOK
```

Sets a search path for view files. This is used by VIEW.EXE

```
SET COMSPEC=D:\OS2\CMD.EXE
```

COMSPEC is used to specify the place to reload the command processor from when the current command processor terminates. If you specify a SHELL statement that contains a file specification other than the default, set the COMSPEC environment variable to the same file specification when a DOS session is started.

```
SET DELDIR=C:\DELETE,512;D:\DELETE,512;
```

DELDIR specifies the location and maximum size of the delete directory for each partition. Use of this variable enables the UNDELETE command.

```
SET DPATH=D:\OS2;D:\OS2\SYSTEM;D:\OS2\INSTALL;...
```

Sets a search path for data files.

```
SET EPMPATH=D:\OS2\APPS;
```

Sets a the path to the Enhanced editor, its .INI and macro files.

```
SET GLOSSARY=D:\OS2\HELP\GLOSS;
```

Sets the location of the OS/2 glossary.

```
SET HELP=D:\OS2\HELP;D:\OS2\HELP\TUTORIAL;...
```

Sets a search path for help files.

```
SET IPF_KEYS=SBCS
```

Sets the OS/2 Help Manager program to use single-byte character set characters when searching for text.

```
SET KEYS=ON
```

Allows command shell command retrieval using the cursor keys. When KEYS is ON, ANSI extended keyboard support is disabled. When KEYS is ON you can:

- Type `KEYS LIST` to list the commands in the stack
- Type a partial command and press F1 to retrieve the next command in the stack that starts with the string
- Use the cursor keys to scroll up and down through the list and along the current command

```
SET MENUSTYLE=SHORT
```

This makes pop-up menus display only those items that do not have a mouse action, for example Move, Copy and Shadow are not shown because they can be performed by a Drag, Ctrl+Drag, and Ctrl+Shift+Drag, respectively.

```
SET OBJECTSNOOZETIME=0
```

This setting controls the amount of time the Workplace Shell will delay the unloading of Dynamic Link Libraries. The default setting will keep unused DLLs loaded, just in case they will be required "some time soon".

```
SET OS2_SHELL=D:\OS2\CMD.EXE
```

Sets the command processor for OS/2 sessions.

```
SET PATH=D:\OS2;D:\OS2\SYSTEM;D:\OS2\INSTALL;...
```

Sets a search path for executable files.

```
SET PROMPT=$i[$p]
```

Sets a new command prompt. ANSI escape sequences and the following special codes can be used:

Value	Meaning
\$\$	The \$ character
\$_	A carriage-return line-feed sequence
\$A	The & character
\$B	The character

\$C	The (character
\$D	The current date
\$E	ASCII code 27 (escape)
\$F	The) character
\$G	The > character
\$H	The backspace symbol
\$I	The help line
\$L	The < character
\$N	The default drive
\$P	The current directory of the default drive
\$Q	The = character
\$R	The return code
\$S	A space character
\$T	The current time
\$V	The version number
\$e[s	Save cursor position
\$e[u	Restore saved cursor position
\$e[0;0H	Move cursor to 0, 0
\$e[1;37;45m	Set status bar color
\$e[K	Erase (in current color) to end of line
\$e[1;32;40m	Set screen color

SET RESTARTOBJECTS=YES

Tells the Workplace Shell to restart all objects that were active at the last shutdown or reboot. YES is the default value. Other options are NO, REBOOTONLY, and STARTUPFOLDERONLY. These values disable all Workplace Shell objects from autostarting; restart objects only following a reboot or shutdown; only restarts programs from the STARTUP folder.

SET RUNWORKPLACE=D:\OS2\PMSHELL.EXE

Sets the interface that is started by the OS/2 operating system. PMSHELL.EXE is the program for the Workplace Shell.

SET SHELLEXCEPTIONHANDLER=OFF

This setting disables the Workplace Shell exception handler so that messages are displayed when errors occur. This setting may be useful for application developers.

```
SET SHAPIEXCEPTIONHANDLER=OFF
```

This setting disables the Workplace Shell API exception handler so that messages are displayed when errors occur. This setting may be useful for application developers.

```
SET SYSTEM_INI=D:\OS2\OS2SYS.INI
```

Sets the INI file used by the Workplace Shell for system information about such items as installed fonts and printer drivers.

```
SET USER_INI=D:\OS2\OS2.INI
```

Sets the INI file used by the Workplace Shell for system information about such items as program defaults, display options, and file options.

```
SET VIDEO_DEVICES=VIO_VGA
SET VIO_VGA=DEVICE(BVHVGA,BVHENH)
SET VIDEO_DEVICES=VIO_XGA
SET VIO_XGA=DEVICE(BVHVGA,BVHXGA)
```

These settings tell OS/2 what the video device is, and the modes it supports. The values in parentheses specify the default base video handler (BVH) and the high resolution handler. The four lines above are from two different machines. The top two lines from a systems with accelerated VGA card and the second two from a system with an XGA-2 adapter.

E.2 BASEDEV Statements

BASEDEV statements identify base system device drivers. A base device driver is one that is needed when the OS/2 operating system is first started. They identify drivers that provide support for disks, diskettes, printers etc.

Unlike the DEVICE statement, the BASEDEV statement cannot contain either drive or path information because the OS/2 operating system cannot process such information at this stage of the startup sequence, because for HPFS partitions, the HPFS file system driver has not been loaded yet. The root directory of the startup partition is first searched for the specified file name, then the \OS2\BOOT directory. If drive or path information is included in a BASEDEV statement, an error is generated.

The following list, taken from the OS/2 online help, lists the usual BASEDEVs that may be present.

BASEDEV	Description
IBMKBD.SYS	Device support for the keyboard.
IBM2ADSK.ADD	Device support for non-SCSI disk drives on Micro Channel workstations.
OS2DASD.DMD	General-purpose device support for disk drives.
IBM1FLPY.ADD	Device support for diskette drives on non-Micro Channel workstations.
IBM2FLPY.ADD	Device support for diskette drives on Micro Channel workstations.
IBM1S506.ADD	Device support for non-SCSI disk drives on non-Micro Channel workstations.
IBMINT13.I13	General-purpose device support for hard disk controllers.
PRINT01.SYS	Device support for locally attached printers on non-Micro Channel workstations. Use the /IRQ parameter to use interrupt driven printing, rather than the default polling method. Polling can use a significant amount of CPU doing nothing if the printer is slow.
PRINT02.SYS	Device support for locally attached printers on Micro Channel workstations.
IBM2SCSI.ADD	Device support for Micro Channel SCSI adapters.
IBM1FLPY.ADD	Device support floppy diskette drives.
IBM2FLPY.ADD	Device support floppy diskette drives on Micro Channel machines.
ICMEMCDD.SYS	Device support for PCMCIA memory.
PCM2ATA.SYS	Device support for PCMCIA hard disks.
OS2SCSI.DMD	General-purpose device support for non-disk SCSI devices.
OS2ASPI.DMD	Device Manager for devices using Adaptec's Advanced SCSI Programming Interface (ASPI).
OS2CDROM.DMD	General-purpose CD-ROM support.
XDFLOPPY.FLT	Device support for XDF Diskettes.
SBCD2.ADD	Sound Blaster connected CD-ROM drives.

XGA.SYS	Device support for XGA display devices.
PCMCIA.SYS	Card Services support for PCMCIA devices.
IBM2xxxx.SYS	Socket Services support for PCMCIA devices. There are a number of Socket Services drivers supported for various manufacturers: <ul style="list-style-type: none"> • IBM2AMB1.SYS - Ambra • IBM2AST1.SYS - AST • IBM2CMQ1.SYS - Compaq • IBM2CAD1.SYS - CompuAdd • IBM2MAT1.SYS - Panasonic • IBM2NEC.SYS - NEC • IBM2NCR.SYS - NCR • IBM2TOS.SYS - Toshiba • IBM2ZEN.SYS - Zenith 2 Lite • IBM2ZOS.SYS - ZEOS • IBM2SSO1.SYS - ThinkPad 750 (ISA Bus) • IBM2SSO2.SYS - ThinkPad 720 (Micro Channel Bus)

For OS/2 SMP the Platform Specific Driver (.PSD) provides the strategy and management code to exploit the multiple processors in SMP machines. There is one .PSD for each machine type, as the manufacturers tend to implement SMP in slightly different ways.

The list of BASEDEVs does not normally require changing unless you have removed, changed, or added devices since installing OS/2.

E.3 IFS Statements

IFS statements are added to CONFIG.SYS by the OS/2 installation if you have more than 6MB of memory, or have formatted your OS/2 partition as HPFS, or you have a CD-ROM installed. If you do not use HPFS partitions, then you can safely remove the line that references the HPFS.IFS driver.

Tuning the HPFS IFS driver involves modifying the amount of memory reserved for the HPFS cache and the size of each record in the cache. These values will depend on your application mix and the use of the system. For example LAN servers will probably benefit from increased cache

whereas database machines, where the database software maintains its own cache, may benefit from a reduced cache value.

In order to tune the IFS driver, modify the CRECL value for record size being used. The default HPFS driver statement is below:

```
IFS=C:\OS2\HPFS.IFS /CACHE:1024 /CRECL:4 /AUTOCHECK:CD
```

The CD-ROM IFS driver has similar options to the HPFS driver. The /C: parameter indicates how many 64KB segments to reserve for the CD-ROM cache, and the /M: parameter tells the driver the maximum number of sectors to read at a time.

The default CD-ROM driver statement is below:

```
IFS=C:\OS2\CDFS.IFS /Q
```

To support file systems across the LAN, IBM Peer for OS/2 and IBM LAN Requester 4.0 add the following statement to CONFIG.SYS:

```
IFS=C:\IBMLAN\NETPROG\NETWKSTA.200 /I:C:\IBMLAN /N
```

E.4 DEVICE Statements

There are many, many DEVICE statements in the OS/2 CONFIG.SYS. The device drivers can be categorized into two major groups:

- OS/2 drivers
- DOS drivers

OS/2 drivers can be identified as they are mainly in the \OS2\BOOT directory. DOS drivers are in the \OS2\MDOS directory.

Device drivers, while critical for system operation, can have a detrimental effect on the system if unnecessary drivers are loaded. Drivers are loaded in physical memory, and are generally not swappable. As such, they make the OS/2 swapper work harder to move application code into less available memory.

Taking each of the DEVICE statements in turn, the purpose of the driver is discussed, and when you may remove it.

```
DEVICE=D:\OS2\BOOT\TESTCFG.SYS
```

This driver is used to test the system configuration. Although you may remove this driver after the installation if no updates are made we

recommend that you not remove it, as it is used by the OS/2 install and re-install programs.

```
DEVICE=D:\OS2\BOOT\APM.SYS
```

This driver is used to support Advanced Power Management. If your system does not have APM, then you don't need this driver.

```
DEVICE=D:\OS2\BOOT\DOS.SYS
```

This driver is used to create the OS/2 virtual DOS environment. If you don't use DOS (see also PROTECTONLY), you can remove this driver from CONFIG.SYS. If you need to use the OS/2 DOS environment then you will also need VVGA.SYS to provide a virtual VGA driver for DOS to talk to.

```
DEVICE=D:\OS2\BOOT\PMDD.SYS
```

This driver is the OS/2 Presentation Manager device driver. If you only use the OS/2 full screen environment, then you don't need this driver. If you use WIN-OS2, then this environment relies on the PM device driver.

```
DEVICE=D:\OS2\BOOT\POINTDD.SYS
```

This driver provides the pointer support for PM and full-screen environments.

```
DEVICE=D:\OS2\BOOT\MOUSE.SYS
```

This driver provides mouse support. This is used in conjunction with POINTDD.SYS and VMOUSE.SYS. The MOUSE.SYS statement for a serial connected mouse must precede the COM driver.

```
DEVICE=D:\OS2\BOOT\COM.SYS
```

This driver provides serial port support. Parameters passed to the driver from CONFIG.SYS are used to configure multiple COM ports. The IRQ and the I/O address are configurable via parameters on the COM.SYS line.

```
DEVICE=D:\OS2\BOOT\ANSI.SYS
```

This driver allows ANSI control sequence processing in OS/2 sessions. You use ANSI control sequences to redefine keys, manipulate the cursor, and change display color attributes. ANSI extended keyboard support is disabled if KEYS=ON is specified.

```
DEVICE=D:\OS2\BOOT\VDISK.SYS
```

This driver allows the creation of a virtual disk. The default size is 16KB. Virtual disks give extremely fast access for frequently used files. However, it does reserve memory that cannot be used by applications.

DEVICE=D:\OS2\MDOS\VAPM.SYS

This driver is used to support Advanced Power Management under DOS. If your system does not have APM, then you don't need this driver.

DEVICE=D:\OS2\MDOS\VEMM.SYS

This driver provides support for the DOS virtual expanded memory manager. If you do not use DOS programs that require expanded memory you can remove this driver from CONFIG.SYS.

DEVICE=D:\OS2\MDOS\VDPX.SYS

This driver, along with VDPMI.SYS, provides DOS Protected Mode Interface memory support. If you do not use DOS programs that require DPMI, you can remove this driver from CONFIG.SYS. Note that this driver is required for Windows.

DEVICE=D:\OS2\MDOS\VXMS.SYS

This driver provides support for the DOS virtual extended memory manager. If you do not use DOS programs that require extended memory, you can remove this driver from CONFIG.SYS.

DEVICE=D:\OS2\MDOS\VDPMI.SYS

This driver, along with VDPX.SYS, provides DOS Protected Mode Interface memory support. If you do not use DOS programs that require DPMI you can remove this driver from CONFIG.SYS. Note that this driver is required for Windows.

DEVICE=D:\OS2\MDOS\VCDROM.SYS

This driver provides DOS CD-ROM support. If you do not use DOS programs that require CD-ROM support, you can remove this driver from CONFIG.SYS.

DEVICE=D:\OS2\MDOS\VWIN.SYS

This driver provides WIN-OS/2 support. If you do not use WIN-OS/2 programs you can remove this driver from CONFIG.SYS. The VWIN.SYS driver also requires the VDPX.SYS, VDPMI.SYS, and VXMS.SYS to be loaded.

DEVICE=D:\OS2\MDOS\VW32S.SYS

This driver provides support for the Win32s APIs under WIN-OS/2. If you do not use WIN-OS/2, or Windows programs that use Win32s then you can remove this driver from CONFIG.SYS.

DEVICE=D:\OS2\MDOS\VMOUSE.SYS

This driver provides mouse support in the DOS and WIN-OS/2 environment. If you do not use DOS or WIN-OS/2 programs, that require mouse support, you can remove this driver from CONFIG.SYS.

```
DEVICE=D:\OS2\MDOS\VVGA.SYS
```

This driver provides DOS VGA support. If you do not use DOS or WIN-OS/2 programs you can remove this driver from CONFIG.SYS.

```
DEVICE=D:\OS2\MDOS\VPCMCIA.SYS
```

This driver provides DOS PCMCIA support. If you do not use DOS programs that require PCMCIA, you can remove this driver from CONFIG.SYS.

```
DEVICE=D:\OS2\MDOS\VCOM.SYS
```

This driver provides DOS COM support. If you do not use DOS programs that require access to COM ports, you can remove this driver from CONFIG.SYS.

The next set of drivers are installed by MMPM/2.

```
DEVICE=D:\MMOS2\SB16D2.SYS
```

This driver provides Sound Blaster support. Depending on the type of card installed, the driver name will vary. Parameters passed to the driver indicate the device number, the DMA channel, the IRQ level, the I/O address, the I/O buffer size, and the name of the driver to be used by the audio subsystem.

```
DEVICE=D:\MMOS2\AUDIOVDD.SYS
```

This driver provides DOS and WIN-OS/2 audio support. If you do not use DOS or WIN-OS/2 programs that require audio support you can remove this driver from CONFIG.SYS.

```
DEVICE=D:\MMOS2\SSMDD.SYS
```

This driver provides digital video support. Parameters can be used to increase the size of the buffer used by this driver, see the MMPM/2 readme file in \MMOS2 for details.

```
DEVICE=D:\MMOS2\ADSHDD.SYS
```

```
DEVICE=D:\MMOS2\SMVDD.SYS
```

This driver provides DOS and WIN-OS/2 digital video support. If you do not use DOS or WIN-OS/2 that require digital video support you can remove this driver from CONFIG.SYS.

E.5 CALL Statements

CALL statements in CONFIG.SYS are used to execute a program "in-line". CONFIG.SYS processing continues after the program ends. Programs executed by call statements in CONFIG.SYS should be fully qualified path names, as variables such as PATH and DPATH are not available when the CALL statement is processed.

E.6 RUN Statements

RUN statements in CONFIG.SYS are similar to CALL statements except the processing of CONFIG.SYS continues after the program is started. As with CALL statements, programs should be fully qualified path names. This is similar to the OS/2 DETACH command.

E.7 Other Statements

Other statements can be classified as those that apply to DOS or OS/2. These statements are inherited by all DOS and OS/2 sessions. If you have a value that is applicable to only a few DOS sessions, you should consider creating a program object for it, and adding this to the settings for that object.

AUTOFAIL=NO

This tells OS/2 to display message pop-ups when errors such as "the drive is not ready". Setting AUTOFAIL to YES will inhibit the pop-ups and an error will be returned.

BREAK=OFF

Instructs DOS to check whether the Ctrl+Break keys have been pressed before carrying out a program request. Setting break ON will slow down DOS applications as they will check the keyboard at regular intervals to see if Ctrl+C or Ctrl+Break has been pressed.

BUFFERS=90

Sets the number of disk buffers that the system uses. The disk buffer is a 512-byte block of storage the system uses to read and write blocks of data that do not occupy an entire sector. It is also used for swap file I/O and to cache the FAT disk directory entries. You can increase the speed of your system by increasing the value specified for BUFFERS. However, when you increase the number of disk buffers, you decrease your available memory.

COUNTRY=044 , D:\OS2\SYSTEM\COUNTRY.SYS

Specifies the country code and the complete name of the file that contains a set of country information for each code page supported for that country.

CODEPAGE=850 , 437

Selects the system code pages (defined character sets) to be prepared by the OS/2 operating system for code-page switching. You must include the appropriate DEVINFO statements (for keyboard and video display) for both code pages in the CONFIG.SYS file.

DEVINFO=KBD , UK166 , D:\OS2\KEYBOARD.DCP

Prepares a keyboard for code-page switching. The keyboard statement specifies your keyboard layout ID (keyboard country and subcountry codes) and a file named KEYBOARD.DCP that contains a keyboard layout table for translating keystrokes into the characters of each code page supported by the OS/2 operating system. Refer to the KEYB command for a table containing the keyboard country and subcountry codes.

DEVINFO=SCR , VGA , D:\OS2\VIOTBL.DCP

Prepares a display screen for code page switching. The display statement specifies your display name and a file named VIOTBL.DCP that contains a video font table for displaying characters in each of the code pages supported by the OS/2 operating system.

DISKCACHE=64 , LW

Specifies the number of blocks of storage to allocate for control information and for use by the FAT disk cache. The disk cache allows a portion of the system storage to be used as an additional hard disk buffer. If you do not use FAT partitions then this can be deleted from your CONFIG.SYS.

DUMPPROCESS=C

This will make OS/2 automatically dump a process address space to the drive specified if a trap occurs in an application. A file PDUMP.000 is created. If the file already exists then 000 is incremented by 1 as many times as necessary to until a unique file name can be generated.

FILES=20

The FILES statement determines the maximum number of files available in DOS sessions. Each session can also be customized by changing the appropriate DOS setting in the Workplace Shell program object settings

notebook. This value must appear high up in the order of "other" statements in CONFIG.SYS otherwise OS/2 will fail to boot.

IOPL=YES

Allows input / output privilege level (IOPL) to be granted to requesting processes in OS/2 sessions. I/O privilege allows applications, rather than the OS/2 kernel, to perform I/O to devices, and to execute instructions that disable interrupts. Presentation Manager applications need IOPL privilege. Additional security for a system can be achieved by listing the applications that are given IOPL, rather than "YES", preventing any other PM applications from being run.

LIBPATH=. ;D:\OS2\DLL;D:\OS2\MDOS;D:\ ;D:\OS2\APPS\DLL;D:\MMOS2\DLL;

LIBPATH tells the OS/2 loader where to look for DLLs that are referenced by programs. LIBPPATH is fixed. The only per-process configuration that can be achieved is by using ".". The "." should be the first item in the LIBPATH directory list. It tells the loader to search for DLLs in the current directory of the current process. Without a "." in LIBPATH the value would become unmanageable as every program would have to either add its directory name to LIBPATH, or copy its DLLs to a common directory making it difficult to remove products. Some products add their DLL directories at the start of LIBPATH. This is often not the best place for them, especially if you have installed programs on a networked drive. To improve OS/2 loader performance network directories should always be at the end of LIBPATH. Further optimization can be achieved by placing directories where frequently loaded DLLs are located at the beginning of LIBPATH. Only having DLLs in the directory will also improve efficiency. Unused directories should be removed from LIBPATH to prevent fruitless searches of directories.

MAXWAIT=3

Sets the amount of time a ready-to-run thread waits before the system assigns it a higher priority. The larger the value, the longer a thread will wait before it is allowed to execute. If you are regularly running many applications simultaneously you may find that increasing this value improves system performance by reducing "thrashing". (See also TIMESLICE and PRIORITY.)

MEMMAN=SWAP , PROTECT , COMMIT

MEMMAN sets options for the OS/2 memory manager. SWAP allows swapping to take place and is the default. PROTECT is retained for compatibility with OS/2 1.3 where memory segments could be allocated and locked. The COMMIT option tells the memory manager to allocate space in the swapper file up to the limit requested by the application, even though it

doesn't require it yet. The default is not to commit, in this case space in the swapper file is only created when the application references the memory pages.

`PAUSEONERROR=NO`

Specifying `PAUSEONERROR=NO` will allow OS/2 to continue processing `CONFIG.SYS`, even if an error is encountered. This is useful for unattended machines, such as LAN Servers. The default is `PAUSEONERROR=YES` which halts `CONFIG.SYS` processing, displays the error message and prompts the user to press enter to continue.

`PRINTMONBUFSIZE=134,134,134`

Sets parallel-port device-driver buffer size for the printer ports LPT1, LPT2 and LPT3. The default is the minimum value. Increasing the value may improve performance if you have a printer driver that can take advantage of the extra memory. Increasing the value will reduce the amount of memory available to applications.

`PRIORITY=DYNAMIC`

Specifying `PRIORITY=DYNAMIC`, the default, allows OS/2 to boost the priority of threads that own the foreground window in PM, or have exceeded the `MAXWAIT` value. The other option, `PRIORITY=ABSOLUTE`, prevents this massaging of priority by OS/2.

`PRIORITY_DISK_IO=YES`

This is used to allow the foreground process to gain priority access to disk I/O. The default of "YES" is suitable for most users, however where a workstation is also a database or file server, to improve the performance of client systems this value should be set to "NO".

`PROTECTONLY=NO`

The `PROTECTONLY` statement allows you to be able to enable or disable the creation of Multiple Virtual DOS Machines (MVDM). If the `PROTECTONLY` statement is missing OS/2 assumes `PROTECTONLY=YES`. If you do not run programs in DOS sessions specify `PROTECTONLY=YES`.

`PROTSHELL=D:\OS2\PMSHELL.EXE`

This statement identifies the program that is to become the user interface. This can be any OS/2 program. If you do not specify a `PROTSHELL` then `CMD.EXE` is used. The `PMSHELL.EXE` is the OS/2 Workplace Shell which is loaded twice (see `RUNWORKPLACE=`) this instance provides the window list and task switching.

REIPL=ON

REIPL=ON is useful for servers where should a trap occur you want the system to reboot itself. If REIPL is not set to ON then the system will display register information, and wait for you to reboot it.

SWAPPATH=D:\OS2\SYSTEM 2048 2048

The swap file (SWAPPER.DAT) is used to store memory pages on disk that will not fit into physical RAM. The greater the demand for memory in the system the larger SWAPPER.DAT will become. You should check the size of your SWAPPER.DAT when you have a typical load on your system and preallocate the SWAPPER.DAT to that size. This will improve performance as OS/2 will not have to extend the swap file. If you are running with a full disk then you may want to increase the minimum free space value to give you more warning of when the partition that holds the swap file is becoming full. For example if you are regularly running with an 8MByte swap file and require 4MB to save your work in progress then your SWAPPATH should be:

SWAPPATH=D:\OS2\SYSTEM 4096 8192

The best location for optimal system performance is to place SWAPPER.DAT on the most used partition on the least used hard drive. This will minimize seeks as the read/write head is likely to be near the location of the swapper and will reduce contention on a disk drives.

SUPPRESSPOPUPS=C

This tells the OS/2 exception handler to prevent the register dialog from displaying and redirects it to a file \POPUPLOG.OS2 on the drive specified.

THREADS=256

Sets the maximum number of threads, for OS/2 sessions. Reducing this number will reduce the system memory reserved by OS/2 for thread control blocks. The default of 256 is sufficient for most uses, but you may have to increase this value for servers or other heavily loaded systems.

TIMESLICE=100,200

The TIMESLICE statement sets the minimum and maximum time, in milliseconds, that a thread can be processed before another thread is given the opportunity to execute. Both values must be between 32 and 65536. Specifying TIMESLICE disables the OS/2 default of dynamic scheduling that continuously modifies the timeslice values to gain optimum throughput.

In OS/2 Warp Version 3 the TIMSLICE statement should not be used because OS/2 Warp Version 3 dynamically modifies threads time slices.

TRACE

Selects which systems events and or processes are to be traced. Tracing logs data to the system trace buffer which can be inspected using the TRACEFMT utility. You can issue this also from an OS/2 command line.

TRACEBUF=32

The TRACEBUF statement reserves memory for the system trace. This value is in KBytes from 1 to 63. If TRACEBUF is not specified then the default value of 4(KB) is used. The more memory used for the system trace, the less memory is available for applications.

TRAPDUMP=ON

This causes OS/2 to take a diskette dump when an exception occurs. This is useful when problems are encountered during unattended operations, or only happen infrequently.

VME=NO

This disables the Virtual Machine Extensions. You should use this if you are experiencing problems with 486 or Pentium processors.

E.8 DOS Values

DOS=LOW,NOUMB

Specifies whether the DOS kernel will reside in the high memory area (HMA) and whether the operating system or DOS applications will control upper memory blocks (UMBs). You need to have a DOS=HIGH/LOW,UMB/NOUMB statement in the CONFIG.SYS file to determine if the DOS kernel resides in high or low memory and to determine the control of upper memory blocks (UMBs). This setting can be overridden by Workplace Shell program objects.

FCBS=16,8

Specifies the maximum and minimum file-control-block (FCB) values for DOS sessions. If a program tries to open more than the number of files specified in the FCBS statement, the system closes the least-recently used file control block and opens the new file. The value of the first number must be greater than or equal to the value of the second number. If you set the two values equal to each other in the FCBS statement and a program tries to open more than the total number of file control blocks you specified, no files can be closed. If a program tries to open more than the number of file control blocks you specified, no new files are opened.

RMSIZE=640

This is the largest usable size for DOS sessions. If you enter a size that is too large for your system, the system displays an error message during startup and automatically calculates the largest default value possible. If you run DOS programs that do not use all 640KB of memory then you can reduce this value. Reducing the value will release memory to other applications.

```
SHELL=D:\OS2\MDOS\COMMAND.COM D:\OS2\MDOS
```

Specifies the name and location of the DOS command processor, COMMAND.COM and the default working directory, or allows you to replace the DOS command processor with another command processor. If SHELL is omitted from the CONFIG.SYS file, the default DOS command processor is loaded and started with a /P parameter to retain COMMAND.COM in storage.

E.9 Sample CONFIG.SYS

Below is a sample CONFIG.SYS from a system with Micro Channel bus and XGA video adapter, and an IBM CD-ROM. It has been reordered to have the statements in the order that they are processed. Long lines for PATH, DPATH, and LIBPATH have been split across several lines. In the CONFIG.SYS they *must* be on the same line.

```
REM .....SET statements.....
SET AUTOSTART=PROGRAMS, TASKLIST, FOLDERS, LAUNCHPAD
SET BOOKSHELF=C:\IBMLAN\BOOK;C:\OS2\BOOK;C:\MMOS2;
SET COMSPEC=C:\OS2\CMD.EXE
REM SET DELDIR=C:\DELETE,512;D:\DELETE,512;
SET DPATH=C:\IBMLAN\NETPROG;C:\IBMLAN;C:\MUGLIB;C:\IBMCOM;C:\OS2;
    C:\OS2\SYSTEM;C:\OS2\MDOS\WINOS2;C:\OS2\INSTALL;C:\;
    C:\OS2\BITMAP;C:\OS2\MDOS;C:\OS2\APPS;C:\MMOS2;
    C:\MMOS2\INSTALL;C:\GRPWARE;C:\NSC;
SET DSPPATH=C:\MMOS2\DSP;
SET EPMPATH=C:\OS2\APPS;
SET GLOSSARY=C:\OS2\HELP\GLOSS;
SET HELP=C:\OS2\HELP;C:\OS2\HELP\TUTORIAL;C:\MMOS2\HELP;
SET IPF_KEYS=SBSCS
SET KEYS=ON
SET MENUSTYLE=SHORT
SET MMBASE=C:\MMOS2;
SET NCDEBUG=4000
SET NWDBPATH=C:\IBMLAN\NETPROG
SET OBJECTSNOOZETIME=0
SET OS2_SHELL=C:\OS2\CMD.EXE
SET PATH=C:\IBMLAN\NETPROG;C:\MUGLIB;C:\IBMCOM;C:\OS2;C:\OS2\SYSTEM;
    C:\OS2\MDOS\WINOS2;C:\OS2\INSTALL;C:\;C:\OS2\MDOS;
    C:\OS2\APPS;C:\MMOS2;C:\NSC;
SET PROMPT=$I[$P]
SET RESTARTOBJECTS=YES
SET RUNWORKPLACE=C:\OS2\PMSHELL.EXE
SET SHAPIEXCEPTIONHANDLER=OFF
SET SHELLEXCEPTIONHANDLER=OFF
SET SOMDDIR=C:\OS2\ETC\DSOM
SET SOMIR=C:\OS2\ETC\SOM.IR;C:\OS2\ETC\WPSH.IR;C:\OS2\ETC\WPDSEVR.IR
```

```

SET SYSTEM_INI=C:\OS2\OS2SYS.INI
SET USER_INI=C:\OS2\OS2.INI
SET VIDEO_DEVICES=VIO_XGA
SET VIO_XGA=DEVICE(BVHVGA,BVHXGA)

REM .....BASEDEV Statements.....
BASEDEV=IBMKBD.SYS
BASEDEV=PRINT02.SYS
BASEDEV=XGA.SYS
BASEDEV=IBM2FLPY.ADD
BASEDEV=IBM1FLPY.ADD
BASEDEV=IBM2SCSI.ADD /LED
BASEDEV=XDFLOPPY.FLT
BASEDEV=OS2DASD.DMD
BASEDEV=OS2SCSI.DMD

REM .....OS/2 DEVICE Statements.....
DEVICE=C:\OS2\BOOT\TESTCFG.SYS
DEVICE=C:\OS2\BOOT\DOS.SYS
DEVICE=C:\OS2\BOOT\PMDD.SYS
DEVICE=C:\OS2\BOOT\OS2CDROM.DMD /Q
DEVICE=C:\OS2\BOOT\POINTDD.SYS
DEVICE=C:\OS2\BOOT\MOUSE.SYS
DEVICE=C:\OS2\BOOT\COM.SYS
DEVICE=C:\OS2\BOOT\XGARING0.SYS

REM .....DOS Virtual Driver Statements.....
DEVICE=C:\OS2\MDOS\VEMM.SYS
DEVICE=C:\OS2\MDOS\VXMS.SYS /UMB
DEVICE=C:\OS2\MDOS\VDPMI.SYS
DEVICE=C:\OS2\MDOS\VDPX.SYS
DEVICE=C:\OS2\MDOS\VWIN.SYS
DEVICE=C:\OS2\MDOS\VW32S.SYS
DEVICE=C:\OS2\MDOS\VCDROM.SYS
DEVICE=C:\OS2\MDOS\VMOUSE.SYS
DEVICE=C:\OS2\MDOS\VCOM.SYS
DEVICE=C:\OS2\MDOS\VVGA.SYS
DEVICE=C:\OS2\MDOS\VXGA.SYS

REM .....MMPM/2 Driver Statements.....
DEVICE=C:\MMOS2\SSMDD.SYS
DEVICE=C:\MMOS2\R0STUB.SYS

REM .....LAN Driver Statements.....
DEVICE=C:\IBMCOM\PROTOCOL\LANPDD.OS2
DEVICE=C:\IBMCOM\PROTOCOL\LANVDD.OS2
DEVICE=C:\IBMCOM\LANMSGDD.OS2 /I:C:\IBMCOM
DEVICE=C:\IBMCOM\PROTMAN.OS2 /I:C:\IBMCOM
DEVICE=C:\IBMCOM\PROTOCOL\NETBEUI.OS2
DEVICE=C:\IBMLAN\NETPROG\RDRHELP.200
DEVICE=C:\IBMCOM\PROTOCOL\NETBIOS.OS2
DEVICE=C:\IBMCOM\MACS\IBMTOK.OS2
DEVICE=C:\IBMLAN\NETPROG\VNETAPI.OS2

REM .....IFS Statements.....
IFS=C:\OS2\HPFS.IFS /CACHE:512 /CRECL:4 /AUTOCHECK:C
IFS=C:\OS2\BOOT\CDFS.IFS /Q
IFS=C:\IBMLAN\NETPROG\NETWKSTA.200 /I:C:\IBMLAN /N

REM .....CALL Statements.....
CALL=C:\IBMCOM\PROTOCOL\NETBIND.EXE

REM .....RUN Statements.....
RUN=C:\IBMCOM\LANMSGEX.EXE
RUN=C:\IBMLAN\NETPROG\LSDAEMON.EXE
RUN=C:\IBMLAN\NETPROG\VNRMINIT.EXE

```

```

REM .....OS/2 Statements.....
AUTOFAIL=YES
BREAK=OFF
BUFFERS=90
CODEPAGE=437,850
COUNTRY=001,C:\OS2\SYSTEM\COUNTRY.SYS
DEVINFO=KBD,US,C:\OS2\KEYBOARD.DCP
DEVINFO=SCR,VGA,C:\OS2\BOOT\VIOTBL.DCP
DISKCACHE=D,LW
FILES=20
IOPL=YES
LIBPATH=C:\IBMLAN\NETLIB;C:\MUGLIB\DLL;C:\IBMCOM\DLL;. ;C:\OS2\DLL;
      C:\OS2\MDOS;C:\;C:\OS2\APPS\DLL;C:\MMOS2\DLL;C:\GRPWARE;
      C:\NSC\DLL;\os2\dll;
MAXWAIT=3
MEMMAN=SWAP,PROTECT
PRINTMONBUFSIZE=134,134,134
PRIORITY_DISK_IO=YES
PROTECTONLY=NO
PROTSHELL=C:\OS2\PMSHELL.EXE
SWAPPATH=C:\OS2\SYSTEM 2048 8192
THREADS=256

REM .....DOS Statements.....
DOS=LOW,NOUMB
FCBS=16,8
RMSIZE=640
SHELL=C:\OS2\MDOS\COMMAND.COM C:\OS2\MDOS

```

Appendix F. Dual Display System Using Image Adapter A/A

This appendix describes the procedure to install the driver for this adapter and provides some hints and tips on how to configure your system for OS/2 Warp Version 3.

The required version of the IAA/A driver is Version 2.11 or later for OS/2 Warp Version 3. Because of the uniqueness of this card, a special install program has been written for this adapter to install the proper driver. Selective Install will *NOT* install all the necessary components and therefore you should always run the special install procedure if you have an Image Adapter A/A card installed on your system.

With the new IAA/A device driver, the IARSPINS.EXE program is used to enable response file installation.

F.1 Restrictions

Be aware of the following restrictions before installing the IAA/A 32-bit driver:

- Do not use Version 2.11 of the IAA/A driver on OS/2 systems which have a revision level lower than 6.514.
- You cannot install this driver if you have the 16-bit PM driver installed on the system.
- Seamless WIN-OS/2 is not supported. Run Windows applications in WIN-OS/2 full screen mode if you have installed this driver.
- To prevent problems when copying data from some WIN-OS/2 applications to PM applications through the Clipboard, add the following statement to the STARTUP.CMD:

```
DETACH C:\OS2\IBMIAA\IAACLIP.EXE
```

- CID installation is still preliminary.
- Virtual Screen Mode is not supported with Image Adapter A/A with only 1MB VRAM attached.
- Video for Windows video playback may not be shown when Video Mode is configured to "Full Screen" because display modes which are not supported by IAA/A may be used.

F.2 Switching to VGA Mode

Note

If your system is configured for the IAA/A 16-bit PM driver (Version 2.01 or lower) you must revert to VGA mode before installing the IAA/A 32-bit driver.

Follow the steps below to switch the system to VGA mode. Also refer to Chapter 12, "Diagnosis and Recovery" on page 247 for information about switching to VGA mode via the Archive and Recovery method.

1. Type `DIR C:\OS2\DLL\DISPLAY.DLL` at a command prompt (where C: is the drive where OS/2 is installed), and then press Enter.
 - a. If the size of DISPLAY.DLL is about 80KB, you can proceed to step 4.
 - b. If the size of the DISPLAY.DLL not around 80KB, then follow the steps below to change to VGA mode.
2. Type `.SETVGA C:.` and press Enter. If OS/2 was preloaded on your computer, type `SETVGA C: /P` and press Enter.
3. Perform one of the following steps:
 - If OS/2 was installed from diskettes:
 - a. Insert OS/2 Diskette 3 into drive A.
 - b. Type `UNPACK A:BUNDLE C: /N:DISPLAY.DLL` and press Enter.
 - If OS/2 was installed from CD-ROM:
 - a. Insert OS/2 CD-ROM into CD-ROM drive.
 - b. Type `UNPACK E:\OS2SE21\DISK_3\BUNDLE C: /N:DISPLAY.DLL` (where E: is the CD-ROM drive), and press Enter.
 - If OS/2 was installed from a server:
 - a. Log onto the network and access the server disk for OS/2 installation.
 - b. Type `UNPACK L:\OS2PATH\DISK_3\BUNDLE C: /N: DISPLAY.DLL` and press Enter.
4. Restart OS/2 Warp Version 3 from diskette using the Installation Diskette and Diskette 1.
5. At the Welcome to OS/2 screen, press F3 to display a command prompt.
6. Type `MOVE C:\DISPLAY.DLL C:\OS2\DLL` and press Enter.

7. Remove diskette from drive A.
8. Press Ctrl-Alt-Del to restart the system.
9. Repeat step 1 to verify which driver is in use.

F.3 Installing IAA/A 32-bit PM Driver

To install the 32-bit driver, follow the steps below:

1. Make sure your system is not configured for the IAA/A 16-bit driver.
2. Open an OS/2 command prompt.
3. Insert the IAA/A 32-bit driver diskette into drive A.
4. Type `A:` and press Enter to change to drive A.
5. Type `IAINSTALL / (N)W / (N)D` and press Enter, where:

`/W` Installs IAA/A High-Resolution WIN-OS/2 Support.

`/NW` Does not install IAA/A High-Resolution WIN-OS/2 Support.

Note

If you previously installed IAA/A High-Resolution WIN-OS/2, do *not* select this option, otherwise, WIN-OS/2 session will not start. Use this option if your application accesses the IAA/A resources directly through the Device Escape function.

`/D` Sets the configuration for Dual display.

You will need the OS/2 Display Driver diskette 1 if you choose this option.

You can still set the Dual Screen mode to OFF and use IAA/A for the primary display with this option. To do this, start IAOPTION.EXE and clear the Dual Screen button in its menu.

`/ND` Sets the configuration for Single Display.

If you have installed IAA drivers with this option, you cannot choose Dual Screen Mode from the IAOPTION.EXE menu.

6. Insert the IAA/A Display Support Diskette when prompted and press Enter.
7. Insert Display Driver Diskette 1 into drive A when prompted and press Enter. This is not required if you are installing with the `/ND` option.
8. When you see the Installation Completed message, exit the prompt.

- Restart your system. It should start with the IAA/A configuration.

Note

Before starting an IAA WIN-OS/2 session, make sure the VIDEO_SWITCH_NOTIFICATION setting is ON for the IAA/A WIN-OS/2 screen switch to work properly.

F.4 Uninstall 32-bit Image Adapter A/A Display Driver

- Open an OS/2 Full Screen or OS/2 Window.
- Insert the IAA/A 32 bit PM Driver Diskette into drive A. Then change the drive to A.
- Type `IAREMOVE` and press Enter.
- A notice about `IAREMOVE.EXE` appears. If you do not want to change the display configuration, press N and exit. If you want to change the display configuration, press Y and continue with step 5.
- If you press Y, `DSPINSTL.EXE` will be started and the Display Driver Install dialog will appear. Change the Primary and Secondary display configuration to what you want other than IAA. Then select **OK**.
- The Source Director dialog appears. It will display the path where OS/2 was installed. If you want to change the source directory path, select the **Change** button and change the source path to the correct one. Then select the Install button.
- When the message `Uninstallation completed` appears, exit the prompt.
- Remove the diskette from drive A and restart your system.

F.5 Changing the WIN-OS/2 Driver to VGA

- If your system is configured for VGA, install IAA/A display drivers with the `/NW` option.
- If your system is previously configured for the IAA/A PM driver, follow the procedure outlined in F.2, "Switching to VGA Mode" on page 528. Then install the IAA/A display drivers with the `/NW` option.

F.6 Changing the WIN-OS/2 Driver to XGA

1. If your system is previously configured for the IAA/A PM driver, follow the procedure outlined in F.2, "Switching to VGA Mode" on page 528.
2. If OS/2 was installed without DOS or WIN-OS/2 support, install DOS and WIN-OS/2 support using Selective Install.

Note

Do *not* use the following instructions without DOS and WIN-OS/2 support. Refer to 8.1, "Windows Support" on page 126 for information about adding WIN-OS/2 support.

3. Install the XGA drivers using Selective Install.
4. Install 32 bit IAA/A drivers using IAINSTAL.EXE with /NW /D options.
5. Shut down and restart OS/2.
6. Follow the steps below to change the CONFIG.SYS manually:
 - a. Open the CONFIG.SYS file using the OS/2 Editor.
 - b. Find the DEVICE= line with IAOS2RFS.SYS. Now add the following three lines: `DEVICE=X:\OS2\IAOS2RFS.SYS (/DisplayID= ...)`
`BASEDEV=XGA.SYS` `DEVICE=X:\OS2\XGARING0.SYS`
 - c. Find the SET VIDEO_DEVICES= line and comment it out. Then add SET VIDEO_DEVICES= and SET VIO_XGA= as follows: `rem SET VIDEO_DEVICES=VIO_VGA,VIO_IAA` `SET VIDEO_DEVICES=VIO_XGA,VIO_I`
`VIO_XGA=DEVICE(BVHVGA,BVHXGA)`
 - d. Find the following two lines for VVGA.SYS and VIAA.SYS. Then add the following line for VXGA.SYS: `DEVICE=X:\OS2\MDOS\VVGA.SYS /DUAL`
`DEVICE=X:\OS2\MDOS\VIAA.SYS` `DEVICE=X:\OS2\MDOS\VXGA.SYS /DUAL`
 - e. Save the CONFIG.SYS file.
 - f. Shut down and restart OS/2.

The new IAA/A driver automatically detects the attached monitor and finds the correct Display Data File. Each driver expects the default directory path to find Display Data File if no special path is specified. The default for OS/2 is C:\OS2\IBMIAA (where C: is the drive where OS/2 is installed).

You can specify your own Display Data File name and Display Data File directory by using the /DisplayID= and DisplayPath= parameters.

F.7 Changing the PM Setting

Note

If your system is configured for the IAA/A 16-bit driver (Version 2.01 or lower), an old object folder named 'Mail' with an old OPTION.EXE icon may exist in the folder. Do *not* change the PM setting with this old program. You can delete the icon and the folder for this old program.

The installation program creates a folder IBM IAA Option on your desktop and puts a program object named Image Adapter A/A Option Program in it. Start the program to change your PM settings.

The main dialog box of this program contains the following:

- Display

Attached display type. If this is incorrect, you need to edit the CONFIG.SYS file and add the proper /DisplayID= option to IAOS2RFS.SYS. (For details, see the README file on the Display Support diskette.)

- Resolution and Bits per Pixel

A list of screen modes available with your hardware configuration is shown. Bits per pixel is specified as 1, 4, 4+ or 8.

1 bpp	: 2 colors
4 bpp	: 16 colors
4+ bpp	: 16 grays
8 bpp	: 256 colors

You can select a favorite mode, which will take effect when you restart OS/2.

- Virtual Resolution

Size of Virtual Desktop. If you select **Disabled**, the Desktop size is the same as the screen size, selected in Resolution and Bits per Pixel. To enable, select a mode that is larger than the screen size. Available modes are subject to restriction by VRAM size on your IAA/A card, selected BPP, and selected screen size. If you select an incorrect virtual resolution, the Option Program displays a warning when the OK button is selected.

If you are not familiar with the concept of Virtual Desktop, just enable and try it! Move the mouse pointer to each edge of the screen (and beyond the edge) and see what happens.

- Font Resolution

Screen resolution (pixels per inch) is used to calculate the fonts size.

- Dual Screen

Check this option if you are using two display systems. (Note: You need to install the IAA/A driver using the /D option to use this option.) If this option is checked, the IAA/A attached monitor does not display the VGA screen when you switch to, for example, an OS/2 full-screen prompt. That monitor would continue to display the PM screen, while another monitor shows the VGA screen.

- Minimum Memory Usage

Check this option only when you want to use applications which use IAA/A on-board memory.

Appendix G. FixPak WRU005

The FixPak WRU005 is upgrading OS/2 Warp Version 3 to OS/2 Warp with WIN-OS/2 level. It includes most fixes included in OS/2 Warp with WIN-OS/2 fixing many device drivers problems and others.

You will receive the FixPak not as a product but through your local support organization. We recommend you to apply the FixPak only in case you have a problem with your OS/2.

G.1 Warp FixPak and Locked File Device Driver

If you apply the OS/2 Warp FixPak, you will continue to see a message stating that the Locked File Device Driver is loading. This is because the FixPak procedure does not currently clean up the CONFIG.SYS after its first reboot.

This is true for the first release of the FixPak. The next revision of FixPak boot diskettes will take care of this.

To get rid of the message do the following:

1. Apply the FixPak.
2. Reboot your system.
3. Remove the following two lines from the CONFIG.SYS (assuming that OS/2 is installed on C:):

```
DEVICE=C:\OS2\INSTALL\IBMCSFLK.SYS C:\OS2\INSTALL\IBMCSFLK.LS  
RUN=C:\OS2\INSTALL\IBMCSFLK.EXE C:\OS2\INSTALL\IBMCSFLK.LS
```

G.2 List of APARs in FixPak WRU005

The FixPak WRU005 contains the following fixes:

APAR	description
PJ14823	User started OEM 3270eml from user appl but sometimes system hang occurred.
PJ15346	Word Perfect Office 820e error message after installing fixpack 38 or fixpack 39.

- PJ15661** COUNTRY.SYS error occurs when booting with Promise IDE caching controller using the IBM1S506.ADD driver.
- PJ15828** CHKDSK traps the system on a partition that is 128 or 512 meg
- PJ15841** Buslogic PCI SCSI driver hangs warp install from CDROM, BT-946C
- PJ15906** Customer is unable to access PCMCIA modem on an IBM ThinkPad 720 (the mode command returns an error).
- PJ15926** Dump to hardfile in a system with 64 MB of RAM or more corrupts the hardfile partitions.
- PJ15963** When "close window on exit" is unselected on a DOS windowed session under warp the session closes when it should not
- PJ15995** Selective install in warp result in SYS3175 in OS2MM.DLL 0001:0002930c ** eip must end in 930c **
- PJ16049** Trap e when running Dataglance v 1.21 on os/2 warp
- PJ16355** Dup of this APAR
- PJ16058** Sony 55e and 55d, Mitsumi FX001DE CDROM's do not work in warp.
- PJ16074** AHA164X.ADD driver for the Adaptec 1640 SCSI card fails to load and the CDROM drive attached is not seen.
- PJ16077** System hangs on warp disk1 with a blank screen, cursor blinking in top left. IBMKBD.SYS broken/regressed.
- PJ16094** Word Perfect Office/Novell Groupwise 820E file i/o error.
- PJ16105** Trap 003 in machines with IDE CDROM with heavy swapping under warp os/2 version 3.0
- PJ16116** Icons of seamless winaps (locally) are not cross hatching when they are run for the 1st time.
- PJ16121** Warp AHA152X.ADD not working with some CDROM's.
- PJ16123** "float to top" option still causing traps in system editor when saving files with no EA's
- PJ16125** Warp CDROM driver SBCD2.ADD does not work with reveal CDROM.
- PJ16148** Under warp, DosQueryCurrentDir and other APIs needlessly return ERROR_INVALID_PARAMETER

- PJ16151** IBM2SCSI won't allow boot partitions > 4 gigs or beyond 4 gigs if the partitions are small under os2 3.0, 2.11 and below
- PJ16152** After an apparently successful install, machine boots up to "run workplace error mess. in PMSHELL.EXE. defect 105124.
- PJ16160** Communication programs are not working in win-os2 sessions if warp was installed over a Windows 3.11 (or Workgroups) system.
- PJ16162** Trap 0160:fff869a7 rev 8.162
- PJ16163** Thinkpads 755c with the Crystal Semi sound chip, adjust sound with ALT+F5 and ALT+F6 the setting is not saved.
- PJ16168** Trap 000d,eip=000017eb,cslim=2e4b trap is in COM.SYS and usually occurs when terminating applications. same problem as pj14545
- PJ16170** Pocket recorder receives a GPF in module USER.EXE at 0001:3aca.
- PJ16211** Ctrl+Alt+Del does not reboot system after shutdown. Must power off system
- PJ16217** Static noise with Media Vision Pro Audio Spectrum 16 or Pro Audio Studio under os/2 warp mmpm/2.
- PJ16231** Warp fails to install on hard drives connected to Adaptec 2940 SCSI card. AIC7870.ADD
- PJ16234** Traps at 0160:fff5db60 or fff5db6c during archiving rev 8.162 _packgea + 1
- PJ16246** 1.44mb diskette will be formatted as 2.88mb with IBM1FLPY.ADD driver. This could cause data loss.
- PJ16249** Pentium systems running with the Mach32 video device drivers hang when start winos/2 fullscreens and windows
- PJ16252** Image inverted when printing (TIF) bitmap from Lotus Amipro 3.0 with warp
- PJ16278** Internet dialer when downloading from Advantis will not work. Customers experience time outs, slow response and other failures
- PJ16282** Data corruption during I.O on hard drive connected to PCI IDE port.
- PJ16298** Warp seamless icons stay crosshatched after app closed
- PJ16336** CHKDSK generates an access violation at 00004825
- PJ16352** Exiting Prestige 2.1 prompts an error message, sqlrun41 caused a general protection fault in module user at 0001:7ee0.

- PJ16482** Dup of this apar
- PJ16358** IPE at 0160:fff65576 - 000d:0001357b 2144, 4023 revision 8.162
- PJ16359** Warp will not format a 1.44 meg diskette which is unformatted.
- PJ16402** Customer receiving printer offline message after installing warp
- PJ16477** Warp SONY31A.ADD CDROM driver does not allow IO port addresses greater than 3FF.
- PJ16699** Internal processing error (IPE) @ line 826 in vmalloc.c
vmassert(!vmreloadreq(f1))
- PJ16715** SYS3175 in pmmerge using Sytos tape backup with warp at
1bd30ed2
- PJ16749** Can't use all 3 PCMCIA adapters on ThinkPad 755c in a Dock II
docking station. PJ16200 dup of this APAR
- PJ16901** IDE drives >540mb that have Ontrack Diskmanager installed
cannot be read.
- PJ16973** HPFS file corruption under warp for windows in open file when no
shutdown of the system is preformed.
- PJ16993** Dup of this APAR
- PJ17331** Using two IDE CDROM drives on a single channel cause trap
- PJ17332** Slave only configurations for ATAPI CDROMs

Appendix H. New REXX Utility Functions

This appendix describes functions of the REXXUtil, a Dynamic Link Library (DLL), that are newly implemented in OS/2 Warp Version 3. The new functions are the following:

- **SysCopyObject**

This function copies an existing Workplace Shell object to the specified destination folder.

```
rc = SysCopyObject (Name_of_Object, Name_of_Destination)
```

- **SysCreateShadow:**

This function creates a shadow of an existing Workplace Shell object in the specified destination folder.

```
rc = SysCreateShadow (Name_of_Object,  
Name_of_Destination)
```

- **SysMoveObject**

This function moves an existing Workplace Shell object to the specified destination folder.

```
rc = SysMoveObject (Name_of_Object, Name_of_Destination)
```

- **SysOpenObject**

This function opens a view of an existing Workplace Shell object.

```
rc = SysOpenObject (Name_of_Object, View_of_Object, Flag)
```

- **SysSaveObject**

This function saves an existing Workplace Shell object

```
rc = SysSaveObject (Name_of_Object,  
Synchron_or_Asynchro)
```

Remember, that before you can use a REXXUtil function you must first call the function *SysLoadFuncs* to load all the REXXUtil functions:

```
call RxFuncAdd 'SysLoadFuncs', 'RexxUtil', 'SysLoadFuncs'  
call SysLoadFuncs
```

For further details on all REXXUtil functions see the online "REXX Information" in the Information folder of OS/2.

Appendix I. IBM Internet Access Configuration Sheets

<i>Table 42. Service Provider Information</i>		
Field Name	User Information	Comments
Provider Name		For reference. Provider name of your choice
Login ID		Supplied by your service provider
Password		Supplied by your service provider / User definable
Nickname		A symbolic name for use as a menu item
Phone Number		The phone number of your SLIP connection destination
Login Script		See 15.5.1, "Login Scripts" on page 336
Connection type		SLIP or PPP
Note: Indicates a required field in the dialer menu		

<i>Table 43 (Page 1 of 2). Connection Information</i>		
Field Name	User Information	Comments
Your IP Address		The 32-bit dotted Internet address supplied by your service provider
Destination IP Address		Supplied by your service provider
Netmask		Supplied by your service provider

Table 43 (Page 2 of 2). Connection Information

Field Name	User Information	Comments
MTU size		Default is 1006, maximum size is 1500. Supplied by your service provider
Domain Nameserver		IP address supplied by your service provider
Your Host name		Symbolic name for your computer, should be supplied by your service provider
Your Domain Name		Supplied by your service provider
<p>Note:</p> <p>Indicates a required field</p> <p>Not required when using a Login script</p>		

Table 44 (Page 1 of 2). Server Information

Field Name	User Information	Comments
News Server		For use by IBM NewsReader/2
Gopher server		For use by Gopher
WWW Server		For use by IBM Web Explorer
POP mail server		For use by UltiMedia Mail/2 Lite for retrieval of stored mail
Reply Domain		The domain in which your mail server resides
Reply (mail) ID		Your e-mail id, supplied by your service provider
POP login ID		Supplied by your service provider

Table 44 (Page 2 of 2). Server Information

Field Name	User Information	Comments
POP login password		Supplied by your service provider

Table 45. Modem Information

Field Name	User Information	Comments
Modem type		Modem type or compatible modem
Com port		Com port the modem is attached to
Speed (Baud)		Serial port speed.
Data Bits		Default =8
Parity		Default =None
Dial Prefix		Either ATDT for tone dialing, or ATDP for Pulse dialing
Initialization string 1		Configured when you select modem type. Use this field if your modem doesn't appear in the modem list
Initialization string 2		Configured when you select modem type. Use this field if your modem doesn't appear in the modem list
Note: Not required when using a Login script		

Appendix J. Worldwide Bulletin Boards

This is a list of Bulletin Board Systems (BBSs) worldwide, which provide some or all of the following for OS/2:

- Information
- Announcements
- Fixes
- Service Paks
- New or updated device drivers
- Forums for conferencing

J.1 CompuServe

CompuServe is one of the biggest bulletin board systems (BBS) in the world, and provides a variety of general services as well as computer software libraries, conference forums, and online support.

CompuServe is also available worldwide. To access CompuServe you can use the OS/2-CIM which is included in the BonusPak of OS/2 Warp Version 3. The numbers to join CompuServe are listed in Table 46 on page 546. This table is not complete and tries only to give you a first logon possibility to CompuServe in your country.

After you have logged on in CompuServe the first time, you should also look for a node in your neighborhood (GO NODES).

IBM runs a lot of OS/2 related CompuServe forums. The easiest way to find them is to use the Find Index function of OS/2-CIM and look for OS/2 or simply go to *IBMOS2*. This is the keyword to get to all IBM OS/2 forums. If you know them by name you can go directly to them.

The most important OS/2 forums are listed below:

OS2SUPPORT IBM OS/2 Support Forum

In this forum you can get first level support for all OS/2 base operating system-oriented questions.

Library 17 of this forum is also a source for official IBM OS/2 drivers.

OS2USER IBM OS/2 Users Forum

This is the general OS/2 user's forum. Here you can find sections for TEAM OS/2 or other OS/2 user groups and more.

OS2DF1 IBM OS/2 Developer 1 Forum

Here you can get support for C Set/2, C++, REXX, or other languages. This forum also has sections for MMPM/2, Open DOC, and all other developer-oriented questions about the operating system.

OS2DF2 IBM OS/2 Developer 2 Forum

With this forum IBM provides developer information on the following themes: CM/2, DB/2, LAN Server, TCP/IP, CID, PEN, LAN NetView and some other products.

OS2UGER IBM PSM Deutschland Forum

This forum is the first German OS/2 user forum in the German language. Here you can get first level support from the German OS/2 Line (hotline). The German magazine *Inside OS/2* is a guest in this forum and keeps two sections.

Table 46 (Page 1 of 3). Access Nodes for CompuServe

Country	City	Country Code	Area Code	Phone Number	Network	Max. Speed
American Samoa	American Samoa	684		633-9205	PAC	2400
Australia	Sydney	61	02	415 3155	FAL	9600
Austria	Vienna	43	222	5056178	CPS	9600
Belgium	Brussels	32	02	215-0530	CPS	9600
Brazil	Outside Brazil	55	011	1081212	INF	2400
	Within Brazil	55	011	000672	INF	2400
Bulgaria	Sophia	359	02	73361	SPR	9600
Canada	Toronto		416	367-8122	CPS	14400
Chile	Santiago	56	02	6954005	CHL	9600
Colombia	Bogota	57	01	320-3811	SPR	9600
Denmark	Copenhagen	45		36445464	CPS	9600
England	London	44	071	490 8881	CPS	14400
Estonia	Tallinn	372	06	31-2286	SPR	2400
Finland	Helsinki	358	0	2919	INF	2400
France	Outside Paris	33		36 06 24 24	TPC	2400
	Paris	33	1	47 89 39 40	CPS	9600
Germany	Munich	49	089	66530170	CPS	14400
Guam	Guam	671		477-1123	PAC	9600
Hong Kong	Hong Kong	852		304-1332	CPS	9600

Table 46 (Page 2 of 3). Access Nodes for CompuServe

Country	City	Country Code	Area Code	Phone Number	Network	Max. Speed
Hungary	Budapest	36	01	2697023	SPR	9600
Indonesia	Jakarta	62	21	386-1044	SPR	2400
Ireland	Dublin	353		01-6768800	INF	2400
Israel	Tel Aviv	972	3	6393562	ISR	9600
Italy	Rome	39		6-2315728	INF	2400
Japan	Tokyo	81	03	5471 7650	CPS	9600
Kazakhstan	Alma-Ata	7	3272	50-7000	SPR	2400
Kuwait	Kuwait City	965		484-4133	SPR	2400
Latvia	Riga	371	02	22-3816	SPR	2400
Luxembourg	Luxembourg	352		498822	INF	2400
Mexico	Mexico City	52	5	629-8101	CPS	9600
Netherlands	Amsterdam	31		020 688 0085	CPS	9600
New Zealand	Wellington	64	04	473 7949	FAL	9600
Northern Ireland	Belfast	44	0232	331284	GNS	2400
Norway	Oslo	47		22414010	INF	9600
Oman	Muscat	968		799455	TYM	2400
Peru	Lima	51		722-692	SPR	2400
Philippines	Manila	63		2-8171449	INF	2400
Portugal	Lisbon	351	1	3956446	INF	2400
Puerto Rico	San Juan		809	722-0995	CPS	9600
Romania	Bucharest	40	0	13112525	SPR	9600
Russia	Moscow	7	095	971-5101	INF	2400
Saipan	Saipan	670		234-1121	PAC	2400
Scotland	Edinburgh	44	031	557 5888	CPS	9600
Singapore	Singapore	65		5351940	INF	9600
South Africa	Johannesburg	27	011	403-5101	INF	9600
South Korea	Seoul	82	02	795-1002	INF	2400
Spain	Madrid	34	1	577-0686	CPS	9600
Sweden	Stockholm	46	8	140-500	CPS	9600
Switzerland	Zurich	41	01	2731028	CPS	9600
Taiwan	Taipei	886		2-395-5102	INF	9600
Ukraine	Kiev	7	044	245-0379	SPR	2400
USA	(toll free)	1		800-848-8990	CIS	9600

Table 46 (Page 3 of 3). Access Nodes for CompuServe

Country	City	Country Code	Area Code	Phone Number	Network	Max. Speed
Uzbekistan	Tashkent	7	3712	49-0356	SPR	2400
Venezuela	Caracas	58	27	93-3233	VNZ	2400

J.1.1 Internet

Internet users can access OS/2 fixes and device drivers using the following details:

```
Internet Anonymous FTP Site
software.watson.ibm.com
IP address is 129.34.139.5.
pub\os2\os2fixes
```

J.1.2 IBM Internal Tools Disks

IBM employees can access OS/2 fixes and device drivers via VM from conferencing disk repositories, using the Tools facilities. Use TOOLCAT, TOOLS, or another method of access. The disks below are the master repositories; local shadows are often available.

```
OS2CSD managed by CSDPROD at KGNVMZ (for OS/2 fixes, OS/2 device driv
OS2BETA managed by OS2BETA at KGNVMCB (for OS/2 betas, OS/2 beta dev:
IBMPC managed by IBMPC at YKTVMV (for OS/2 forums and conferences)
MKTTOOLS managed by TOOLS at DALVM41B (for OS/2 marketing-related ma
DOSCS managed by CSDPROD at KGNVMCB (for DOS and hardware-related f.
NLSTOOLS managed by TOOLS at KGNVM2 (for OS/2 National Language Supp
```

J.2 Country Bulletin Boards

This section lists the bulletin boards which are aimed at one specific country or small group of countries.

Where a line speed is not stated, it typically handles speeds up to at least 9,600 baud, with automatic line speed configuration. The majority of lines support V32bis.

J.2.1 IBM US PC Company Bulletin Board (PCCBBS)

The IBM PC Company bulletin board is available free (apart from the cost of the telephone call) to end users, dealers, OS/2 developers, and IBM users.

Name: IBM PCC BBS
Phone: 1-919-517-0001 (40 lines)
Available: 24 hours/day - 7 days a week
Location: IBM, Raleigh, NC.

J.2.2 IBM US TalkLink

TalkLink is a subscription bulletin board service which provides software libraries, conferencing forums, and online support. It includes the OS2BBS bulletin board system which contains the OS/2 fixes and device drivers.

For information on registration, charges, and how to access TalkLink, call 1-800-547-1283 (voice).

TalkLink is accessed via the IBM Information Network. For most of the US, this is a local or toll-free phone number.

The OS2BBS conferencing forums can also be accessed by IBM employees via the IBMPC internal IBM conferencing disk, such as CFORUMS.

J.2.3 US Prodigy

Prodigy is a subscription bulletin board service in the US, which provides a variety of general services as well as computer software libraries, conferencing forums, and online support.

For information on registration, charges and how to access Prodigy, call 1-800-PRODIGY (voice).

J.2.4 IBM EMEA DAP

IBM EMEA provides a local bulletin board system for OS/2 developers from Europe and the rest of EMEA. The central BBS is located in Basingstoke, UK, and is shadowed to eight countries around Europe.

The EMEA DAP BBS is available 24 hours a day, 7 days a week, providing conferencing facilities and online support to developers in over 30 countries. DAP members can gain access to vast repositories of information about OS/2 and related products, including software libraries, fixes, tools, shareware, and much, much more.

Members of the EMEA DAP in Belgium, Denmark, Germany, Israel, the Netherlands, Portugal, and Switzerland have local access to a shadow BBS, which is connected to the central EMEA DAP BBS in Basingstoke, UK. This reduces telephone connection charges for developers. There are plans to extend this local access to the EMEA DAP BBS to more countries in the near future.

More information on becoming a member of the EMEA Developer Assistance Program can be obtained, if you have a touch-tone telephone, by calling the IBM HelpFax fax response system in the UK on +44 (0)256 50096 and requesting document number 30600 (for a DAP brochure) or document number 33001 (for a DAP membership application form). If you cannot access this HelpFax service, then send a fax requesting further information about the DAP, to +44 (0)256 336778.

J.2.5 IBM Australia

The Australian OS/2 BBS is available to end users and developers from Australia.

Name: IBM OS/2 BBS
Phone: (61)-2-241-2466 (8 lines, up to 14,400 automatic)
Available: 24 hours / day, 7 days a week
Location: Sydney, Australia

J.2.6 IBM Austria

The IBM Austria BBS is available to end users and developers.

Name: IBM Austria BBS
Phone: (43)-222-21145-6600 (4 lines)
Available: 24 hours/day - 7 days a week
Location: Vienna, Austria

J.2.7 IBM Belgium

The IBM Belgium End-User BBS is available to end users and developers. There is a DAP front-end for developers.

Name: IBM Belgium End User BBS
Phone: (32)-2-725-6010 (8 lines)
Available: 24 hours/day - 7 days a week
Location: Brussels, Belgium

J.2.8 IBM Canada

The IBM Canada OS/2 BBS is available to end users and developers.

Name: IBM OS/2 BBS
Phone: 604-664-6464 (Vancouver) (up to 19,200 bps automatic)
905-316-4255 (Toronto) (up to 19,200 bps automatic)
514-938-3022 (Montreal) (up to 19,200 bps automatic)
Available: 24 hours/day - 7 days a week
Location: Vancouver, Toronto, Montreal, Canada

J.2.9 IBM Denmark

The IBM Denmark OS/2 BBS is available to end users and developers.

Name: IBM OS/2 BBS
Phone: (45)-45-88-72-22 (6 lines)
Available: 24 hours/day - 7 days a week
Location: Lyngby, Denmark

J.2.10 IBM Finland

The IBM Finland OS/2 BBS is available to end users and developers.

Name: IBM OS/2 BBS Finland
Phone: (351)-90-45-95-900
Available: 24 hours/day - 7 days a week
Location: Helsinki, Finland

J.2.11 IBM France DAP

The IBM France BBS is a subscription BBS for OS/2 developers only.

Contact the following people for information on registration and charges:

- JL Gaillard, (33)-1-48-15-48-61
- C Bordeaux, (33)-1-49-31-57-94
- S Myja, (33)-1-49-31-57-98

J.2.12 IBM Germany

The IBM Germany Enduser BBS is for end users, dealers, OS/2 developers, and IBM users.

Name: IBM Enduser BBS
Phone: (49)-7034-15-2160 (10 lines)
Available: 24 hours/day - 7 days a week
Location: Ehningen, Germany

J.2.13 IBM Greece

The IBM Greece BBS is for end users, dealers, OS/2 developers, and IBM users.

Name IBM OS/2 BBS
Phone: (30)-1-3281303
Available: 24 hours/7 days
Location: Athens, Greece

J.2.14 IBM Israel

The IBM Israel BBS is for end users, dealers, OS/2 developers, and IBM users.

Name IBM OS/2 BBS
Phone: (972)-3-6951874
Available: 24 hours/7 days
Location: Tel-Aviv, Israel

J.2.15 IBM Italy / SEMEA

The IBM SEMEA OS/2 BBS is for end users from Italy and the rest of SEMEA.

Name: IBM SEMEA OS/2 BBS
Phone: (39)-2-7531441
Available: 24 hours/day - 7 days a week
Location: Milan, Italy

J.2.16 IBM Netherlands

The IBM Netherlands OS/2 BBS is for end users, dealers, OS/2 developers, and IBM users.

Name: IBM OS/2 NL BBS
Phone: (31)-30-334771 (8 lines)
Available: 03:00-24:00 - 7 days a week
Location: Utrecht, Netherlands

J.2.17 IBM New Zealand

The New Zealand PC BBS is available to end users and developers from New Zealand.

Name: IBM New Zealand PC BBS
Phone: (64)-4-576-5583 or (64)-4-576-5593 (up to 14,400 autc
Available: 24 hours / day, 7 days a week
Location: Wellington, New Zealand

Users are restricted to 120 minutes per call, and to 180 minutes per day.

J.2.18 IBM Norway

The IBM Norway OS/2 BBS is available to end users and developers.

Name: IBM OS/2 BBS
Phone: (47)-66-99-94-50 (2 lines)
Available: 24 hours/day - 7 days a week
Location: Oslo, Norway

J.2.19 IBM Portugal

The IBM Portugal OS/2 BBS is available to end users and developers.

Name: IBM OS/2 BBS
Phone: (351)-1-791-5726/5480
Available: 24 hours/7 days
Location: Lisbon, Portugal

J.2.20 IBM Singapore

The IBM Singapore BBS is available to end users and developers.

Name: IBM OS/2 BBS
Phone: (65)-227-7827 (3 lines, up to 9,600 automatic)
Available: 24 hours/day - 7 days a week
Location: Singapore

J.2.21 IBM South Africa

The IBM South Africa OS/2 BBS is available to end users, dealers, OS/2 developers, and IBM users.

Name: IBM OS/2 BBS
Phone: (27)-11-320-9201/2/3/4 (4 lines)
Available: 24 hours/day - 7 days a week
Location: Johannesburg, South Africa

J.2.22 IBM Spain

The IBM Spain OS/2 BBS is available to end users and developers.

Name: IBM OS/2 BBS
Phone: (34)-1-397-5580/5581/5873/5963 (4 lines)
Available: 24 hours/day - 7 days a week
Location: Madrid, Spain

J.2.23 IBM Sweden

The IBM Sweden BBS is available to end users, dealers and developers.

Name: IBM BBS Sweden
Phone: (46)-8-7932200 (10 lines)
Available: 24 hours/day - 7 days a week
Location: Stockholm, Sweden

J.2.24 IBM Switzerland

The IBM Switzerland OS/2 BBS is managed by AMK Hitline Communications.

Name: AMK Hitline BBS
Phone: (41)-64-56-02-00 (40+ lines)
(41)-64-56-41-20 (4 ISDN lines)
Available: 24 hours/day - 7 days a week
Location: Aarau, Switzerland

J.2.25 IBM United Kingdom

The IBM UK PC BBS is available free (apart from the cost of the telephone call) to anyone.

Name: IBM UK PC BBS
Phone: (44)-256-336655 (15 lines)
Available: 24 hours/day - 7 days a week
Location: Basingstoke, UK

J.3 IHV Bulletin Boards

There are many bulletin boards available for a variety of information. The Digicom BBS contains a list of Technical Support BBSs available and Fax-back services. To obtain a copy of the latest edition of this list, you can dial the Digicom BBS on (812) 479 1310. IBM Internal users can obtain this list by sending the following command from a VM session:

```
REQUEST SUPPBBS FROM WLS AT RALVM13
```

The following is a short list of IHV bulletin board systems to access the latest OS/2 device drivers and assistance. The phone numbers are for access from the US, unless otherwise stated. These BBS numbers can be dialed from anywhere in the world. Local shadows may also exist that are not listed here.

Table 47 (Page 1 of 2). IHV Bulletin Board Systems

OEM	BBS Phone Number
Adaptec	(408) 945-7727
	(800) 959-7274
	(818) 597-1400
Advance Logic	(510) 226-7220
Always Technology	(818) 597-1440
ATI	(905) 764-9404
	(905) 882-2600
BusLogic	(408) 492-1984
Canon	(714) 438-3325
	(800) 848-4123
Canon (Netherlands)	(31) 20-6403406
Cirrus Logic	(510) 440-9080
	(510) 623-8300
Compaq	(713) 378-1418
Colorgraphics	(404) 452-8238
Creative Labs	(405) 742-6660
Dell	(512) 728-8528
Diamond Tech Support	(408) 524-9301
Distributed Processing Technology (DPT)	(407) 831-6432
DPS Solutions	(415) 494-1621
Future Domain Corporation	(714) 253-0432
Hercules Computer Technology	(510) 623-7449
	(510) 623-7142
	(510) 623-7034
Hitachi (UK)	(44) 81-849-2086
Iomega	(801) 392-9819
Lexmark	(606) 232-5238
Laplank - Travelling Software	(206) 483-8088
Media Vision	(510) 770-0527
	(800) 348-7116
Sony Corporation of America	(408) 955-5107

Table 47 (Page 2 of 2). IHV Bulletin Board Systems

OEM	BBS Phone Number
Spider Graphics Inc	(408) 526-1219
Tektronix	(503) 685-4504
Trident	(415) 691-1016
	(415) 691-0211
Western Digital	(714) 753-1234

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