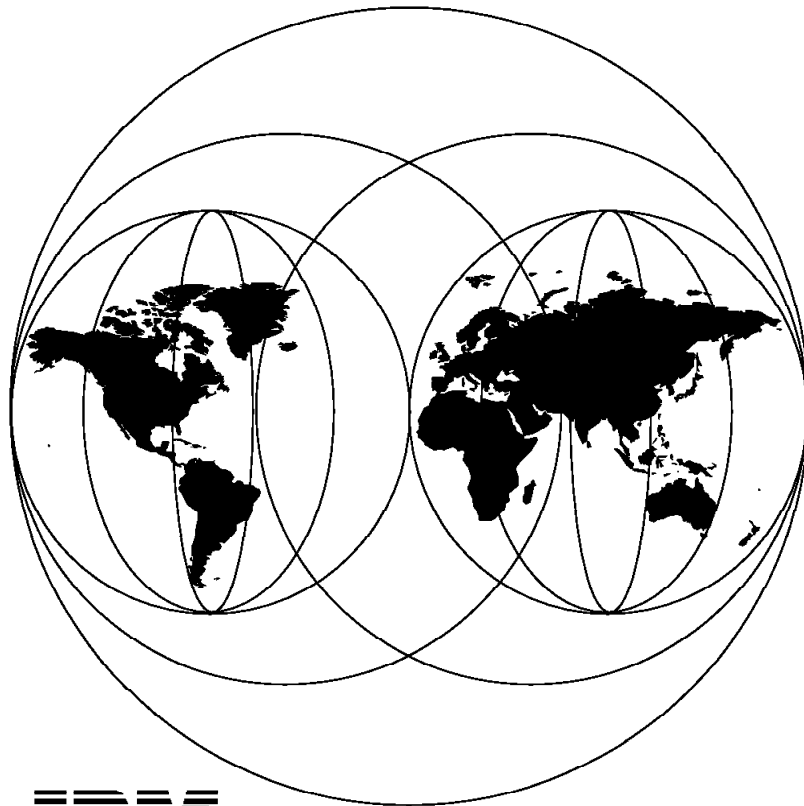


International Technical Support Organization

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**Personal Communications Version 4.1
DOS, Windows, and OS/2
Implementation Guide**

May 1996



IBM

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May 1996

Take Note!

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

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Abstract

This redbook is Volume I in a series of redbooks about Personal Communications; it describes the connection options and features of the DOS, Windows, and OS/2 versions of the following products:

- Personal Communications AS/400 Version 4.1
- Personal Communications AS/400 and 3270 Version 4.1

The book explores their flexibility and modes of operation, and focuses on how to customize the Personal Communications products for 3270 or 5250 host-system communications.

Although a Windows 95 version of Personal Communications is now available, this book includes only brief information about it; full information will be in a separate book, *Personal Communications for Windows 95 Implementation Guide*, SG24-4689, available in July 1996.

Volume II, *Personal Communications for Mobile Users*, SG24-4456 (available July 1996), is intended for mobile users and for administration personnel who have to set up Personal Communications in a mobile environment.

Volume III, *Personal Communications for Coax, LAN, and WAN Users*, SG24-4688 (available July 1996) focuses on how to customize Personal Communications for 3270 or 5250 host-system communications and how to use them in the coax, LAN and WAN environments.

This redbook was written for workstation communications specialists or anyone who has the responsibility of installing any of the products available in the Personal Communications family. Some knowledge of 3270 or 5250 workstation-to-host communications and of OS/2 or DOS/Windows is assumed.

(268 pages)

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Special Notices

This publication is intended to help IBM and customer personnel to install, customize, and use Personal Communications family for the mobile environment. The information in this publication is not intended as the specification of any programming interfaces that are provided by Personal Communications AS/400 and 3270 Version 4.1. See the PUBLICATIONS section of the IBM Programming Announcement for Personal Communications family for more information about what publications are considered to be product documentation.

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OfficeVision/MVS	OfficeVision
OfficeVision/VM	Operating System/2
OS/2	OS/400
PC 300	Personal System/2
PowerPC	Presentation Manager
PROFS	PS/ValuePoint
PS/2	Quickwriter
Quietwriter	S/370
S/390	SAA
Series/1	SP
System/370	System/390
System/38	System/36
Systems Application Architecture	ThinkPad
VM/ESA	VM/XA
VSE/ESA	VTAM
WindSurfer	Workplace
XGA	XT
400	

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Preface

This redbook is Volume I in a series of redbooks about Personal Communications (PCOMM); it describes the connection options and features of the DOS, Windows, and OS/2 versions of the following products:

- Personal Communications AS/400 Version 4.1
- Personal Communications AS/400 and 3270 Version 4.1

The book explores their flexibility and modes of operation, and focuses on how to customize the Personal Communications products for 3270 or 5250 host-system communications.

Although a Windows 95 version of Personal Communications is now available, this book includes only brief information about it; full information will be in a separate book, *Personal Communications for Windows 95 Implementation Guide*, SG24-4689.

Volume II, *Personal Communications for Mobile Users*, SG24-4456, is intended for mobile users and for administration personnel who have to set up the Personal Communications family in a mobile environment.

Volume III, *Personal Communications for Coax, LAN, and WAN Users*, SG24-4688, focuses on how to customize the Personal Communications products for 3270 or 5250 host system communications and how to use them in the coax, LAN and WAN environments.

How This Redbook Is Organized

The book is organized as follows:

- Chapter 1, "Personal Communications Version 4.1 Family Overview" on page 1

This chapter is an overview of Personal Communications. It provides the user with a history of the product, lists the enhancements made from Version 3.0 to 4.1, and includes a table of the connection options of Version 4.1.

- Chapter 2, "Introduction to Major Functions and Enhancements" on page 31

This chapter provides brief descriptions of the major enhancements, features and functions in the Personal Communications family.

- Chapter 3, "Hardware and Software Requirements" on page 65

This chapter lists the hardware and software required to support or coexist with Personal Communications Version 4.1.

- Chapter 4, "Compatibility and Limitations" on page 85

This chapter describes the compatibility and limitations of Personal Communications 4.1.

- Chapter 5, "Installation and Customization for DOS" on page 95

This chapter describes the common installation and customization tasks for Personal Communications Version 4.1 in a DOS environment. It should be read as a basis for the relevant chapters in Volume II or Volume III, according to the customer's environment.

- Chapter 6, “Installation and Customization for Windows” on page 119
 This chapter describes the common installation and customization tasks for Personal Communications Version 4.1 in a Windows 3.1/3.11 environment. It should be read as a basis for the relevant chapters in Volume II or Volume III, according to the customer’s environment.
- Chapter 7, “Installation and Customization for OS/2” on page 137
 This chapter describes the common installation and customization tasks for Personal Communications Version 4.1 in an OS/2 environment. It should be read as a basis for the relevant chapters in Volume II or Volume III, according to the customer’s environment.
- Chapter 9, “SNA Data Compression/Decompression” on page 179
 This chapter explains the benefits of using SNA Data Compression/Decompression. Details are given on the configuration requirements and Personal Communications Version 4.1 to support SNA Data Compression/Decompression.
- Chapter 10, “Dynamic Definition of Dependent Logical Units” on page 189
 This chapter explains the benefits of using Dynamic Definition of Dependent Logical Units. Details are given on the configuration requirements and Personal Communications Version 3.x or later to support Self-Defining Dependent Logical Units (SDDL).
- Chapter 11, “Printing Considerations” on page 197
 This chapter should be read by persons wishing to use the print functions of PC/3270 V4.1. It includes host-addressable printing and local copy emulation. A section is dedicated to redirecting print via a print server and deferred printing to disk.
- Chapter 12, “File Transfer” on page 219
 This chapter provides information on setting up and carrying out file transfers between a PC/3270 V4.1 workstation and a host.
- Chapter 13, “Personal Communications AnyNet Support” on page 237
 This chapter provides a description of AnyNet SNA over TCP/IP for Windows.
- Appendix A, “Communications Trace Facility” on page 261
 This appendix briefly describes the use of the problem determination utilities provided with the Personal Communications.

Related Publications

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

- *Personal Communications AS/400 and 3270 Version 4.1 for Windows Up and Running*, SC31-8261
- *Personal Communications/3270 for DOS (Full-Function Mode) Up and Running*, SC31-8262
- *Personal Communications/3270 for DOS (Entry-Level Mode) Up and Running*, SC31-8263
- *Personal Communications AS/400 and 3270 Version 4.1 for Windows Reference*, SC31-8264
- *Personal Communications/3270 for DOS (Full-Function Mode) Reference*, SC31-8265
- *Personal Communications AS/400 and 3270 for Windows and DOS (Full-Function Mode) Programmer's Guide*, SC31-8266
- *Personal Communications/3270 for DOS (Entry-Level Mode) Programmer's Guide*, SC31-8267
- *APPC Networking Services for Windows Getting Started*, SC31-8124
- *IBM AnyNet Guide to SNA over TCP/IP for Windows*, GV40-0113
- *Personal Communications AS/400 and 3270 Version 4.1 for OS/2 Up and Running*, SC31-8258
- *Tell Me About OS/2 Access Feature*, SC31-8257
- *Personal Communications AS/400 and 3270 Version 4.1 for OS/2 Programmer's Guide*, SC31-8260
- *Personal Communications AS/400 and 3270 Version 4.1 for OS/2 Reference*, SC31-8259

International Technical Support Organization Publications

- *Personal Communications Version 4.X Interoperability and Problem Determination*, GG24-4457
- *Personal Communications for OS/2 and CM/2: Product Differentiation Guide*, GG24-2546
- *Communications Manager/2 - SNA Phone Connect*, GG24-4385
- *To Emulate or Not to Emulate? A 3270 and 5250 Workstation and Emulation Selection Guide*, SG24-4458
- *Personal Communications for Mobile Users*, SG24-4456 (available July 1996)
- *Personal Communications for Coax, LAN and WAN Users*, SG24-4688 (available July 1996)
- *Personal Communications Version 4.1 for Windows 95 Implementation Guide*, SG24-4689 (available July 1996)
- *An Introduction to Wireless Technology*, SG24-4465

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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```

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```
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```

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IBM United Kingdom

Chapter 1. Personal Communications Version 4.1 Family Overview

The IBM Personal Communications Version 4.1 family of products provides powerful client communications on all major desktop operating systems. It offers

The packaging of the products has changed in Version 4.1 - whereas there were previously three packages (3270, 5250 and combined), there are now only two (5250 and combined). This means that, if you want 3270 emulation only (or both), you must buy the combined package, known as Personal Communications AS/400 and 3270 Version 4.1; if you want 5250 emulation only, you can buy Personal Communications AS/400 Version 4.1. The prices have been adjusted to reflect these changes. The changes apply to the products for all operating systems.

With Personal Communications AS/400 Version 4.1 (PC400), you can connect PCs to IBM AS/400 and, now, to S/36 or S/38 mid-range host computers. PC400 provides an impressive array of features, including a state-of-the-art graphical user interface (GUI), Shared Folders support, and Data Transfer support. Administration tools are also provided.

Personal Communications AS/400 and 3270 Version 4.1 products give you GUI-based 5250 and 3270 terminal emulation capability in addition to a wide range of end-user and system administrator tools to simplify your client communications needs. These products allow you to simultaneously access and process information on AS/400 and S/390 hosts, and provide a common look and feel in both environments.

The IBM Personal Communications family is IBM's response to the host-attached client-communications needs of the PC marketplace. These products provide 3270/5250 emulation for DOS, Windows, Windows 95, Windows NT and OS/2. They also provide SNA-client and peer-to-peer communications for customers with PCs running DOS, Windows, Windows 95, and OS/2. While all the Personal Communications products take advantage of the specific operating system they operate on, they also maintain a high level of common function and end-user interface. This allows you to minimize training and support when migrating between platforms or when using multiple platforms within your business.

The emulators provide many powerful, simple-to-use features, such as macro support, keystroke record and playback, iconic toolbar (which can now be customized), dynamic data exchange (DDE), and enhanced clipboard editing. The products have the same look and feel on all operating systems and in 3270 and 5250 emulation. The OS/2-based emulators also support Configuration, Installation, and Distribution (CID), to make management over a LAN easy. The Personal Communications family offers comprehensive support for a variety of LANs/WANs and important APIs.

The Personal Communications AS/400 Version 4.1 and Personal Communications AS/400 and 3270 Version 4.1 family of products give you a range of SNA-based client application program interfaces (APIs), offering flexibility in LU 6.2 application implementation.

The versatile connectivity offers great flexibility to S/390 and AS/400 customers in expanding their LAN/WAN network capabilities, and encourages workforce mobility by providing several types of asynchronous communications.

Even greater flexibility is offered to OS/2 customers by the inclusion of the OS/2 Access Feature, based on the Communications Manager/2 (CM/2). This new support provides additional connectivity options and SNA-based client application programming interfaces such as Advanced Program-to-Program Communication (APPC), Common Programming Interface for Communications (CPI-C), and Sockets over SNA Access Node and SNA over TCP/IP Access Node (AnyNet).

The current Personal Communications family consists of the following products:

- Personal Communications AS/400 and 3270 Version 4.1 for Windows
- Personal Communications AS/400 Version 4.1 for Windows
- Personal Communications AS/400 and 3270 Version 4.1 for Windows 95
- Personal Communications AS/400 Version 4.1 for Windows 95
- Personal Communications AS/400 and 3270 Version 4.1 for OS/2
- Personal Communications AS/400 Version 4.1 for OS/2
- Personal Communications AS/400 and 3270 Version 4.1 CD-ROM
- Personal Communications AS/400 Version 4.1 CD-ROM

Note: The CD-ROMs include all 3 versions of the respective product

1.1 Description and Packaging

The Personal Communications client products are available for use in DOS (3270 only), Windows 3.1x, Windows 95, and OS/2 environments. The family of products consists of six 3.5-inch diskette packages and two CD-ROM packages, as shown above.

The Personal Communications AS/400 Version 4.1 products allow you to connect to and use applications resident on IBM mid-range computers, such as an AS/400 or S/3x.

Personal Communications AS/400 Version 4.1 for Windows, Windows 95 and OS/2 (CD-ROM) provides all the features and functions found on the diskette versions of the following three packages:

- IBM Personal Communications AS/400 Version 4.1 for Windows
- IBM Personal Communications AS/400 Version 4.1 for Windows 95
- IBM Personal Communications AS/400 Version 4.1 for OS/2

The Personal Communications AS/400 and 3270 Version 4.1 products allow you to connect to and use host applications resident on either IBM mainframes, such as the S/390, or IBM mid-range hosts, such as an AS/400 or S/3x.

Personal Communications AS/400 and 3270 Version 4.1 for Windows, Windows 95 and OS/2 (CDROM) provides all the features and functions found on the diskette versions of the following three packages:

- IBM Personal Communications AS/400 and 3270 Version 4.1 for Windows
- IBM Personal Communications AS/400 and 3270 Version 4.1 for Windows 95
- IBM Personal Communications AS/400 and 3270 Version 4.1 for OS/2

The CD-ROM packages provide the following:

- An easier, more convenient way to order, install, upgrade, and maintain Personal Communications emulation products
- A superset of the respective diskette packages for Windows, Windows 95, and OS/2
- Greater flexibility in expanding network capability
- Product documentation in both online and Postscript printable format

By packaging the components of the diskette versions onto one CD-ROM, IBM has provided a convenient mechanism for ordering, installing, upgrading, and maintaining the Personal Communications family of products regardless of the operating system being used.

1.2 Key Features and Highlights

No matter what the connectivity to the S/390 and AS/400, the IBM Personal Communications family provides the necessary tools to make it easy to use S/390 and AS/400 applications, as follows:

- Full-function 5250 and 3270 emulation, SNA-based client support, client/server and peer-to-peer computing
- Multiple client application programming interfaces

A variety of programming interfaces are supported, including Emulator High-Level Language Application Programming Interface (EHLAPPI), Dynamic Data Exchange (DDE), Server-Requester Programming Interface (SRPI) and PCSAPI.

- Automation tools, including CMMouse and ZipPrint
- Powerful system-administrator tools
- Packaging that makes the products easy to install and configure

Supports technical support staff with ease of installation, remote installation facilities and administration, productivity tools, and unattended installation through IBM's Configuration, Installation, and Distribution (CID) for OS/2.

- Versatile connectivity options

Expands the types of supported local area network (LAN) and wide area network (WAN) environments. It provides Coax as well as Twinax attachments, token-ring, Ethernet, SDLC, APPC3270 and APPC5250 via SNA Networks, TCP/IP, and IPX/SPX.

- Superior asynchronous support, including wireless cellular data communications

A virtual communication driver (VCD) enhances the maximum line speed and provides user mobility with the latest in asynchronous connectivity, such as SNA-over-ASYNC, Hayes AutoSync, and IBM Global Network connections.

- Multiprotocol Transport Networking (AnyNet) support (Windows and OS/2)

AnyNet connections enable application programs to communicate across interconnected networks that run different protocols. Using AnyNet can reduce the number of transport networks without the need to modify existing programs or hardware.

- Up to twenty-six sessions per workstation
- User-customized emulator settings
- Easy-to-use file transfer
- The following features are specific to 5250 emulation:
 - Connection to AS/400, S/36 or S/38
 - Shared Folders
 - Virtual Printers (Windows only)
 - Open Database Connectivity (ODBC) (Windows only)
 - Data Transfer (SQL)
 - ENPTUI
 - PC Organizer
 - Text Assist
 - Support of OS/400 V2R2, or later
 - Console connection (via async or twinaxial)
- The following features are specific to 3270 emulation:
 - Connection to the IBM Global Network
 - GDDM and non-GDDM graphics

The IBM Personal Communications family gives you not only industry-leading 3270 and 5250 terminal emulation, but also powerful automation tools (CMMouse, ZipPrint), client support (Data Access, client/server communications) and system administration tools (adapter-status reporter, menu-bar customization, maintenance aid, trace facility). In other words, the family gives you everything available in the market today, including the following:

- Graphical and customizable tool bar that allows you to launch other applications (for example, the IBM Web Browser)
- Drag-and-drop color remapping
- Three-dimensional hotspots
- Pop-up keypads - customizing allows a *floating toolbar*
- Macros with record by example
- Dynamic configuration/addition/deletion of sessions
- Installation and execution from LAN server
- Versatile edit functions
- Intelligent spreadsheet support
- Copy link
- Clipboard viewer
- Keyboard and code-page support for some 30 languages
- Rule line
- 132-column support
- The following features are specific to 5250 emulation:
 - Auto logon
 - 3812 host print emulation
 - Host print transform
 - PFT-to-PDF migration utility

The Personal Communications Version 4.1 clients also provide many ways to connect to S/390, AS/400, and S/3x systems. Their versatile connectivity offers great flexibility to S/390 and AS/400 customers in expanding their LAN/WAN network capabilities, and encourages workforce mobility by providing several types of asynchronous communications, including:

- IEEE 802.2 (LAN)
- IPX/SPX (NetWare for SAA for 3270)
- TCP/IP (TN3270 and TN5250)
- SDLC (with V.25bis autodialing capability)
- Asynchronous
 - SNA over Async
 - Hayes AutoSync (Windows and OS/2)
 - Dial-in asynchronous high-performance option (HPO) to IBM Global Network
 - Dial-in asynchronous home terminal (Home3270)
 - Asynchronous to an IBM Information Network/Series/1 Gateway (Async IIN)
 - Wireless (cellular data communications)
- Twinaxial
 - Advanced program-to-program communication (APPC) to an AS/400
 - Console support to an AS/400 (5250) (Windows and OS/2)
 - To a S/36 or S/38 (Windows and OS/2)
- 3270 passthrough via AS/400 (3270)
- Coaxial
 - Distributed function terminal (DFT 3270)
 - Control unit terminal (CUT 3270) (Windows and OS/2)
- APPC3270 (3270 over APPC)

Additionally, Personal Communications Version 4.1 provides a wide range of programming interfaces that allow other workstation applications to make use of applications residing on the host. These programming interfaces include:

- Emulator High-Level Language Application Programming Interface (EHLLAPI)
- Dynamic Data Exchange (DDE)
- Server-Requester Programming Interface (SRPI)
- Personal Communications Application Programming Interface (PCSAPI)
- Common Programming Interface for Communications (CPI-C)
- Advanced program-to-program communication (APPC)

The entire Personal Communications family of products is designed to provide customers with a state-of-the-art, comprehensive set of tools for accessing applications and data that reside on either mid-range or mainframe computers. These products allow you to be more creative and more productive by masking the complexity of connecting to and using host applications.

In addition to spanning the major PC operating systems in use today, the Personal Communications family provides a common look and feel across operating systems, enabling you to switch easily between operating systems and hosts.

With the unequalled range of connectivity options offered by the Personal Communications family, you can have the same host interface in the office, at home, or even on the road. The productivity benefits include minimized retraining costs, the ability to switch easily between mid-range-based and mainframe-based applications, and shared keyboard definitions. Other functions such as enhanced edit functions, pop-up keypads, and macro support also help increase productivity.

The Personal Communications family offers a variety of standard programming interfaces for client/server-based applications, including support for CPI-C and APPN applications. These application programming interfaces allow you to access and process information on peer workstations or mid-range or host computers. This access to applications on other systems allows developers to create a common design for applications, which is relatively independent of the operating system platform. This helps them develop applications more quickly.

IBM Personal Communications Tools provides a file transfer program that allows personal computers (PCs) running PC400 to exchange files with an AS/400. This file transfer program is an OS/400 program running on either Version 2 Release 2 or later (including V3Rx). The file transfer program now comes on 1/2", 1/4", and 8-mm cartridge tapes.

The Personal Communications Toolkit for Visual Basic is a companion product to IBM Personal Communications for Windows. The Toolkit provides Windows programmers with a rich set of tools and utilities to help create new client/server applications based on S/390 and AS/400 host applications, and new front ends for existing host applications.

1.3 Personal Communications Product Positioning

The information contained in this section is provided to help you market and plan activities of the Personal Communications family and other emulators from IBM.

A Personal Communications Version 4.1 Family of Desktop Software Positioning White Paper, Product Overview Diskettes and other useful marketing information are all included in the PCOMM41 PACKAGE on MKTTOOLS.

1.3.1 OS/2 Communications Products

For many years, IBM's Personal Communications/3270 for DOS and Windows and Communications Manager/2 for OS/2 have been the workstation communications products of choice for millions of customers to meet their PC workstation connectivity requirements.

The new IBM products described below represent the natural evolution of this widely recognized, industry-leading SNA communications software. These products are as follows:

- The IBM Personal Communications Version 4.1 family of products (PCOM), which provides powerful client communications across all major desktop operating systems - DOS, Windows 3.x, Windows 95, Windows NT and OS/2.

- The IBM Communications Server for OS/2 Warp Version 4.0 (refer to the ITSO redbook *IBM Communications Server V4.0 Enhancements*, SG24-4587 for more information), which provides industry-leading multiprotocol gateway and APPN network node support

With the introduction of IBM Communications Server V4.0, the next phase of IBM's communications support of the PC environment is here. IBM Communications Server V4.0, a high-performance multiprotocol gateway, provides SNA protocol support, plus interoperability with Transmission Control Protocol/Internet Protocol (TCP/IP), to give customers flexibility and choice for their communications needs. IBM Communications Server provides customers with the power and capability to turn an OS/2 PC into a multiprotocol communications gateway/server.

The evolution of these products is represented in this figure:

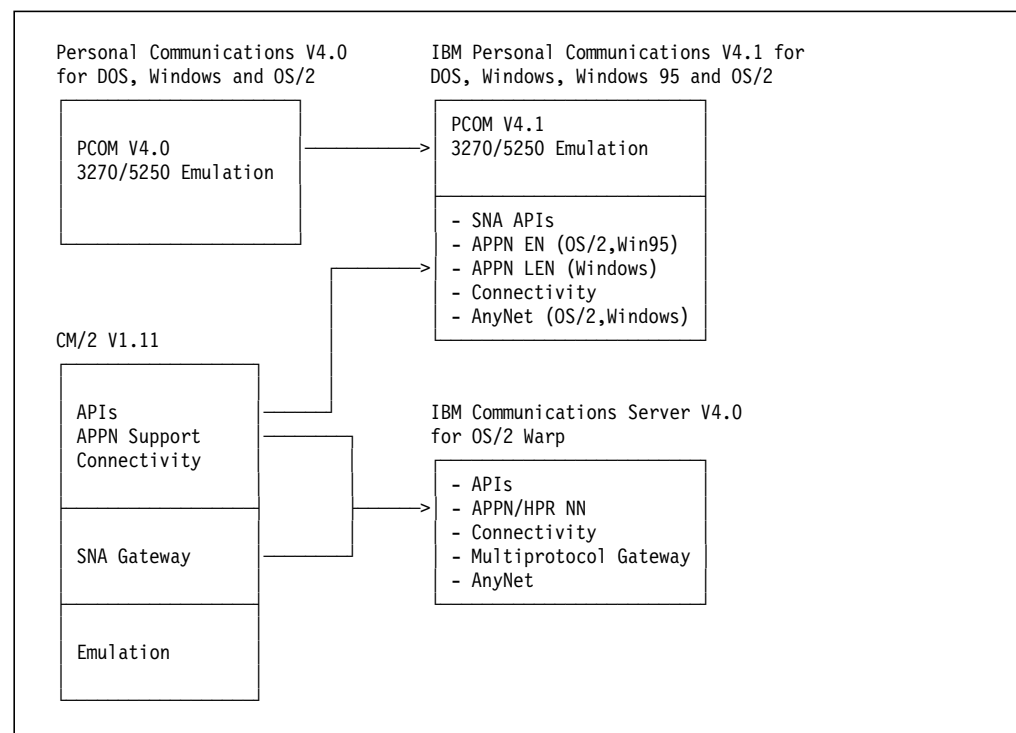


Figure 1. Evolution to PCOM 4.1 and Communications Server 4.0

Personal Communications Version 4.1 for OS/2 installed with the newly added OS/2 Access Feature is the natural migration path for CM/2 customers who need the advanced emulation capabilities provided in PCOM and APPC support for the workstation.

IBM Communications Server for OS/2 Warp Version 4.0 is the natural path for CM/2 customers who need an advanced gateway with all-in-one SNA services, Advanced Peer-to-Peer Networking (APPN) including high-performance routing (HPR) and multiprotocol support.

With the Personal Communications family of client products, IBM introduces a line of clients across multiple operating system environments. PCOM provides customers with 3270 and 5250 emulation, SNA client support, and automation tools for their workstations running OS/2, DOS/Windows, and Windows 95.

OS/2 Access Feature and Windows Access Feature

Communications Server provides two free-standing components, which can be licensed and installed separately, to support application development in the OS/2 and Windows environments. These components provide SNA services and application programming interfaces that function independently from the communications gateway/server. They provide support for applications that execute on the workstations, as follows:

- **OS/2 Access Feature** consists of the CM/2 SNA communication support and services, the CM/2 APIs (including APPC and CPI-C support) and the AnyNet/2 Access Node, which allows SNA and TCP/IP workstation applications to communicate through the multiprotocol gateway to IBM and other computers.
- **Windows Access Feature** consists of the APPC Networking Services for Windows products (NS/Windows) and the AnyNet Access Node, which allows APPC and CPI-C to communicate through the SNA over TCP/IP gateway to both IBM and other computers. NS/Windows provides the CPI-C and APPC support for APPN low-entry networking node (LEN node).

The OS/2 Access Feature is shipped with Personal Communications for OS/2. The Windows Access Feature is NOT shipped with Personal Communications for Windows; instead, the Windows package includes

Note: There is one main difference between the AnyNet support included with PCOM V4.1 and that provided by Communications Server V4.0: PCOMM V4.1 provides AnyNet support for LU 1, 2, 3, and 6.2; the Access Feature for Windows that is shipped with Communications Server V4.0 provides AnyNet support for LU 6.2 only.

1.3.2 Client Access/400

With Personal Communications AS/400 (PC400) V4.1 and previous announcements of Client Access/400 (CA/400) and OS/400 V3R1 comes a new age of connectivity options to communicate from intelligent workstations (PCs) to mid-range systems.

Client Access/400 and Personal Communications AS/400 provide the natural migration path from PC Support/400 which has long been the standard software solution for most customers wishing to link the AS/400 with PC workstations. The existing PC Support/400 product contains DOS, Windows and OS/2 solutions for 5250 emulation, Shared Folders, Data Transfer, Virtual Print, APPC APIs, Submit Remote Command, Data Queues and more. However, PC Support/400 no longer meets the needs of many users due to conventional memory constraints, new connectivity requirements and a need for better integration into the Microsoft Windows for Workgroups desktop environment.

IBM understands that customer networking needs, multi-platform operating needs, and budgetary constraints do not always allow one solution to satisfy all users' requirements. To address the needs of a diverse marketplace, IBM has developed two solutions as represented by Client Access/400 and Personal Communications AS/400.

Client Access/400 is the recommended solution for users of OS/400 V3R1 who require AS/400 connectivity for PCs running Windows and OS/2. CA/400 brings together an impressive set of functions and clients into a single product. CA/400 offers a true Windows client (eliminating the conventional memory constraints under V2Rx with PC Support/400), an OS/2 client which offers exploitation of the 32-bit operating system environment as well as a vast array of features such as E-mail enablement (Vendor Independent Mail (VIM), Mail Application Programming Interfaces (MAPI)), Open Data Base Connectivity (ODBC), and Graphical Operations. Also included in Client Access/400 are IBM's Personal Communications 5250 emulators. IBM's Personal Communications 5250 (PC5250) is a state-of-the-art 5250 emulator which has a common look and feel in the Windows and OS/2 environments.

Personal Communications AS/400 is the recommended choice for customers who:

- Currently have OS/400 V2R2 or V2R3 installed and do not plan an immediate upgrade to V3R1
- Do not require all the functions provided by CA/400
- Require a quick/easy way to connect remote (dial) workstations to the AS/400
- Require a native Windows 95 solution

Personal Communications AS/400 offers a state-of-the-art 5250 emulator based on the same technology as the emulator (Personal Communications 5250) found in Client Access/400. Personal Communications AS/400 is a PC program product (shipped via diskettes and CDROM). Personal Communications AS/400 provides native solutions for workstations running Windows, Windows 95 and OS/2 operating systems. PC400 provides 5250 display and printer emulation, as well as SNA APIs (APPC and CPI-C), Data Transfer support, AnyNet (for Windows and OS/2), Shared Folders support (for Windows and OS/2), Virtual Print (for Windows) and ODBC (for Windows). PC400 provides a wide range of connection options including LAN (802.2 and TN5250), Async, Autosync, Twinaxial, SDLC and even PCMCIA support for Twinax, Async and LAN environments.

As users' requirements grow beyond what is provided by existing OS/400 V2Rx to V3R1, the solution provided by PC400 for Windows, OS/2 or Windows 95 allows you to migrate seamlessly to V3R1. You can continue to use PC400 with V3R1 until you migrate your users to Client Access/400.

For the users who require both 3270 and 5250 emulation support for Windows, OS/2 or Windows 95, IBM offers a combined product called Personal Communications AS/400 and 3270 to provide the latest in PC-to-Mainframe or PC-to-AS/400 connectivity. The combined product provides all the support found in PC400, but adds the award winning features of its sister product Personal Communications/3270.

1.3.3 Other Emulators from IBM

The IBM Personal Communications family of clients also provides a natural migration path for users who require a full function emulator and are currently using the AttachPak for OS/2 Warp Connect, Personal Communications AS/400 Twinaxial Entry Level, Personal Communications/3270 LUA Entry Level (part of Communications Server Version 4.0 for OS/2 Warp), IBM 5250 Emulation for Windows V1.1 or one of the Telnet-3270 or Telnet-5250 products that ship with IBM's TCP/IP for OS/2, or TCP/IP for DOS and Windows.

1.4 Personal Communications/3270 Version 4.1

IBM Personal Communications/3270 (PC/3270) provides SNA-based client support for several different operating platforms, as follows:

Personal Communications/3270 for DOS (Entry-Level Mode)

This provides 3270-display emulation under DOS, with Control Unit Terminal (CUT) coax and Home3270 asynchronous dial-up connections.

Personal Communications/3270 for DOS (Full-Function Mode)

This provides 3270 display and printer emulation under DOS, and also a 3270 gateway. It offers many different types of host connection.

Note: Personal Communications/3270 Entry-Level DOS and Personal Communications/3270 Full-Function DOS are included in the Personal Communications AS/400 and 3270 Version 4.1 for Windows package.

Personal Communications/3270 for Windows

This provides 3270 display and printer emulation, as well as many utilities. It offers many different types of host connection and is a native Microsoft Windows 3.1 or Windows for Workgroups V3.11 application. It is part of Personal Communications AS/400 and 3270 Version 4.1 for Windows (there is no longer a separate 3270-only package).

Personal Communications/3270 Microsoft Windows 95

This is a 32-bit application that runs on Windows 95 or Windows NT and provides 3270 display and printer emulation, several utilities, and APPC and CPI-C programming interfaces. It offers many types of host connection and operates as an End node in an APPN network. It is part of Personal Communications AS/400 and 3270 Version 4.1 for Microsoft Windows 95

Personal Communications/3270 for OS/2

This is a 32-bit application that runs on OS/2 and provides 3270 display and printer emulation, as well as many utilities. It can be used independently or can run on top of Communications Manager/2 or OS/2 Access Feature if you need connection-types that Personal Communications/3270 itself does not provide, or if you want to use the APPC or CPI-C programming interfaces. It is part of Personal Communications AS/400 and 3270 Version 4.1 for OS/2 (there is no longer a separate 3270-only package).

PC/3270 4.1 continues the theme of using a single product family to satisfy 3270 workstation emulation requirements and allows for a common look and feel across a wide variety of connections and operating platforms.

Workstation support includes the 122-key host connected keyboard, 132-column display without scrolling (3270 display Model 5 support), record/play function, rule line support, network management improvements, data compression/decompression in SNA networks, usability enhancements, reduced memory requirements and new connection-types.

PC/3270 provides you with host-based graphics capability, double-byte-character-set support, productivity and administration tools, and end-user features (such as tool bar and pop-up keypad) for simple activation of often-used facilities. Up to 26 simultaneous display (LU2) or printer (LU1/LU3) sessions are supported. Each session can have its own workstation profile.

1.4.1 Highlights of PC/3270 V4.1

IBM Personal Communications/3270 Version 4.1 builds on the success of the previous versions. Some of its main features are as follows:

- Supports a wide range of connectivity options for both the LAN and the WAN environments - DFT, CUT (coax), IEEE 802.2 (token-ring, Ethernet), TCP/IP, SDLC, APPC3270, IPX/SPX (NetWare for SAA), Hayes AutoSync, SNA over Async, IBM Global Network (async) and wireless (cellular data communications).
- The APPC3270 attachment has been added to PC/3270 V4.1 configuration to allow migration from LU2 to LU6.2 through APPN networks. APPN networks are more flexible in their layout and easier to maintain than traditional SNA networks.
- The enhanced networking capabilities of Advanced Peer-to-Peer Networking (APPN) end-node, High Performance Routing (HPR), and Dependent LU Requester (DLUR) are provided by the OS/2 Access Feature and are built into PC/3270 for Windows 95.
- AnyNet connections enable application programs to communicate across interconnected networks of different types. Using AnyNet can reduce the number of transport networks without modifying existing programs or hardware.
- Under Windows, a virtual communication driver (VCD) increases the maximum port speed for asynchronous connections such as SNA-over-Async, Hayes AutoSync, Home3270, and IBM Global Network (HPO and IIN).
- Supports several programming interfaces including EHLLAPI, SRPI and PCSAPI. The OS/2 and Windows 95 versions also support APPC and CPI-C.
- Improved systems management with an emphasis on users migrating from 3270 dependent displays to intelligent workstations, or required to work in a mixed environment.
- Provides for connection via PC cards (PCMCIA).
- PC/3270 V4.1 for OS/2 can run alone as a full-function 32-bit 3270 workstation emulation or can be configured to use the LUA or APPC interfaces of Communications Manager/2 (Version 1.1 or 1.11) or OS/2 Access Feature. Furthermore, additional connections (eg. X.25, ISDN) are available when PCOMM runs over Communications Manager/2 or OS/2 Access Feature.
- PC/3270 V4.1 for OS/2 provides technical support staff with ease of installation, remote installation facilities and administration, productivity tools, and unattended installation through CID.

Additional functions and facilities improve usability and increase overall productivity. These allow you to customize the software to the needs of your business and users, such as color mapping (drag-and-drop), mouse setup, and automatic font-sizing, through the graphical user interface (GUI). Also, the macro record-and-play function helps you to eliminate repetitive keystrokes.

1.4.2 Personal Communications/3270 - History

IBM introduced Personal Communications/3270 Version 1, a new 3270 emulation program for DOS PCs, in May 1989. Since then, it has become the most popular emulation product. It has been the choice of over one million customers to meet their PC workstation application and connectivity needs.

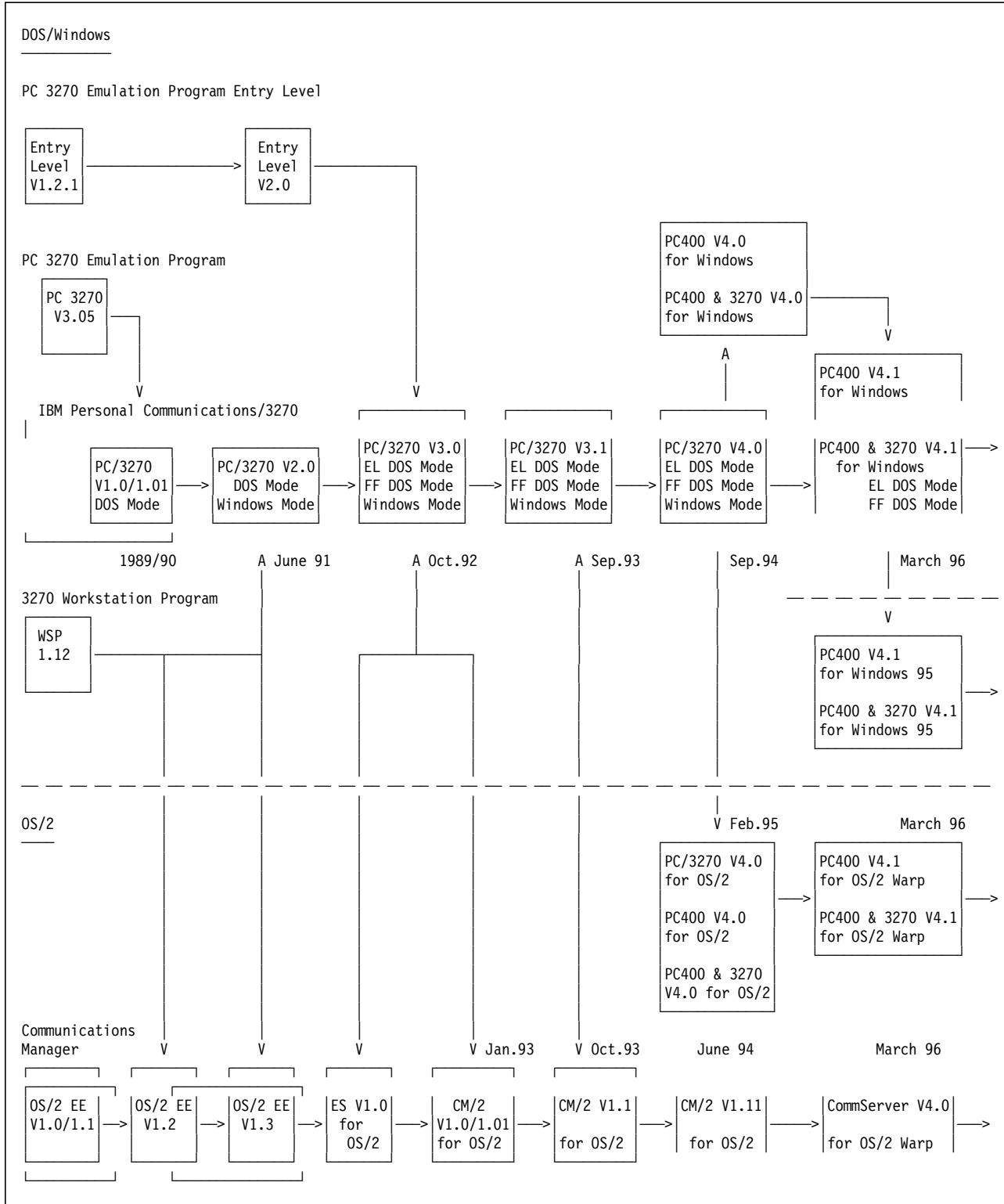


Figure 2. The Personal Communications Family History Chart

1.4.3 Features of PC/3270 V3.1

The major features of PC/3270 up to version 3.1 are listed below:

Table 1 (Page 1 of 2). Features of PC/3270 V3.1

Function	DOS Entry Level	DOS Full Function	Windows
Control unit terminal (CUT) attachment	X		X
Home3270 (async to a protocol converter)	X		X
DOS 5.0 Task Swapper		X	
PCSSWAP (unload, leaving a stub)		X	
Record/Play (macro function)		X	X
Rule line		X	X
Scroll-bars			X
GDDM host graphics	X	(X)	X
GDDM/PCLK Enhancements (PCSPCLK)		X	
OfficeVision/MVS Import/Export		(X)	X
Enhanced 3270 Setup and Printing Utilities		X	X
ISO/DIN-compliant fonts	X	X	X
Enhanced-Front-of-Screen		(X)	X
Underscore display on VGA or XGA		X	
IBM Host-Connected keyboard (122-key)		(X)	X
Up to 26 logical sessions			X
Dynamic configuration/addition/deletion of sessions			X
VTAM Compression/Decompression		X	X
Self-Defining Dependent LUs (SDDLJ)		X	X
Response Time Monitor (coax)		X	X
Customization-free DFT connection		(X)	X
Asynchronous Connection (Async3270 IIN)		(X)	
Gateway (token-ring, SDLC, X.25, DFT)		(X)	
Gateway (Ethernet support)		X	
Accessibility for Persons with Disabilities		X	
Double Byte Character Set (DBCS) Version			X
Concurrent sessions in multiple languages			X
Network installation option		X	X
APL support			X
Printer Definition Table (PDT/PDF) support		(X)	X
DOS Virtual Machine (DOS-box) EHLLAPI			X
Server Requester Programming Interface (SRPI)		(X)	X
Async V.32bis support	X	X	X
Async V.42bis support	X	X	X
Async FIFO queue in COM port use	X	X	X
IPX/SPX (NetWare for SAA) attachment		X	X

<i>Table 1 (Page 2 of 2). Features of PC/3270 V3.1</i>			
Function	DOS Entry Level	DOS Full Function	Windows
TCP/IP Telnet3270 attachment		X	X
3270 Passthrough via AS/400			X
SDLC V.25bis auto-dialing			X
PCMCIA support	X	X	X
Print to Disk		X	(X)
Copy to Buffer		X	(X)
Append to Clipboard (Copy Append)			X
Send/Receive at DOS prompt (file transfer)	(X)	(X)	X
File Transfer by macro			X
ZipPrint Utility			X
Partial installation		(X)	X
Keyboard Definition Utility	X	X	X
Menu-bar configuration			X
Selector-Light-Pen emulation by mouse			X
IBM Operating System/2 (OS/2) Version 2.0 DOS Box	X	X	
IBM Operating System/2 (OS/2) Version 2.0 WIN-OS2			X
Utility to install on OS/2 desktop (PCOMOS2)			X
Note:			
(X) available in previous releases			

1.4.4 Enhancements in PC/3270 V4.0

PC/3270 Version 4.0 included some enhancements to the DOS version, many enhancements to the Windows version, and introduced a 32-bit version for OS/2. The major enhancements are described in Chapter 2, "Introduction to Major Functions and Enhancements" on page 31 and are listed below:

<i>Table 2 (Page 1 of 2). Enhancements in PC/3270 V4.0</i>			
Function	DOS Version	Windows Version	OS/2 Version
Provides full functionality of PC/3270 V3.1		(X)	X
Demonstration Diskette included		X	X
Full-function, 32-bit 3270 emulation			X
SNA-over-Async	X	X	X
Hayes AutoSync	X	X	X
Wireless (cellular data communications)	X	X	X
CUT for port 0 customization		X	X
LUA or APPC via Communications Manager/2			X
X.25, ISDN via Communications Manager/2			X

<i>Table 2 (Page 2 of 2). Enhancements in PC/3270 V4.0</i>			
Function	DOS Version	Windows Version	OS/2 Version
MS SNA client on Windows NT (FMI)		X	
Novell's DOS 7 supported	X	X	
3D Iconic Tool-bar and Hotspots		X	X
Graphical Menu-bar configuration		X	X
Drag-and-Drop color remapping		X	X
Clipboard viewer		X	X
Edit enhancements (Paste-next, Trim-Paste)		X	X
Intelligent spreadsheet support via Clipboard		X	X
DDE Copy Link function		X	X
Popup-Keypad enhancements (<i>floating toolbar</i> and function/color customization)		X	X
Selectable Backspace-key function		X	X
Macro enhancements (GOTO, RUN, EXIT)		X	X
EasyREXX programming interface for HLLAPI			X
Half-block cursor in Insert mode		X	X
ALMCOPY and ACPM file transfer utility			X
Host-print Page-eject control by timeout-value		X	X
GDDM and non-GDDM graphics		X	X
Vector Graphics		X	X
Programmed Symbol Set graphics		X	
Graphics Local Screen Print (scalable)		X	X
Mouse utility program (CMMOUSE)			X
Maintenance Utility		X	X
Remote, unattended installation via CID			X
Notes:			
(X) previously available with PC/3270 V3.1			

1.4.5 Enhancements and New Features of PC/3270 V4.1

IBM PC/3270 V4.1 provides numerous enhancements to the product as compared to Personal Communications Version 4.0. The major enhancements are described in Chapter 2, "Introduction to Major Functions and Enhancements" on page 31 and all are listed in the table below. Features of PCOMM for Windows 95 are included for comparison.

<i>Table 3 (Page 1 of 3). Enhancements and Features of PC/3270 V4.1</i>				
Function	DOS Version	WIN31 Version	WIN95 Version	OS/2 Version
CM MOUSE automation utility	X	X	X	(X)
APPC3270 through APPN networks		X	X	(X)
Dependent LU Requester (DLUR)			X	(*3)
APPN LEN/End node (APPC and CPI-C API)	(*1)	(*2)	X	(*3)

<i>Table 3 (Page 2 of 3). Enhancements and Features of PC/3270 V4.1</i>				
Function	DOS Version	WIN31 Version	WIN95 Version	OS/2 Version
High Performance Routing (HPR)			X	(*3)
SNA over TCP/IP (AnyNet)		X		(*3)
NetWare for SAA - asterisk for server & service names	X	X	X	X
TN3270E (LU1/LU3 host print etc over TCP/IP)		X	X	X
Async performance enhancement (VCD)		X		
Autodial usability improvements	X	X	X	X
IBM Global Network (IGN) attachment (HPO)		X	X	X
IGN phone numbers built in		X	X	X
Display title with phone number	X	X	X	X
Easy selection of a backup phone number	X	X	X	X
Idle timeout option (async & SDLC)		X	X	X
Additional modem support	X	X	(*4)	X
Toolbar pop-up description		X	X	X
Toolbar customization		X	X	X
Online publications			X	X
Printer Form-Feed options increased		X	X	X
Improved Drag-and-Drop GUI			X	X
32- & 16-bit interfaces for EHLLAPI, SRPI, PCSAPI			X	X
EHLLAPI multiple links			X	X
PCSAPI Connect/Disconnect Session			X	X
Programmed Symbol Set support		(X)		X
PCSAPI connect/disconnect			X	X
On/Off selection for PCSMON trace		X		X
Response Time Monitor	(X)	X		(X)
Print to Disk - Separate file		X	X	X
Installation - emulator selection (3270, 5250, both)		X	X	X
Installation - more granular component selection		X	X	X
Migration without reconfiguration	(X)	(X)	X	X
Restoration of a previous version		X	X	X
Uninstall option to remove/delete	(X)	X	X	X
Improvement for OS/2 locked device drivers				X
Support of ECID keywords (Copy, Migrate, Version, Copy/Delete)				X
Creation of CID response file from CM/2 configuration file				X
Keyboard-graphic layout with NLS (remap)		X	X	X

<i>Table 3 (Page 3 of 3). Enhancements and Features of PC/3270 V4.1</i>				
Function	DOS Version	WIN31 Version	WIN95 Version	OS/2 Version
Choose keyboard layout - 3270, 5250, Combined		X	X	X
Support for the MS Natural Keyboard		X	X	
Keyboard/Code-Page support for many new languages	X	X	X	X
Performance improvements				X
Notes:				
(X) previously available with PC/3270 V4.0				
(*1) Supported with APPC Networking Services for DOS				
(*2) Supported with APPC Networking Services for Windows				
(*3) Supported with OS/2 Access Feature				
(*4) Uses Windows 95's modem configuration by default				

All features of previous versions are still included; many have been improved in Version 4.1. Entry-Level DOS is still part of the package

1.4.6 PC/3270 V4.1 Connections to S/390

Personal Communications/3270 Version 4.1 supports a wide variety of communication adapters; except where precluded by hardware conflict, you can use any valid combination of adapters to communicate to System/390 or AS/400 hosts.

You can have up to 26 concurrent host sessions (display - LU2, or printer - LU 1 or 3) in Windows or OS/2 modes, and up to eight in Full-Function DOS mode, depending upon the type and number of adapters installed and upon the amount of memory in your workstation.

Personal Communications/3270 Version 4.1 supports the following connection-types:

<i>Table 4 (Page 1 of 2). PC/3270 V4.1 Connections to S/390</i>					
PC/3270 V4.1 to 3270 Host System		DOS Version	WIN31 Version	WIN95 Version	OS/2 Version
Interface	Attachment				
LAN Token-Ring Ethernet FDDI (OS/2) ATM (OS/2) Wireless	IEEE 802.2 via LAN	X G	X	X	X
	NetBIOS via 3270 Emul. Gateway	X	X		
	IPX/SPX via NetWare for SAA	X	X	X	X
	TCP/IP Telnet3270	X	X	X	X
	AnyNet (SNA over TCP/IP) (*1)		X		(*4)
	3270 Passthrough via AS/400		X	X	X
	APPC3270 via SNA Network (LU 6.2)		X(*1)	X	X
	MS SNA Client (FMI) (*6)		X	X	
	MS SNA Client (LUA) (*1 *6)			X	
	MS SNA Client (APPC) (*1 *6)			X	
	DLUR			X	

Table 4 (Page 2 of 2). PC/3270 V4.1 Connections to S/390

PC/3270 V4.1 to 3270 Host System		DOS Version	WIN31 Version	WIN95 Version	OS/2 Version
Interface	Attachment				
Coaxial	SNA Distributed Function Terminal	X G	X	X	X
	Non-SNA Distributed Function Terminal	X	X	X	X
	Control unit terminal	(*3)	X		X
	3174 Peer Communication (IEEE 802.2)	X	X		X
COM port	Home3270	(3)	X	X	X
	Hayes AutoSync	X	X		X
	SNA-over-Async	X	X	X	X
	IBM Global Network (HPO) (*1)		X	X	X
	Advantis (IIN) via S/1 SNA Gateway	X	X	X	X
	DLUR			X	
SDLC	Synchronous Data Link Control	X G	X	X	X
	3270 Passthrough via AS/400	X	X	X	X
	APPC3270 via SNA Network (LU 6.2)		X(*1)	X	X
	DLUR			X	
SNA CM/2 or OS/2 AF	LUA3270 via SNA Network (LU 0,1,2,3)				X
	APPC3270 via SNA Network (LU 6.2)				X
Twinaxial	3270 Passthrough via AS/400		X	X	X
	DLUR			X	
X.25	X.25 Co-Processor	X G			(*4)
Frame Relay	Wide Area Connector (WAC)				(*5)
ISDN	ISDN Co-Processor Card	X			(*4)
	WaveRunner ISDN		X		(*4)
Notes:					
<p>(X) Also for Gateway (upstream)</p> <p>(*1) New attachment in this release</p> <p>(*2) New attachment since PC/3270 V4.0</p> <p>(*3) Supported by Entry-Level DOS Mode</p> <p>(*4) Supported with OS/2 Access Feature</p> <p>(*5) Supported with RouteXpander/2 and CM/2 or OS/2 Access Feature</p> <p>(*6) Also supported on Windows NT Workstation</p>					

1.5 Personal Communications AS/400 Version 4.1

IBM Personal Communications AS/400 (PC400) connects personal computers with AS/400 systems. Personal Communications AS/400 Version 4.1 provides a full-function, integrated solution including an up-to-date graphical user interface (GUI), Shared Folders, and Data Transfer in a single, easy-to-install software solution running in conjunction with IBM OS/400 (V2R2 or later).

PC400 V4.1 is available in two packages - alone or combined with PC/3270 V4.1 - on each of three operating systems.

Personal Communications AS/400 for Windows

This provides Windows-based 5250 terminal emulation when used in conjunction with Microsoft Windows 3.1 or Windows for Workgroups V3.11. This enables AS/400 and workstation applications to be run concurrently in different windows, seamlessly integrating 5250 sessions into the Windows environment. The package includes two other applications: AnyNet SNA over TCP/IP for Windows, which allows PC400, configured to use APPC, to connect to an AS/400 over a TCP/IP network; and APPC Networking Services for Windows, which provides APPC and CPI-C programming interfaces.

Personal Communications AS/400 for Windows 95

PC400 for Windows 95, in addition to providing 5250 emulation and Data Transfer (not Shared Folders), is a 32-bit SNA client that can work as an End Node in an APPN network and has APPC and CPI-C programming interfaces.

Personal Communications AS/400 for OS/2

This provides presentation-manager-based 5250 terminal emulation when used in conjunction with OS/2 2.1 or later. It is a 32-bit application and has both 16- and 32-bit APIs. The package includes the OS/2 Access Feature, which provides SNA End-Node, AnyNet, DLUR and HPR support.

Personal Communications AS/400 Version 4.1 continues the theme of providing a common look and feel regardless of the type of emulation, the connection-type or the operating system. PC400 V4.1 provides a full-function, integrated solution including the latest in graphical user interface (GUI), shared folders, data transfer (SQL file transfer), PC Organizer and text assist features to integrate platforms seamless across the network in a single, easy-to-install application package.

Note: For simplicity, these programs will be referred to collectively as PC400 V4.1 from now on, unless a particular operating system is mentioned.

1.5.1 Highlights of PC400 V4.1

IBM Personal Communications AS/400 Version 4.1 belongs to the expanding IBM family of PC - Host Communication products. These provide seamless integration of the PC and AS/400 environment for Windows and OS/2 users. These products are sophisticated 5250 emulation packages which do the following:

- PC400 V4.1 for Windows provides utilities such as Data Transfer, File Transfer, Shared Folders, PCS/400 Router API, Virtual Printers and Database Access via ODBC. It will connect to AS/400, System/36 or System/38.
- PC400 V4.1 for OS/2 can run alone as a full-function, 32-bit 5250 terminal emulation program or can be configured to use the APPC interface of Communications Manager/2 or OS/2 Access Feature.
- Shared Folder support is provided; up to 8 PC drives can be connected at one time. Data Transfer (SQL file transfer) is also provided to allow the updating and sharing of information between a PC and an AS/400. A File Transfer function is provided, to exchange complete files between a PC and an AS/400.
- PC Organizer and Text Assist, originally PC Support/400 client functions, are included.
- Personal Communications AS/400 Version 4.1 for Windows has a PC400 Database Access query tool that uses ODBC to access databases using SQL and lets you exchange data with other ODBC applications.
- The enhanced networking capabilities of Advanced Peer-to-Peer Networking (APPN) end-node, High Performance Routing (HPR), and Dependent LU Requester (DLUR) are provided by the OS/2 Access Feature and are built into PC/3270 for Windows 95.
- AnyNet connections enable application programs to communicate across interconnected networks of different types. Using AnyNet can reduce the number of transport networks without modifying existing programs or hardware.
- Supports a wide range of connectivity options for both the LAN and the WAN environments - IEEE 802.2 (token-ring, Ethernet), TCP/IP, SDLC, IPX/SPX (NetWare for SAA via a router), Hayes AutoSync, SNA over Async, and wireless (cellular data communications).
- Under Windows, a virtual communication driver (VCD) increases the maximum port speed for the asynchronous connections - SNA-over-Async and Hayes AutoSync.
- Provides for connection via PC cards (PCMCIA).
- PC400 V4.1 for OS/2 provides technical support staff with ease of installation, remote installation facilities and administration, productivity tools, and unattended installation through IBM's CID.

Additional functions and facilities improve usability and increase overall productivity. These allow you to customize the software to the needs of your business and users, such as color mapping (drag-and-drop), mouse setup, and automatic font sizing, through the graphical user interface (GUI). Also, the macro record-and-play function helps you to eliminate repetitive keystrokes.

1.5.2 Features of PC400 V4.0

IBM Personal Communications AS/400 Version 4.0 is available as a full-function, 32-bit product for OS/2, and as native Windows application, allowing seamless integration of your workstation and AS/400 environment. The major enhancements are described in Chapter 2, "Introduction to Major Functions and Enhancements" on page 31.

Function	Windows Version	OS/2 Version
Demonstration Diskette included	X	X
Full-function, 32-bit 5250 Emulation		X
Shared Folders	X	X
Data Transfer (SQL file transfer)	X	X
PC Organizer	X	X
Text Assist	X	X
Auto logon	X	X
Intelligent 132-column support	X	X
3812 host print emulation	X	X
Host print transform	X	X
PFT to PDT migration utility	X	X
Multiple File Transfer	X	X
LAN connection (token-ring, Ethernet, FDDI)	X	X
Wireless (cellular data communications)	X	X
Twinaxial attachment (with console support)	X	X
SNA-over-Async, Hayes AutoSync	X	X
TCP/IP Telnet5250	X	X
PC Support/400 Router	X	
IPX/SPX (NetWare for SAA with Router)	X	
APPC5250 configured to use Communication Manager/2		X
X.25, ISDN when configured using Communication Manager/2		X
Multiple-adapter support	X	X
PCMCIA support	X	X
Drag-and-Drop GUI	X	X
Rule line	X	X
Clipboard viewer	X	X
Versatile Edit functions (incl. Copy Append, Paste-Next, Trim-Paste)	X	X
Intelligent spreadsheet support	X	X
DDE Copy Link function	X	X
Play and record macro	X	X
Programming Interfaces (EHLAPI, DDE, PCSAPI)	X	X
EasyREXX for HLLAPI utility	X	X

<i>Table 5 (Page 2 of 2). Features of PC400 V4.0</i>		
Function	Windows Version	OS/2 Version
Enhanced Non-Programmable Terminal User Interface (ENPTUI)	X	X
Customizable menu-bar	X	X
3D iconic tool-bar, Hotspots	X	X
Drag-and-Drop color remapping	X	X
Popup keypads (including <i>floating toolbar</i> and function/color customization)	X	X
Dynamic configuration/addition/deletion of sessions	X	X
Installation and execution from a server	X	X
Intelligent-mouse utility (CM MOUSE)		X
Maintenance Utility	X	X
122-key keyboard and NLS keycap support	X	X
Remote, unattended installation via CID		X
LAPS included in package		X
Note: There is no PC400 for DOS.		

1.5.3 Enhancements and New Features of PC400 V4.1

IBM PC400 V4.1 provides numerous enhancements to the product as compared to Personal Communications Version 4.0. The major enhancements are described in Chapter 2, "Introduction to Major Functions and Enhancements" on page 31 and all are listed in the table below. Features of PCOMM for Windows 95 are included for comparison.

<i>Table 6 (Page 1 of 2). Enhancements and Features of PC400 V4.1</i>			
Function	WIN31 Version	WIN95 Version	OS/2 Version
System/3X attachment (Twinax only)	X		
X			
Virtual Printer	X	c.	
PCS/400 Router API	X		
ODBC driver	X		
Database Access	X		
Router session no longer needed for SF, DT	X		
ASYNCR performance enhancement (VCD)	X		
Autodial usability improvements	X	X	X
Display title with phone number	X	X	X
Additional modem support	X	X(*3)	X
Toolbar pop-up description	X	X	X
Toolbar customization		X	X
APPN LEN/End Node (APPC and CPI-C API)	(*1)	X	(*2)

<i>Table 6 (Page 2 of 2). Enhancements and Features of PC400 V4.1</i>			
Function	WIN31 Version	WIN95 Version	OS/2 Version
High Performance Routing (HPR)		X	(*2)
SNA over TCP/IP (AnyNet)	X		(*2)
SNA-over-Async (Console)	X		X
Online publications		X	X
Column-separator customization (lines/dots)	X	X	X
Improved drag-and-drop GUI		X	X
16- and 32-bit interfaces for EHELLAPI, SRPI, APPC		X	X
EHELLAPI multiple links		X	X
PCSAPI Connect/Disconnect Session			X
X			
On/Off selection for PCSMON Trace	X		
X			
Installation - emulator selection (3270, 5250, both)	X	X	X
Installation - more granular component selection	X	X	X
Migration without reconfiguration	X	X	X
Ability to stop installation	X	X	X
Restoration of a previous version	X	X	X
Uninstall option to remove/delete	X	X	X
Improvement for OS/2 locked device drivers			X
Support of ECID keywords (Copy, Migrate, Version, Copy/Delete)			X
Creation of CID response file from CM/2 configuration file			X
Keyboard-graphic layout with NLS (remap)	X	X	X
Support for the MS Natural Keyboard	X	X	
Keyboard/Code-Page support for many new languages	X	X	X
Performance improvements			X
Notes:			
(*1) Supported with APPC Networking Services for Windows			
(*2) Supported with OS/2 Access Feature			
(*3) Uses Windows 95's modem configuration by default			

All features of previous versions are still included; many have been improved in Version 4.1.

1.5.4 PC400 V4.1 Connections to AS/400

Personal Communications AS/400 Version 4.1 supports a wide variety of communication adapters; except where precluded by hardware conflict, you can use any valid combination of adapters to communicate to AS/400 hosts. You can use only Twinax adapters to connect to S/36 or S/38.

You can have up to 26 concurrent sessions (display or printer), depending upon the type and number of adapters installed and upon the amount of memory in your workstation.

Personal Communications AS/400 Version 4.1 supports the following connection-types:

<i>Table 7. Personal Communications AS/400 Version 4.1 Connections to AS/400 and S/3X</i>				
PC400 V4.1 Connections		WIN31 Version	WIN95 Version	OS/2 Version
Interface	Attachment			
LAN token-ring Ethernet FDDI (OS/2) ATM (OS/2) Wireless	IEEE 802.2 via LAN	X	X	X
	TCP/IP Telnet5250	X	X	X
	AnyNet (SNA over TCP/IP) (*1)	X		(*2)
	PC Support/400 Router	X		
	IPX/SPX via NetWare for SAA	(*3)		
SDLC	Synchronous Data Link Control	X	X	X
	PC Support/400 Router	X		X
Twinaxial	Twinaxial Data Link Control (APPC)	X	X	X
	Twinaxial Data Link Control (Console)	X		X
	PC Support/400 Router	X		X
COM port	Hayes AutoSync	X		X
	SNA-over-Async	X	X	X
	SNA-over-Async (Console)	X		X
CM/2 or OS/2 AF	APPC5250 via SNA Network (LU 6.2)			X
X.25	X.25 Co-Processor			(*2)
Frame Relay	Wide Area Connector (WAC)			(*2 *4)
ISDN	ISDN Co-Processor			(*2)
	WaveRunner ISDN	X		
Notes:				
S/3x only supports a Twinax connection				
(*1) New attachment in this release				
(*2) Supported with OS/2 Access Feature				
(*3) Can be used with the PC Support/400 Router attachment (only for emulation, no utilities)				
(*4) Supported with RouteXpander/2				

1.6 Personal Communications Toolkit for Visual Basic

The Personal Communications Toolkit for Visual Basic is a companion product to the Personal Communications/3270 and Personal Communications AS/400 terminal emulator products. The Toolkit provides Windows programmers with a rich set of tools and utilities to help create new client/server applications based on S/390 and AS/400 host applications, and new front ends for existing host applications.

With the Personal Communications Toolkit, application developers can create value-added clients (based on Visual Basic) for the Windows workstation, which use existing host applications as servers for data and text processing. The clients can utilize the enhanced graphics, video, and sound capabilities of the workstation. The host applications provide the security, integrity, and capacity for storing and processing business-critical data and text. This provides an effective way to migrate mission critical host applications to client/server computing. With the Personal Communications Toolkit, end users and application developers can create graphical user interface (GUI) front ends for existing S/390 and AS/400 applications. Data and text from one or more host applications can be captured and displayed at a workstation in a Microsoft Windows format. New or revised data can then be returned to the host application from the workstation window.

The Personal Communications Toolkit includes the following two components:

- Tools and utilities for the application developer
- Run-time support for the IBM Personal Communications emulators

The tools and utilities are productivity aids for application developers working with Visual Basic or C. One of the tools, QuickFRONT Generator (QFG), generates Visual Basic programs that execute on the workstation and use data and text from S/390 and AS/400 applications. The tools eliminate the need for Visual Basic programmers to have experience with the high level language application programming interface (HLLAPI) that is used to communicate with the host application.

The run-time support consists of Windows dynamic link libraries (DLLs) that work in conjunction with the Personal Communications family for Windows workstation emulator programs. A copy of the DLLs can be made and installed on personal computers that have a license of Personal Communications/3270 Version 3.0 or higher; the license is Personal Communications AS/400 or Personal Communications AS/400 and 3270 Version 4.0 or higher for Windows.

- Preserves customers investment in existing host applications
 - Allows existing host-based data and text to be used with Windows applications on a workstation
 - Provides new GUI front ends for host applications
- Provides the capability to extend host applications into client/server applications
 - Extends the processing for host data and text to a Windows workstation using Visual Basic client applications
 - Adds more capabilities to host applications using new client functions and processing
- Gives developers new ways to use S/390 and AS/400 applications

- Provides time-saving utilities and tools for the application developer and advanced user
- Uses QFG to simplify the creation of Visual Basic applications that use host-based data and text
- Includes run-time support for IBM Personal Communications/3270 and IBM Personal Communication As/400 for Windows terminal emulators

1.6.1 Tools and Utilities

The Personal Communications Toolkit can be used with languages such as Borland C ++, Microsoft C and C ++, and the Microsoft Visual Basic application development tool. Application developers can generate Visual Basic forms from 3270 and 5250 screens, create screen matchlists, and generate Visual Basic applications using the QuickFRONT Generator component. For developers using other languages or tools, Personal Communications Toolkit captures 3270 and 5250 screens, and generates the C data structures and matchlists needed for host interaction.

With Personal Communications Toolkit, end users and developers can create new GUI front ends to applications on S/390 and AS/400 hosts. These new GUI front ends can improve the usability of the application and eliminate user complaints with host *green screens*. In addition to screen appearance improvements, the front ends created with Personal Communications Toolkit can also incorporate data and text from more than one host screen, from more than one host session. This can improve end user productivity by eliminating the effort required to move between screens and between host sessions.

In addition to front-end screens, the Personal Communications Toolkit allows application developers to create new front-end applications or processes for host applications. These new front-end applications can run on the workstation while using or exchanging data and text from one or more host applications. This enables customers to migrate or transition their legacy host applications into client/server applications, which helps protect the customers' investment in host applications.

The capability to create new client/server applications based on existing host applications also allows customers to take advantage of the strengths of the workstation and host environment. Using the workstation, developers can create applications that incorporate new features, such as enhanced graphics, video, and sound, and include the host-environment benefits of security and central administration for business-critical data. The Personal Communications Toolkit helps customers realize these benefits with an affordable, easy-to-use extension to their IBM Personal Communications emulators.

1.6.2 QuickFRONT Generator

For users of Microsoft Visual Basic (2), the QFG component of the Personal Communications Toolkit provides a rapid way to create fully functional front-end applications without programming. QFG is built around a development model in which 3270 or 5250 screens are treated as objects with associated properties and events. A QFG application, which has a set of properties defining application behavior, is a collection of captured 3270 or 5250 screens and associated behaviors that occur when a given 3270 or 5250 screen is recognized.

Using QFG, an application developer captures 3270 or 5250 screens and specifies the workstation processing logic associated with each screen. As needed, the developer can automatically generate Visual Basic forms mapped to a given host screen. Once all applications and properties are specified, a complete Visual Basic application is automatically generated. This application is ready for execution or extension within the Visual Basic development environment.

The QFG can improve the productivity of Visual Basic programmers, as follows:

- Programmers are not required to learn how to use the HLLAPI interface for access to the host screens.
- QFG is an automated development tool that generates executable Visual Basic programs, allowing new applications to be developed more easily.
- QFG is also dialog-driven, making it easy to learn.
- With reduced learning requirements and automatic code generation, QFG should help to significantly lower the cost of developing Visual Basic applications that require communication with host applications.

1.6.3 Toolbar

In addition to QFG, the Personal Communications Toolkit provides another tool to develop applications, the Toolbar. You can use the Toolbar by itself or in conjunction with one of several Windows development tools, as follows:

- Borland C ++
- Microsoft C, C ++, Visual C ++
- Microsoft Visual Basic

The Toolbar, which is activated from the Windows Program Manager Work group, provides access to the following:

- **Screen Capture Tool** lets developers take a snapshot of a host screen image and use the image to create a Visual Basic form or a C program structure. With this tool, developers can save screen captures for use with more than one Visual Basic form or data structure. The Screen Capture Tool also allows developers to complete screen definitions off-line from the host, which is more cost-effective.
- **Screen Maintenance Tool** allows developers to reuse or further define screens previously captured by the Screen Capture Tool. With the Maintenance Tool, screens can be captured online in one host session, and then screen definitions can be completed offline on the workstation.
- **Screen Match Tool** helps the front-end application manage the task of identifying screens sent between the workstation and host application.
- **Control Panel** allows a developer to dynamically configure and customize the Toolbar for either the Visual Basic or C environments.
- **Help Facility** contains online copies of user publications and examples of how to use the product.

These Personal Communications Toolkit tools provide several savings possibilities, as follows:

- Application developers and system administrators can easily learn the full function of the Personal Communications Toolkit using the online helps and examples, eliminating the expense of classroom training.
- Programmers can customize the Toolbar to fit the development environment, reducing training time and development costs.
- The toolkit tools enable developers to capture host screens online and complete screen definitions offline. This reduces host resource requirements during the development cycle.
- The Screen Match Tool uses selection button and drag and drop capabilities to simplify the creation and maintenance of screen matchlists for application developers.

1.6.4 Run-Time Support

The Personal Communications Toolkit run-time support is a collection of Windows DLLs that work in conjunction with the terminal products of the IBM Personal Communications/3270 and PCOMM for Windows. The Personal Communications/3270 and PCOMM for Windows emulators provide the communication connection from the Windows workstation to the S/390 and AS/400 host applications. The DLLs support a variety of functions for controlling and interacting with the host application. The DLLs are called by the application programs or front-end processes created with the Personal Communications Toolkit. The DLLs are required on each workstation that runs a GUI front-end or application.

The Personal Communications Toolkit run-time support is provided at no additional charge. The DLLs can be installed on any workstation that has a valid license for Personal Communications/3270 or Personal Communications AS/400 for Windows. To simplify the installation process, the DLLs can be packaged and distributed with the new front-end code or application.

Chapter 2. Introduction to Major Functions and Enhancements

This chapter provides a brief description of the major enhancements, features and functions of Personal Communications Version 4.1 for the DOS, Windows and OS/2 environments.

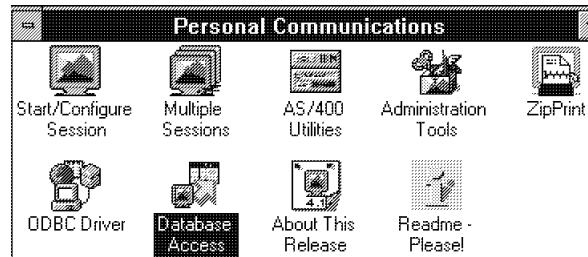


Figure 3. Personal Communications AS/400 and 3270 Version 4.1 Program Group

2.1 3270 and 5250 Terminal Emulation

Personal Communications supports most displays and display adapters, to emulate 3270 and 5250 display Models 2, 3, 4 or 5, as well as user-defined screen sizes.

A set of logical-terminal definitions, saved in a workstation profile, can be used for all sessions, or a different profile can be used for each session.

Support for four audible alarms is included in the program:

- 3270 alarm, which is controlled by the host system
- Screen-update alarm
- Invalid-keystroke alarm
- Undefined-keystroke alarm

Personal Communications for Windows or OS/2 let you choose, within some limits, the font that will be used for this session. The style and whether it will be an *Automatic-Sizing Font* or a *Fixed-Size Font*. If you use a fixed-size font, you can also choose its size. The set of fonts from which you can choose depends on the type of display you are using.

A full-screen view is possible in the Windows and OS/2 environments if the session window is maximized. You can customize all session-window appearances as you see fit.

2.1.1 Front-of-Screen Support

There are two levels levels available for PC/3270 V4.1 DOS modes:

- FOS support compatible with PC/3270 V1.0
- Enhanced FOS support, as provided in PC/3270 V2.0 and later

The Windows and OS/2 versions have enhanced FOS support.

The enhanced FOS is available for VGA and higher-resolution displays.

Enhanced fonts make the screen easy to read and allow it to support the presentation space of 3270 and 5250 terminals Models 2 through 5, while making full use of the display area without the need for scrolling.

The following enhanced-FOS characteristics better approximate the quality offered by 3270 and 5250 dependent displays:

Display attributes

- Normal video
- Blinking
- Underscored letters display on SVGA and XGA monitors
- Reverse video
- Extended colors (7-color attributes)
- High intensity (monochrome monitors)
- Alternate characters (OIA graphics, escape characters)

Display and Screen colors

You can use the color-setup function to change the colors of the attributes, indicators etc listed below. If you want to set the default colors so that they as similar as possible to those of mainframe-interactive (MFI) or AS/400 terminals, choose Appearance - Display Setup - Palette - IBM Custom Color.

- PC/3270 - base colors
 - Normal, unprotected
 - Intensified, unprotected
 - Normal, protected
 - Intensified, protected
- PC/3270 - extended colors
 - Seven-color attributes
 - Default color
 - Default intensified
- PC/3270 graphics colors
- PC400 field colors (7-color attributes)
- OIA colors:
 - Status indicators
 - Information indicators
 - Attention indicators
 - Error indicators
- Other Screen colors:
 - Default background color
 - Divider line
 - Rule line
 - Blink attribute
 - PC400 column separator

Display Cursor and Pointer

The following cursor capabilities are supported:

- Underline/block/half-block
- Blinking/stable
- Slow blinking (Full-function DOS only)
- Change shape in Insert mode - Yes or No

Pointer selection lets you specify a Crosshair or Arrow pointer in the Windows and OS/2 versions.

Operator Information Area (OIA) and Divider Line

Personal Communications displays OIA indicators such as the clock (wait) symbol. A divider line, using four display-scan lines, separates the host session from the OIA and thus increases readability. A Row/Column indicator is shown in OIA area by default but you can remove it.

In addition to the above enhancements, Personal Communications supports the 132-column display (full screen Model 5, 132 columns by 27 rows) in APA mode for VGA and higher resolution displays.

This support has the following restrictions:

- Character blinking is not supported
- Cursor blinking is not supported
- Color of the underline cursor is always white.

2.1.2 Font Style and ISO/DIN-compliant Font Support

Personal Communications Version 4.1 contributes to total system ISO 9241 compliance by satisfying the font portion (part 3) to display sharp, crisp display characters. This enables it to satisfy DIN 66234 also. It can be used with other ISO-compliant hardware (display monitors, display video adapters) which provide flicker-free performance, stable display images, increased screen brightness, high contrast, and reduced glare.

Personal Communications Full-Function DOS allows you to select the font to be used to display characters on the screen in host sessions.

You can choose from four types of font:

- The System font (PC supplied) is the ordinary PC font, as used in the DOS mode sessions.
- The PC/3270 sans-serif font is the 3270-terminal and full CECP (code page 850) font.
- The ISO 9241 Part 3-compliant sans-serif font is a special version of IBM3270 sans-serif font that conforms to the standard specified in ISO 9241-part-3. ISO-compliant video capabilities (video chips/adaptor and display monitor) are needed to display this font.
- The DIN 66234-compliant sans-serif font is the Euro style font that is capable of ISO 9241 Part-3-compliance when used with ISO-capable configurations.

2.2 3270 and 5250 Host Print Emulation

Personal Communications lets you direct print from both S/390 and AS/400 systems to your workstation. When you use a printer session, your workstation printer becomes a system printer.

- PC/3270 V4.1 printer support provides emulation of 3270 printers, such as the IBM 3287 Model 1 or 2, for local copy and host-directed printing.
- PC400 V4.1 printer support provides emulation of 3812 printer.

Local Copy / Print-Screen

Local copy, both user or host initiated, can be performed on a PC-attached printer. Users can get a full-screen print to the PC printer by using the local Print-Screen function. In addition, they can make a partial screen prints (trim print) using the Personal Communications trim function.

Note: Local copy to a 3174-attached printer is not supported.

Graphics Local Print-Screen

A graphical local Print-Screen function is included in Personal Communications for vector and raster graphics printing displayed in the workstation window. There are two print options available for:

- Scaling
- Black on white printing

Host-directed printing

For host-directed printing, Personal Communications supports both the 3270 printer data stream (LU3) and the SNA Character String (SCS) data stream (LU1). The user can preset the attached printer per SCS TRN (LU1) as he wants in PDT mode. But, when not in PDT mode, these capability depends on the Printer Device Driver in Windows or OS/2. After sending control data per SCS TRN, he can send data per SCS text to get desired print-outs.

Host Print Function by PDT/PDF

Printer Definition Tables (PDT) are included with the program for a large number of IBM and non-IBM printers. Refer to 3.1.4, "Printer" on page 66 for a list of those supported printers and drivers. The PDT is created by converting the printer definition file (PDF), which defines how characters and control codes are sent to the printer and how printer output is formatted (it let the user control EBCDIC to ASCII character conversion for example). Additional PDF can be created by using a text editor that produces an ASCII file or by modifying one of the PDFs provided. The Printer Table Compiler can be used to convert a PDF file to a binary PDT file. Both file formats are fully compatible among IBM's Personal Communications family.

Printer Translation Table

Each defined print session can have its own printer character and control string translation table so that a user may define which printer is to be supported by which print session. For printers having color print capabilities, the program is able to support seven color definitions. Underlined characters will be printed with underline if the printer is capable of underline support.

APL Character printing

When APL characters are printed, Personal Communications uses the APL fonts provided for displays because special APL characters are not provided for printer devices. Normally, display devices have lower resolution than printers. Therefore, Personal Communications provides a scalable APL font to print larger APL characters with higher resolution.

Print Function by OS/400 Host Print Transform

The Host Print Transform (HPT) function is provided by OS/400 V2R3 or later. It performs an SCS-to-ASCII transformation on the AS/400 according the model of printer that you want to use. Since the AS/400 does not generate an ASCII data stream, software products must transform AS/400 print data into an ASCII format. This transformation is also referred to as printer emulation for PC400.

PFT Migration Utility

The PFT Migration Utility converts the printer function table (PFT) for the PC Support/400 workstation feature to a printer definition file (PDF) for Personal Communications. The file name of the PFT Migration Utility program is **PCSPFC.EXE** and can be added to the **Personal Communications** folder/group as a **PFT Migration Utility** icon.

PC400 Virtual Printer

The Virtual Printer function lets the user attach a printer to an AS/400 as though it were directly connected to the workstation. This means that a LPT port can be assigned to an AS/400 attached printer, so that it can be used as a normal PC printer. A local port (LPT) needs to be connected with the Network Print Server transaction program, which is available with OS/400 Version 3 Release 1 or later. This virtual printer can print the following type of data:

- SNA Character String (SCS) data
- PC print data to SCS
- PC print data
- Printer device (OS/400 V3R3 or later)
- Spooled file (OS/400 V3R3 or later)

2.2.1 ZipPrint Utility

ZipPrint is a productivity tool for Personal Communications/3270 Windows and OS/2 environments; it allows you, from the session menu-bar, to print PROFS or OfficeVision notes, calendars, and documents, CMS files, XEDIT workspaces and host-session screens.

You must start ZipPrint before the session(s) in which you want to use it; you can do this manually or by including the necessary command in a batch file (refer to 8.1.3, "Customize a WorkStation Batch File" on page 169). When you start the session(s) for which you have specified ZipPrint, a ZipPrint item is added to the session menu-bar; this contains the following functions:

- **Print PROFS/OV Note**
When you are viewing a Note, this function prints the note from beginning to end, even if you are not currently viewing the first screen
- **Print PROFS/OV Calendar**
This function allows you to print the calendar when a PROFS (or OfficeVision) calendar is displayed.
- **Print PROFS/OV Document**
Prints the document that you are looking at
- **Print CMS File**
Prints a CMS file; you can type or paste the name of the file into the dialog-box
- **Print XEDIT Workspace**
Prints the XEDIT workspace that you are looking at; this can be a CMS Note, a reader-list, a file, etc

- **Print Screen**

This function allows you to print a quick draft-mode copy of the host-session screen.

- **Exit ZipPrint**

Ends all instances of ZipPrint and all sessions

By default, ZipPrint works only with session **a**. If you want it to work with other sessions, you must add a parameter to its command - for example, ZIPPRINT.EXE /abc to start it for sessions a, b and c.

2.2.2 DOS Printer Utility

A menu-driven, interactive DOS Printer Utility program is included; it provides the following functions for the Full-Function DOS mode of PC/3270 V4.1:

- View the current mapping of sessions to printers
- View the current mapping of sessions to printer tables/host code pages
- View the current status of the physical printers
- Remap sessions to printers and printer tables
- Change printer settings, such as characters per inch, lines per inch, form length and margins.
- Issue the host PA1 and PA2 functions, or Cancel Print to terminate a print job.

With this utility, you can dynamically remap a print session to another printer or to another printer definition table if unique print requirements arise. Printer management is provided, to allow multiple host and/or DOS print sessions to share a printer without collisions.

PC/3270 for Windows and OS/2 provide similar functions.

2.3 Utilities in PC400 V4.1 for Windows

PC400 V4.1 for Windows has four new utilities and the method of implementation of the two original utilities (Data Transfer and Shared Folders) has changed.

The new utilities are:

- PC Support/400 Router API
- Virtual Printers
- ODBC driver
- Database Access

The original Data Transfer and Shared Folders functions, together with the PC Support/400 Router API and Virtual Printers functions, are now implemented through a common interface known as AS/400 Utilities.

As a result of these changes, the Program Manager window includes three new icons - AS/400 Utilities, ODBC Driver, and Database Access; the Data Transfer and Shared Folder icons have been removed.

Router Sessions With PC400 V4.0 for Windows and with PC400 V4.0 and 4.1 for OS/2, you must configure a router session, which Data Transfer (and Shared Folders) will use to connect to the AS/400. You do this in the same way as you configure a display or printer session.

With PC400 V4.1 for Windows, however, it is no longer necessary to configure a router session (in fact, you cannot do so); you can use an existing display or printer session to provide the connection to the AS/400, or you can configure a connection through the utility itself. The first time you start any of the four AS/400 Utilities, you are asked what connection you want to use; this information is saved in a .INI file and subsequent invocations of the utility use the same connection automatically.

Note: None of these changes applies to the OS/2 version.

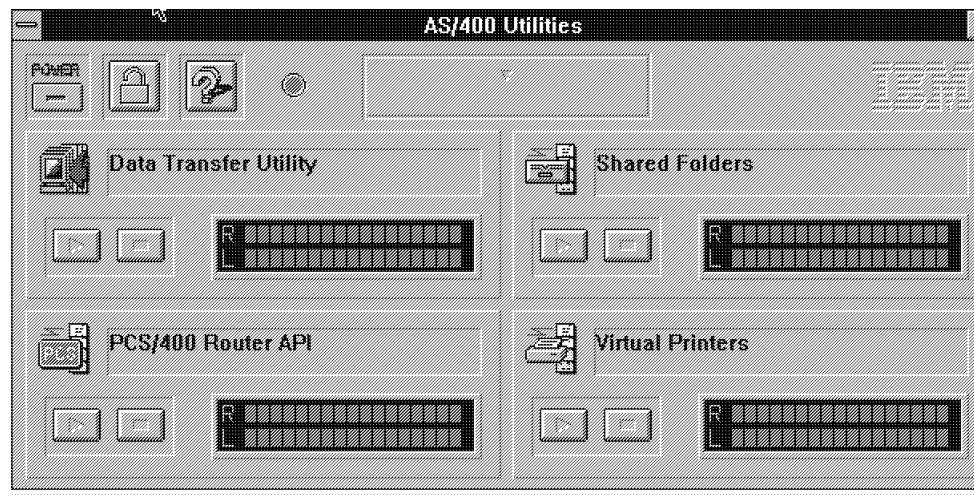


Figure 4. Personal Communications AS/400 Version 4.1 Utilities for Windows

2.3.1 AS/400 Utilities

The AS/400 Utilities main window lets you control four of the AS/400 utilities. It is intended to provide a graphical, and therefore easy, way of starting, configuring and stopping the utilities, though some aspects of it are confusing; all its functions are described in the Help.

If, having started the utility you want to use, you minimize the window, you will see instead a small window that contains seven icons, one for each utility and one each to stop or start all the utilities, to lock the functions, and for Help. You can control the utilities through this window. You are recommended to minimize the main window because its 'stereo system' lights detract from the performance of the system.

There is a third panel, called the AS/400 Utilities Control Panel, which lets you control the utilities from the keyboard. You can open this panel by clicking the system menu at the top left of the main panel, then choosing the Control Panel.

The four utilities that are controlled by this interface are :

Data Transfer

Lets you exchange data, at the field or record level, between one or more AS/400s and your workstation. This is *not* the same as File Transfer.

Note: You can also run Data Transfer from the Transfer item on the session menu-bar. By default, this item controls File Transfer but you can change it by choosing Transfer - Setup - Data Transfer Function; the Send File and Receive File items (or tool-bar icons) then produce the appropriate Data Transfer panels.

Shared Folders

Lets you store and share PC files in AS/400 folders by assigning an unused workstation drive to a folder.

PCS/400 Router API

Lets you establish a link to one or more AS/400s so that you can run, from the DOS prompt, applications that were written to use the PC Support/400 Router API.

Virtual Printers

Lets you use AS/400-attached printers to print workstation files. You can control the printers from your workstation.

2.3.2 ODBC Driver

Open Database Connectivity (ODBC) is a standard interface, proposed by Microsoft, for SQL database access among different systems. It consists of an ODBC driver manager and a set of ODBC drivers, which enable you to access databases from ODBC applications, using SQL. The ODBC driver is a dynamic link library (DLL) that an ODBC-enabled application, such as Microsoft Excel, can use to gain access to particular data sources. Each database management system (DBMS), such as IBM DB2 or Microsoft SQL Server, requires a different driver.

Once an ODBC driver is installed, you can define one or more data sources for it. The data source name should provide a unique description of the data. The data sources that are defined for all the currently installed drivers are listed in the Data Source (Driver) list.

2.3.3 Database Access

In addition to the ODBC driver PC400 V4.1 for Windows provides a PC400 Database Access tool. This is a query tool that lets you to access a host or workstation database and get data, using ODBC drivers. By choosing the PC400 **Database Access** icon, you can easily create and run the query that meets your requirement. If you define the conditions for accessing a database, and if you set up the command for data processing in the respective windows, the SQL statement is created automatically.

The following are the PC400 Database Access highlights:

- From any window, you can see and modify the SQL statements that are created automatically
- You can see the available database table lists
- You can put data into the main-window spreadsheet, into other applications, such as Lotus 1-2-3 or Microsoft Excel, or can send data to a printer.
- If you want to know the meaning of items in the windows, you can click the item to see an explanation.

2.4 Transferring Data between Workstation and Host

Personal Communications provides several functions and user interfaces for transferring data between workstations and hosts. Both PC/3270 and PC400 have a *File Transfer* function; PC400 also has a function called *Data Transfer*. The differences are as follows:

File Transfer

For both PC/3270 and PC400, this lets you exchange whole files with the host; it requires a file-transfer program (described later) to be installed on the host system. You can run file transfer from the menu-bar, from the tool-bar or with a macro.

Data Transfer

For PC400 only, this lets you send to or receive from the host *parts* of files - for example, fields or records selected according to criteria that you specify (though you can transfer whole files by not setting any selection criteria). Data Transfer needs PC Support/400 or Client Access/400 to be installed on the AS/400. You can start Data Transfer from the AS/400 Utilities panel or from the menu-bar or the tool-bar.

2.4.1 File Transfer - General

You can send files to, or received from, host systems that are running VM/CMS, MVS/TSO, MVS/CICS, OV/MVS, VSE/IWS or OS/400. Depending on the mode of operation, you can do file transfer as follows:

- The 3270 file-transfer commands SEND and RECEIVE can be invoked on the DOS or OS/2 command line
- DOS users can also transfer files using the menu-driven 3270 File Transfer Utility.
- OS/2 and Windows users can do file transfer functions through the session menu-bar or tool-bar.

Translation Tables Personal Communications for the Windows and OS/2 environments let you easily create or modify the translation table that converts PC (ASCII) codes to host (EBCDIC) codes; you can do this separately for the send and receive directions. The default tables depend on the workstation and host-system code page that are customized.

Templates define the rules which govern the way in which a the name of a workstation file is used to create a host file name (SEND), or vice versa (RECEIVE), and the type of transfer to be used (Text, Binary, Append etc). When you enter the name of a file to be transferred, it is scanned by the relevant send or receive templates for as close a match as possible to the source-file name, and a workstation or host file-name and a transfer type are generated. Several templates are provided; you can create your own and can change the sequence in which they are scanned.

Miscellaneous Settings. This is one of the items in the File Transfer pull-down menu; it allows you to change such things as the timeout value for host response, the number of characters to be in each packet transferred, the PC code-page, etc.

2.4.2 3270 File Transfer

Host computers that use CMS, TSO, or CICS system software, and have the required file transfer program installed, support file transfer through 3270 terminal emulation; this transfer is always initiated from the workstation. In addition, OfficeVision/MVS provides a different kind of file transfer, initiated from the host.

File transfer uses an emulator session to transfer a file; you must be logged on to the emulator session that you want to use for the file transfer. File transfer has exclusive use of the session, so you cannot interact with a host application while file transfer is running.

The SEND.EXE and RECEIVE.EXE programs provided as part of Personal Communications interact with the appropriate host IBM 3270-PC File Transfer Program:

IND ϕ FILE

For SBCS-mode file transfer, you need one of the following host programs, commonly referred to as IND ϕ FILE:

- IBM 3270-PC File Transfer Program, 5665-311 (MVS/TSO)
- IBM 3270-PC File Transfer Program, 5664-281 (VM/SP 2.1)
- IBM CICS/VS 3270-PC File Transfer Program, 5798-DQH (CICS/MVS 1.5)

APVUFILE

For DBCS-mode file transfer (Japan, China, Korea and other countries), you need one of the following host programs, commonly referred to as APVUFILE:

- IBM VM/CMS File Transfer Program, 5799-BWK
- IBM MVS/TSO File Transfer Program, 5799-BWJ
- IBM CICS (MVS, VSE) File Transfer Program, 5799-BWL

2.4.3 5250 File Transfer

APVAFILE

PC400 File Transfer is designed so that a user can easily transfer a file if he knows the library name and file name. It is not suitable for complicated processing, such as the manipulation of an AS/400 database on a workstation and then returning the results to the AS/400.

For 5250-session file transfer, the following program, commonly referred to as APVAFILE, must be installed on the AS/400:

- Personal Communications Tools, program number 5622-976
 - 8mm tape 46H8350
 - 1.5in tape 59H2018
 - 1.25in tape 59H2019

2.4.4 ALMCOPY and ACPM (PC/3270 OS/2 only, VM only)

Personal Communications/3270 ALMCOPY is a fast file transfer program allows you to send single or multiple files to and from a VM system, using wildcard-matching schemes or a control file containing a list of the files to transfer. It is not a batch-file generator, but it is a fully cooperative application which uses a low-level API to achieve its functions. ALMCOPY is supported only for VM systems, not for TSO or CICS systems.

A Presentation Manager user interface panel (called the ACPM) is provided; this makes it easier to specify parameters and invoke ALMCOPY.

ALMCOPY is installed during the Personal Communications installation process, and the corresponding icons for ALMCOPY are added to the Productivity Tools folder.

The major features of ALMCOPY let you:

- Transfer files to/from the VM system using wildcard characters
- Transfer files by list processing
- Eliminate duplicate-file-name conflicts
- Specify a flexible target file name automatically
- Transfer the file package
- Check the file sent by the previous command
- Back up the files in the PC to a VM system
- Provide national language support (NLS) for data translation and file naming

2.4.5 OfficeVision/MVS Import/Export Functions

The Import/Export function exchanges documents with OfficeVision/MVS on the host system by using the controls defined by the file transfer services of the Document Interchange Architecture (DIA).

OfficeVision/MVS is a menu-driven office system communication program that runs under the IBM Customer Information Control System (CICS) application program. It allows IBM 3270 terminals to exchange documents with IBM products that use the Distributed Office Support System (DISOSS). A Personal Communications/3270 user can:

- Write a host-produced file to a PC medium (Export)
- Receive a PC file (Import)

Import/Export is initiated from the host program, not from a PC program.

2.4.6 PC400 Data Transfer

The data transfer function, like Shared Folders and PC Organizer, was originally a PC Support/400 client function. Data transfer is a SQL-based transfer, that allows the selective transfer of data between the workstation and the AS/400. Sources like programs, records and the information listed below can be transferred:

- Information organized for analysis
- Information used for decision making
- Information suited for computer processing

Data Transfer can be classified according to how the program is started, as follows:

- Data is transferred by interactively entering information. In this case, the window for sending is called the PC→AS/400 Transfer window and that for receiving is called the AS/400→PC Transfer window.
- Data is transferred according to information that has already been saved in a file, so the interactive window is not necessary.

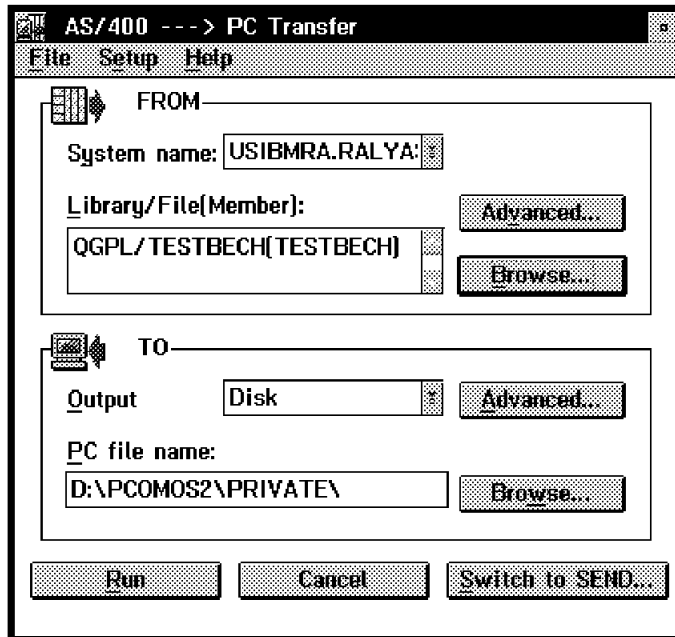


Figure 5. PC400 Data Transfer

To use Data Transfer, one of the following programs is required on the host system:

- AS/400 PC Support Version 2.0 or later, 5738-PC1
- AS/400 Client Access Version 3.0 or later, 5763-SS1

Note: The data-transfer panels have been improved in PC400 V4.1 for Windows

2.4.7 Shared Folders (PC400 only)

The Shared Folders function allows information in AS/400 folders to be shared with a PC400 workstation. This increases the storage space available to the workstation.

You can assign any unused PC drive-letter to a folder, though only 8 can be assigned at one time. You can then treat the folders as if they were PC drives, with some restrictions as to the PC commands that you can use, and with less good performance than you would get on a real PC drive.

Note: PC files stored in AS/400 folders are not converted to AS/400 format, so they cannot be used by AS/400 applications.

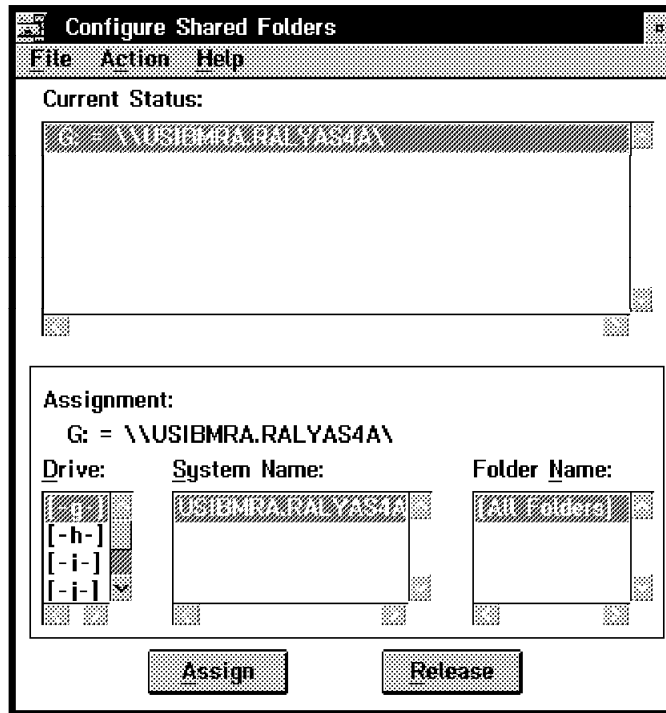


Figure 6. PC400 Shared Folders - for OS/2

2.5 GDDM Host Graphics (3270 only)

Host-graphics support is provided by all members of Personal Communications family for the IBM Graphical Data Display Manager (GDDM) application; in the Windows and OS/2 versions, support is also provided for non-GDDM applications from other manufacturers. You can use graphics in any display session (except with the IBM Global Network and Home3270 asynchronous connections).

Graphics support is built into the Windows and OS/2 versions of PCOMM but the GDDM-PCLK program is required for the DOS versions.

2.5.1 GDDM-PCLK for DOS Mode

To use host graphics with for DOS (Entry-Level Mode) and for DOS (Full-Function Mode), you must install IBM GDDM-PCLK Version 1.1 (PCLK), which you have to buy separately. This PC application, when paired with the GDDM host program, allows you to interact with GDDM to display, print and plot host graphics.

The GDDM-PCLK program uses low-level API calls to provide graphics support. The API is built into the Entry Level DOS program but, for Full-Functions DOS, you need either of the following two modules:

PCSLAPI Standard low-level API calls

PCSPCLK Special 'turbo' -version of the low-level API. It provides enhanced performance and usability.

Notes: While a graphics session under PCLK is active:

- If PCSPCLK is configured, you cannot run PCSLLAPI at the same time.

- If you try to hot-key to a 3270 display session, PC/3270 will perform a mode check; you will hear a beep and will remain in the PC session.
- If a second display is attached, the host display session(s) may be assigned to the second display. With this configuration, the user is able to switch between the PCLK graphics session and the 3270 display session(s).

2.5.2 GDDM Graphics Support for Windows and OS/2

Personal Communications/3270 for the Windows and OS/2 environments allows you to use host-graphics applications such as GDDM and others. There are two type of graphics and protocol supported.

- **Vector Graphics**
 - Native protocol - to be used for older GDDM versions or non-GDDM host graphics applications.
 - Advanced protocol - to be used for GDDM V2R3 or later. This is equivalent to OS/2-Link and previous PC/3270 versions.
- **Programmed Symbols**
 - This has been added to PCOMM for OS/2 in version 4.1 and was available in PCOMM for Windows from version 4.0
 - Up to 6 sets of triple-plane symbol-sets are available

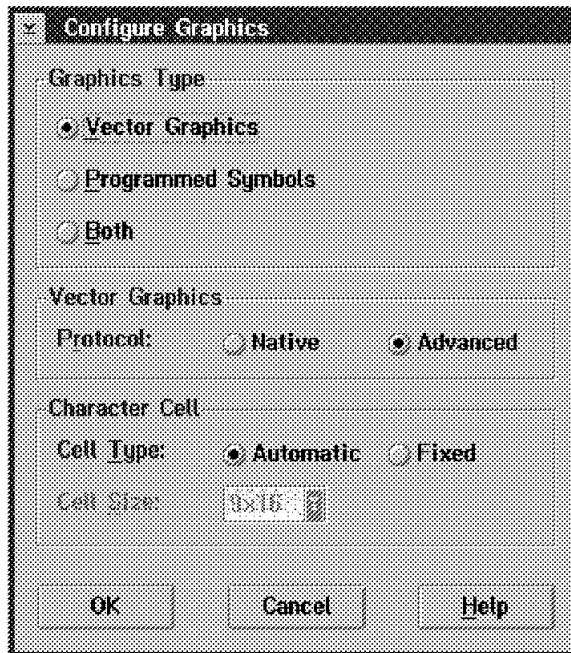


Figure 7. Personal Communications Graphics Support

The following functions are supported:

- Multiple, mixed alphanumeric and graphic host sessions
- Use of print and plot facilities
- Creation of PIF (Picture Interchange Format) files
- Clipping graphics images into the clipboard

Note: If you do not intend to use graphics applications, do not choose Enable Host Graphics because some old host applications, which do not support graphics, may hang when a graphics terminal is connected to them.

In addition, it will save memory and other system resources if the graphics modules are not loaded.

2.6 Connectivities and Protocols

Personal Communications's versatile connectivity provides great flexibility to new and established S/390 and AS/400 customers in expanding LAN/WAN network capabilities, and in allowing workforce mobility with asynchronous and wireless communications. Advanced networking capability is provided by Advanced Peer-to-Peer Networking (APPN) end-node support, High Performance Routing (HPR), and Dependent LU Requester (DLUR). The tables Table 4 on page 17 and Table 7 on page 25 show you all the connection possibilities of the product in an overview. The following sections summarize the most important connection-types.

2.6.1 APPC3270 - 3270 over APPN Networks

Thousands of networks use SNA LU2 protocols for 3270 terminal emulation. Applications are being developed that run over APPN networks, which are more flexible in their layout and easier to maintain than traditional SNA networks. APPC3270 provides a migration path from LU2 to APPC and client/server computing.

The APPC3270 attachment was first provided with PCOM for OS/2 V4.0; it has now been added to PCOM for Windows V4.1. PC/3270 V4.1 for OS/2 also allows you to use CM/2 or the OS/2 Access Feature if you want to use APPC or CPI-C APIs for user-defined applications at the same time.

The following attachment types are possible with APPC3270:

- APPC3270-via-LAN attachment
- APPC3270-via-SDLC attachment
- APPC3270-via-CM/2 attachment (for OS/2 only)

Note: OS/2 Access Feature requires approximately 3 MB RAM for an APPC, LUA, or DLUR configuration.

For the APPC3270 connection, host computers require the following:

- ACF/VTAM V4R2 for MVS/ESA (5695-117) or
- ACF/VTAM V4R2 for VM/ESA (5654-010) or
- The APPC Application Suite for earlier releases of MVS or VM

2.6.2 Dependent LU Requester (DLUR)

Dependent LU Requester (DLUR) in conjunction with VTAM's Dependent LU Server (DLUS) function, enables dependent LUs (LU 0, 1, 2, 3 and dependent LU 6.2) to operate in an APPN network, without the need for change to the applications that use them. The DLUS establishes an LU 6.2 session with, and provides SSCP services to, the DLUR node; it resides in a Network Node that contains the SSCP function, such as:

- ACF/VTAM V4R2 for MVS/ESA (5695-117) or
- ACF/VTAM V4R2 for VM/ESA (5654-010)

SSCP/-PU/LU flows are encapsulated in a LU6.2 pipe between a DLUS and DLUR.

With the introduction of DLUS/DLUR, dependent applications, such as 3270 sessions, no longer have to reside in the domain that contains the SSCP function; the PLU (dependent application) may now get to the SLU (secondary logical unit) through the APPN network. The dependent LUs will locate each other in the APPN network via LU names.

The OS/2 Access Feature with PCOMM for OS/2, and PCOMM for Windows 95, provide DLUR support for downstream workstations. The Communications Server Version 4.0 gateway provides any number of dedicated PUs to be defined on the LU 6.2 sessions as well as network management access through the dedicated PU to downstream workstations.

DLUR allows customers to protect their investment in 3270 emulation and other dependent LU applications while migrating new applications to LU 6.2 and APPN.

2.6.3 LAN Connection via 3174 Peer Communication

The 3174 Peer Communication attachment provided for PC/3270 V4.1 allows a coax-attached workstation to behave as if it were directly attached to a token-ring network; the workstation uses the IEEE 802.2 protocol to communicate with other:

- Workstations coax attached to ports on the same 3174
- Workstations attached to the same token-ring as the 3174
- Workstations attached to a different 3174, which is itself attached to the same token-ring
- Other SNA gateways on the same token-ring as the 3174

When using 3174 Peer Communication, a peer workstation acts as if it were attached to a logical token-ring inside the 3174. In addition, a logical bridge inside the 3174 can be enabled to allow the internal logical ring to be bridged to an external physical ring.

For PCOM for Windows, you must install the 3174 Peer Communications NDIS Driver for DOS, IBMXLN.DOS, which is available from IBM bulletin boards. This is a NDIS MAC driver that makes a coax adapter look like a LAN adapter; it runs with LAN Support Program to provide the necessary protocol stack.

The 3174 Peer Communications NDIS Driver for OS/2 is part of Multi-Protocol Transport Services (MPTS), which is provided with LAN Server V4.0, OS/2 Warp Connect and Warp Server Version 3.0.

AS/400 users can connect via 3174 Peer Communications by using the normal LAN via IEEE802.2 attachment with Personal Communications AS/400 Version 4.1. The AS/400 must be connected to the token-ring network where the 3174 Establishment Controller is attached.

Note: This works but is not a supported connection.

2.6.4 IPX/SPX for NetWare for SAA

Novell's NetWare for SAA gateway allows workstations which are using Novell's IPX/SPX protocols to connect to IBM S/390 and AS/400 hosts. Personal Communications can attach to a NetWare-for-SAA gateway via Token-ring, Ethernet or PC Network.

Between a NetWare-for-SAA gateway and Personal Communications, Novell's IPX (Internetwork Packet Exchange) and SPX (Sequenced Packet Exchange) protocols are used for the lower communication layers, and the QEL/MU (Queue Element/ Message Unit) message format is used instead of SNA-defined formats (PCOM provides the necessary QEL/MU modules).

There are some specific requirements for the NetWare-for-SAA attachment:

- A NetWare Requester (Client) must be installed; this is to provide the necessary protocol stack and so that you can log in to a server to establish the connection. The Requester can be provided by Novell or, for OS/2, it can be the one provided as part of Warp Connect.
- For Windows, NWIPXSPX.DLL must reside in the Windows\System directory

PC400 V4.1 for Windows can use the NetWare-for-SAA router function to connect to an AS/400; you must choose the PC Support/400 Router attachment for this connection. Only 5250 emulation is supported - you cannot use Shared Folders, Data Transfer, ODBC or Virtual Printers.

2.6.5 Windows NT SNA Client (FMI)

The Windows-NT SNA Client (FMI) attachment allows PC/3270 to connect to the host through a Microsoft SNA Server. Your workstation must be running Microsoft Windows for Workgroups V3.11 and the SNA Client for Windows must be installed. The Microsoft Networking (NETBEUI) driver, Microsoft IPX/SPX or the Novell Requester are necessary so that you can connect to the server.

PC/3270 can have a maximum of ten sessions through this attachment.

There is no support for PC400.

2.6.6 TCP/IP

TCP/IP (Transmission Control Protocol/Internet Protocol) is a set of communications protocols, and has become a de facto standard in the industry. The term TCP/IP represents an ever-growing collection of protocol standards, defining, for instance, how to transmit data from one point to another (TCP), or how to route data within the network (IP), as well as higher-level application protocols providing functions like file transfer (FTP), mail (SMTP), virtual file system (NFS), remote logon (TELNET), remote printing (LPR), remote execution (REXEC), network management (SNMP) and so on.

TCP/IP provides connectivity functions for both local area networks and wide area networks, and includes the capability to route information between LANs and WANs. A standardized addressing scheme is used on the major TCP/IP network, that is, the Internet, to ensure uniqueness of IP addresses and communications between enterprises.

TCP/IP is a peer-to-peer network architecture in which all hosts have similar network characteristics. Some hosts have greater application functionality than others but all hosts are peers from the network's perspective. A workstation running Personal Communications is regarded as one of those hosts.

TCP/IP protocols are based on a client-server model. The client end of the conversation asks for a service to be performed on its behalf. The other end of the conversation is the server, which performs or responds to the request and provides the service. Personal Communications acts as a Telnet3270 or Telnet5250 client in the TCP/IP environment.

PCOMM V4.1 (PC/3270 and PC400) TCP/IP support requires one of the following TCP/IP programs to be installed:

- PCOMM for Windows or DOS
 - IBM TCP/IP for DOS Version 2.1.1.4 or later
 - PC/TCP from FTP Software Inc
 - Microsoft TCP/IP
 - Chameleon from NetManage
 - Novell LAN Workplace
 - Trumpet Software's TCP/IP
- PCOMM for OS/2
 - IBM TCP/IP Version 2.0 for OS/2 (CSD level UN64092 or later)
 - OS/2 Warp Connect Version 3.0 or later

PCOMM's features and functions when connected by TCP/IP are much the same as for other connection-types. However, some new capabilities have been added in Version 4.1:

- TN3270E support according to the specifications of RFCs 1646 and 1647
 - 3287 printer emulation for LU1 and LU3
 - Ability to specify an LU name in the PCOMM configuration panel
 - Access to SNA bind information
 - Support of the ATTN and SYSREQ keys
 - Handling of positive and negative responses from the host
 - Support of structured fields
 - Optional automatic reconnection of the Telnet session if it is broken

Note: The TN3270E support requires a TN3270E server between the workstation and the host. The servers supported are Brixton PU2.1 v3.0 (for RFCs 1646 & 1647) and Open Connect Server II (for RFC 1646 only).

2.6.7 AnyNet

AnyNet enables application programs to communicate across networks that are interconnected but are of different kinds, such as SNA and TCP/IP. Using AnyNet can reduce the number of transport networks without the need to modify existing programs or hardware.

The AnyNet product family, using the Multiprotocol Transport Networking (MPTN) architecture, allows for fully integrated communication among mixed-protocol networks. MPTN is an open architecture for multiprotocol networking.

AnyNet Support Provided by Personal Communications

AnyNet support has been added to Personal Communications for Windows or OS/2 in Version 4.1.

For OS/2, PCOMM's AnyNet support is provided by the OS/2 Access Feature (which is shipped with PCOMM), so the function available is determined by the Access Feature.

For Windows, PCOMM's AnyNet support is provided by AnyNet SNA over TCP/IP for Windows, which is shipped with PCOMM. This is a special version of AnyNet that does not have Sockets-over-SNA capability.

SNA over TCP/IP With SNA over TCP/IP support, APPC and dependent-LU applications (such as display or printer emulation) running on a TCP/IP network can connect from to a host which is on a SNA network. With PCOMM, this is achieved in one of two ways:

- For 3270 emulation, PCOMM must connect to the host through an IBM Communications Server v4.0, configured as an AnyNet gateway; PCOMM cannot connect directly to the host. The reason for this is that the AnyNet connection requires DLUR/DLUS function to carry the dependent-LU traffic, and PCOMM does not DLUR support; so the DLUR support is provided by Comm Server.
- For 5250 emulation, PCOMM can connect directly to the AS/400, which must be configured to support an AnyNet connection.

One of the following TCP/IP programs is needed to support the AnyNet attachment for Windows:

- IBM TCP/IP for DOS Version 2.1.1.4 or later
- PC/TCP from FTP Software Inc
- Microsoft TCP/IP
- Chameleon from NetManage
- Novell LAN Workplace

2.6.8 3270 PassThrough via AS/400

Personal Communications/3270 Version 4.1 can be connected to a S/390 host system via one or more AS/400s by using the 3270 passthrough function of the AS/400 (available for OS/400 Version 2 Release 2 or later). Since the 3270 passthrough function allows LU 0, 1, 2 or 3 data to be passed through AS/400s, a PC/3270 V4.1 user can make use of applications that reside in an S/390 as if the workstation were directly connected to it.

Three types of connection are possible:

- LAN via IEEE 802.2
- SDLC
- Twinax (TDLC)

Descriptions for the line, the controller and various devices must be defined in the AS/400 for both the upstream and the downstream links. Please note that some of the descriptions related to the 3270 pass-through function cannot be automatically created by the auto-configuration function; please ask your system administrator how to define the descriptions.

2.6.9 PC Support/400 Router

PC400 V4.1 for Windows can use the PC Support/400 or Client Access/400 DOS extended router function to connect to the AS/400 system (available for OS/400 Version 2 Release 2 or later). The only information you must enter is the AS/400 system name, so it is very easy to configure. You might want to use this attachment if you must run PCOMM at the same time as applications that need the router.

This attachment can also be used to connect to a NetWare-for-SAA gateway (IPX/SPX) with the NetWare Router.

2.6.10 Asynchronous Communication

Many improvements have been made to the asynchronous communication support in Personal Communications Version 4.1, including the support of many extra modems and of new functions provided by recently-announced modems. Some of the new modem functions allow the connection to be established with greater speed and increased reliability, while facilitating the dialing process. The following are the main enhancements:

Improved performance (PCOMM for Windows)

Up to PCOMM Version 4.0, all the asynchronous attachments communicated directly with the COM port hardware; this meant that performance and port speed were restricted and that they needed terminate-and-stay-resident (TSR) modules. In Version 4.1, all the async attachments except Hayes AutoSync use a virtual device driver, IBMVCD.386; the result is that TSRs are no longer needed and that the port speed can be up to 57,600bps. There are two exceptions to this:

- Hayes AutoSync cannot use a VCD; this is because the protocol uses parity and framing errors between the modem and the PC but Windows does not provide an interface for applications to detect these. As a result, PCOMM must continue to use a TSR and to address the COM port directly.
- Shared Folders cannot use the VCD because its IFS driver has a loop in it that causes the VCD to abend. So that PCOMM can continue to support Shared Folders over a SNA-over-Async attachment, the Version 4.0 implementation has been retained and is available as a separate attachment in the Customize Communication panel (Shared Folders requires an APPC link to the AS/400, so the other async attachments do not support it).

FIFO use

The COM ports in newer PCs have FIFO capability. This allows Personal Communications to work at data rates of over 38400 bps, provided the modems comply with CCITT V.32bis and/or V.42bis.

CCITT V.32bis support

The CCITT V.32bis standard (recommendation) is an enhanced version of V.32. A modem conforming to V.32bis allows full-duplex operation up to 14400 bps over dial-up or leased lines. It also allows communication with a V.32 modem at 4800 or 9600 bps speed.

Personal Communications will support various V.32bis modems if a type-2 (or better) COM port (equipped with FIFO queues) is available.

CCITT V.42bis support

CCITT V.42bis is an international standard protocol for up to 4:1 compression and decompression using BTLZ.¹

Personal Communications will support various V.42bis capable modems if a type-2 (or better) COM port is available.

¹ British Telecom modified Lempel Ziv.

Auto dial/Automatic Access Utility

The following improvements have been made in Version 4.1 to attachments that use the dial function:

- Improved auto dial customization (ease of use)
- Setup for quick-dial and dial without disconnection
- Idle time out
- Support for V.42bis modem with data compression
- Setup for dial mode, speaker volume, modem-operational mode, and auto-answer mode
- The phone numbers of IBM Global Network gateways throughout the world are included and are available when you choose the appropriate country
- Display of a descriptive title with the phone number
- Easy selection of a backup phone number
- Additional modem support

For more detailed information refer to the ITSO document:

*Personal Communications for Mobile Users
PCOMM 4.1 for DOS/Windows, OS/2, SG24-4456.*

2.6.11 Synchronous Communication

The Personal Communications family provides synchronous connection to S/390 and AS/400 host systems; you can make an SDLC attachment on dedicated (non-switched) or dial-up (switched) communication lines through modems. Switched connections let you connect to different networks and host systems; you must dial the telephone number of the relevant computer system.

For the SDLC attachment, a line speed of up to 19,200 bps is supported. However, the actual line speed will vary with the adapter version and machine performance. If an SDLC attachment fails at the specified line speed, reduce it.

SDLC connections can be used in a variety of ways:

- SDLC connections to S/390 and AS/400
- 3270 Pass-Through via AS/400 to S/390
- APPC3270 via SDLC connecting SNA Network to S/390

SDLC Auto-dial (V.25-bis)

Personal Communications supports CCITT V.25bis automatic dialing for SDLC connection; the V.25bis commands supported are described in the online Help. The user interface for dialing is almost the same as that of asynchronous communications in PC/3270 V4.1.

For more detailed information refer to the ITSO document:

Personal Communications for Coax, LAN and WAN Users, SG24-4688.

2.6.12 ISDN connections with WaveRunner

Integrated Services Digital Network (ISDN) is a network architecture that uses digital technology to support integrated voice, data and image applications through standard interfaces over normal telephone lines served by digital switches. ISDN is a major advance in telecommunications technology that provides three information-bearing channels on a single line for simultaneous transmission of voice, data, and image at high quality and high speeds.

The IBM WaveRunner ISDN and Analog Modem is an adapter that provides a digital connection to a PC for communications over an ISDN with other ISDN devices, at speeds up to 64Kbps; it can also communicate through ISDN to analog modems and FAX machines connected to an existing telephone network. Unique to the design of the WaveRunner is its ability to communicate with devices attached to an existing analog telephone line via conventional modems as well as with those that are directly attached to an ISDN line.

Personal Communications for Windows or OS/2 can use the IEEE 802.2 LAN attachment to communicate through the WaveRunner NDIS driver and the WaveRunner dialer function to an IBM Communication Server Gateway or Network Node, or to an IBM 7820. The OS/2 Access Feature can directly communicate over ISDN, using SNA phone connect for SDLC, IDLC and X.25 protocols to the S/390 or AS/400. It provides direct ISDN connectivity for Personal Communications AS/400 and 3270 Version 4.1 for OS/2.

ISDN connectivity for PCOM users is also available by using LAN Distance or the IBM 8235 Dial In Access. Both products allow you to use peer networking to access resources on a remote LAN in order to communicate with a S/390 and/or AS/400.

2.6.13 ATM (LAN emulation)

Personal Communications Version 4.1 can take advantage of the Asynchronous Transmission Mode (ATM) network through the use of the 25Mbps or 100Mbps ATM adapter's LAN Emulation function.

ATM LAN Emulation supports clients and servers in a PC environment. With these products and the IBM 8282 ATM Workgroup Concentrator, IBM has enabled ATM at the desktop in a cost-effective manner so that customers can migrate their workgroup to ATM in accordance with their needs and resources. This protects the customer's application investment and allows PCOM users to communicate with S/390 and AS/400.

2.7 SNA Data Compression/Decompression

PC/3270 V4.1 supports SNA data compression (length-checked compression LCC), which is often used in SNA networks. It is especially used when line speeds limit application throughput and the costs (typically CPU cycles and storage) of compression are paid for by the resulting benefit.

Data compression should not be blindly used on every session. It should be used only for sessions on which some combination of the following benefits outweighs the cycle and storage costs:

- Better response time on lower-speed lines
- Lower line costs under tariffs based on volume of data

- Reduction in the number of lines needed

SNA data compression is not supported for non-SNA DFT, Control Unit Terminal, Home3270, Telnet, IPX, IBM Global Network or Hayes AutoSync connections.

2.8 Personal Communications/3270 Gateway

Personal Communications/3270 for DOS (Full-Function Mode) can function as a gateway as well as a workstation (or as a combined gateway/workstation). The gateway supports up to 254 downstream stations that must connect to it by the IEEE 802.2 protocol.

The gateway can connect to a System/390 host by IEEE 802.2, X.25, SDLC or SNA DFT. It supports up to 253 display or printer sessions, when the gateway is connected via IEEE 802.2, SDLC or X.25 but only five when attached via SNA DFT. Only one host attachment is allowed at a time.

A gateway can have token-ring, PC Network or Ethernet adapters; up to two, in any combination, can be used to connect downstream stations, one of these also being used for the upstream link. The IBM LAN Support Program Version 1.3x is required.

The gateway provides session management through the use of logical units (LUs). These LUs correspond to the host sessions that the gateway distributes to the workstations on the LAN. The gateway allows workstation LUs to be categorized as one of three types: local, pre-allocated or pooled (20 pools), as follows:

- Local LUs are assigned to the gateway
- Pre-allocated LUs are assigned to a specific workstation
- Pooled LUs allow multiple workstations to share a pool of assigned sessions, thus requiring fewer host sessions to support many casual users with similar or identical host requirements

PC/3270 V4.1 can be configured as a dedicated gateway or as a gateway with local LU sessions. The local LU sessions are allocated to the gateway in the same way as LU sessions are allocated to the attached workstations. Each LU allocated to the gateway for a local session reduces the number of LUs available for the attached workstations.

A Gateway Status Utility is provided to assist in gateway management and diagnostics. It is also used to terminate the gateway functions when desired.

Support is provided for workstations using 3270 terminal emulation functions, as follows:

- Personal Communications/3270 (all versions)
- Communications Manager/2 V1.0 and later
- Communications Manager of OS/2 Extended Edition V1.3 or Extended Services V1.0
- PC 3270 Emulation Program Version 3.05
- 3270 Workstation Program Version 1.12
- IBM Networking Services for DOS or APPC/PC
- IBM Networking Services for Windows

- OEM products can connect as long as they are LU 1, 2, 3 or dependent 6.2 types and can use the IEEE 802.2 protocol

2.8.1 Self-Defining Dependent Logical Units (SDDL U)

PC/3270 V4.1 supports the Self-Defining Dependent Logical Unit (SDDL U) function of ACF/VTAM Version 3 Release 4.1 (MVS) or ACF/VTAM Version 3 Release 4.0 (VM) for Dynamic Definition of Dependent LUs. SDDL U provides the ability to dynamically create dependent LUs on predefined PUs and to reconfigure dependent LUs without interruption to any other user on the network or intervention by system programming or operations staff.

This capability lets you predefine the characteristics of your workstations to installation standards down at the control unit or workstation level, if necessary, while maintaining the ability to tailor particular workstations to individual needs. It also allows you to relocate workstations or add new workstations without network programmers being required to define each workstation to the network. This architecture requires no change to the current environment.

2.9 Network Management

For those workstations connected directly to an IBM 3174 Establishment Controller as a CUT or DFT terminal emulation, the following network management benefits are supported:

- Vital Product Data, including machine type, model and serial number
- Extended Vital Product Data, which lets users decide what information is valuable to them for asset management and allows users to enter the data via a menu
- Response Time Monitor, which allows users to perform response-time measurements and display the measurements for network analysis purposes
- Standard Operator Information Area (OIA) symbols, which simplify the job of Help Desk personnel
- Network management alerts, which pass error conditions and information to the host.

2.10 Programming Interfaces

Personal Communications supports the following application programming interfaces:

- Emulator High-Level Language Application Programming Interface (EHLLAPI) (16-bit for DOS and Windows, 16- and 32-bit for OS/2)
- Personal Communications API (PCSAPI)
- Dynamic Data Exchange (DDE)
- Use of the DDE function by Visual Basic (for Windows only)
- Use of the EHLLAPI function by REXX (for OS/2 only)
- Use of DOS EHLLAPI applications in Windows and OS/2
- Server-Requester Programming Interface (SRPI) (32-bit for OS/2)
- 32-bit LU Application (LUA) (for OS/2 only)

- Low Level Language Application Programming Interface (LLAPI)

In addition to these, APPC and CPI-C programming support is offered by the OS/2 Access Feature and by APPC Networking Services for Windows.

2.10.1 EHLLAPI and DDE

EHLLAPI and DDE can be used to provide interaction between PC application programs and host sessions.

PC/3270 V4.1 for Windows also offers a powerful Dynamic Data Exchange (DDE) programming interface that allows applications to make use of the Microsoft Windows 3.1 programming environment by linking PC and host applications.

In Windows and OS/2, you can use both EHLLAPI and DDE interfaces; in DOS mode, there is no DDE interface. In Windows and OS/2, a dynamic link library (DLL) provides an interface between your application and EHLLAPI/DDE. In DOS, a language interface module provides an interface between your application and the EHLLAPI.

2.10.2 SRPI

SRPI provides an application programming interface that allows the PC programmer to issue requests for service and to receive replies from IBM host systems running TSO/E in MVS or VM/CMS. The interface supports programming statements in high-level programming languages and/or Macro Assembler language. Combined with IBM Enhanced Connectivity Facilities (ECF) Servers and Requesters, Version 1.1 and later, the SRPI lets you access IBM System/390 resources, such as host system disk space and high-speed printers, by means of familiar PC commands.

2.10.3 PCSAPI

PC/3270 V4.1 and PC400 V4.1 provide another API set called Personal Communications API (PCSAPI). Where EHLLAPI is used to manage the interaction between a workstation application program and the host system after the session is established, the PCSAPI can be used to control the session itself; the functions provided are:

- Start session
- Stop session
- Query session status
- Connect session (OS/2 and Windows 95 only)
- Disconnect session (OS/2 and Windows 95 only)

Both 16- and 32-bit entry-points are provided for OS/2 and Windows 95, only 16-bit for Windows 3.1x.

You can write PCSAPI applications in IBM C or IBM C++. To develop a PCSAPI application, do the following:

1. Prepare the source code and add the appropriate PCSAPI calls.
2. Include the header file PCSAPI.H in the application program.
3. Compile the source code.
4. Link the resultant OBJ file with the appropriate object file or libraries. The PCSAPI import library PCSCALLS.LIB for 16-bit and/or PCSCAL32.LIB for 32-bit must also be linked.

Note: For further information about programming, migration and compatibility, refer to the *Personal Communications Version 4.1 Programmer's Guide* appropriate to your operating system.

2.10.4 APPC

The advanced program-to-program communications (APPC) API provides program-to-program communications that support a class of distributed processing programs, called transaction programs (TPs), over a variety of connections. APPC is an implementation of SNA logical unit type 6.2 (LU 6.2).

An APPC TP is a uniquely-identified section of a program; one program can contain many TPs. The APPC API provides verbs to start and stop TPs; a verb is a formatted request issued by a TP and executed by APPC. TPs issue verbs to perform some action for an application program and use verb sequences to communicate with other TPs. Two programs that communicate with each other can be located on any node in any connected networks that support APPC.

LU 6.2 functions supported by APPC include:

- Basic and mapped conversations
- Synchronization level of confirmation
- Session-level and conversation-level security
- Multiple LUs
- Parallel sessions (multiple sessions over a link)
- Concurrent sessions (multiple sessions over multiple links)
- Full-duplex conversations

APPC services can be used from Personal Communications Version 4.1 for Windows or OS/2 to communicate over links provided by APPC Networking Services for Windows, OS/2 Access Feature or CM/2.

2.10.5 CPI-C

The Systems Application Architecture (SAA) Common Programming Interface for Communications (CPI-C) provides an alternative method of program-to-program communications that uses SNA LU 6.2 facilities.

SAA describes a set of software interfaces, conventions, and protocols that provide a framework for designing and developing portable applications. Applications that follow SAA guidelines are easily integrated and run on any hardware and software platform that provides an SAA environment.

Both APPC and CPI-C support TPs that uses the OS/2 Access Feature or APPC Networking Services for Windows APPC support. CPI-C TPs, however, call SAA CPI-C functions rather than issuing APPC verbs. CPI-C functions and APPC verbs provide similar services.

CPI-C provides a set of calls that are portable across SAA platforms. CPI-C also provides calls that are extensions to the SAA API.

2.10.6 LUA

The OS/2 Access Feature offers the Conventional LU Application (LUA) access method; this provides an API for secondary, dependent LUs over a variety of connections. LUA consists of system software and interfaces that supply input/output (I/O) service routines to support communications that use LU types 0, 1, 2, and 3 over SNA protocols. These protocols support user-defined, SNA character string, and SNA 3270 data streams. LUA services include only those services that support data communications. LUA does not supply any device emulation facilities, but can be used to implement 3270 emulation applications.

LUA services can be used from Personal Communications Version 4.1 for OS/2 to communicate over links provided by OS/2 Access Feature or CM/2.

This is not an open interface.

2.11 Administration Tools

Personal Communications provides utilities and usability features for administration and problem determination as shown in Figure 8.



Figure 8. Personal Communications Administration Tools

Menu-Bar-Customization Utility

This utility enables you to remove items from the menu-bar of the Personal Communications session window. The changes affect only the session that you customize, so you can make different changes to each session.

Configuration and Program Options

This utility lets you change the operating system settings for Personal Communications functions and provides the following options:

- Add or remove program components
- Add or remove communication drivers
- Enabling or disabling DOS-Mode EHELLAPI or utilities

Maintenance Aid

Users who have problems and need IBM assistance might need to provide information about their workstation configuration. The Maintenance Aid icon is helpful in gathering the information about the installed workstation or for installing Corrective Service Diskettes (CSDs). The Maintenance Aid provides the following functions:

- Installing a CSD
- Displaying CSD information
- Applying an APAR fix (PTF)
- Gathering workstation configuration information

Adapter-Status Reporter (TOKSTAT)

This utility displays the status of the token-ring or Ethernet adapter in use. It shows many parameters that help you to determine the resources available to the network adapter. It is often the only way to find out the Universally Administered Address of an adapter.

Trace-Capture Program (PCSMON)

This utility is a fundamental program for analyzing problems. It formats the contents of a Personal Communications trace table, which can then be displayed, saved or printed. The trace information can be used to determine the source of communication or API-program errors.

Trace-Setup Utility (PCSTRSET)

This utility allows you to turn the trace function on/off by making selections in a window. You do not need to know the communication link, nor do you need to edit a workstation profile (.WS file).

Tool-bar Customization

This function is not included in Administration Tools but you can get to it from the Display Setup menu or by clicking the right-hand mouse button when the pointer is on a blank part of the tool-bar. You can add or remove icons or spaces from the tool-bar, move them, choose to display a description or not, or modify the description.

2.12 Productivity Tools

Personal Communications provides utilities and usability features to increase overall productivity. EasyREXX and ALMCOPY are available only for OS/2. CM Mouse and CMRTM have to be installed separately from Personal Communications itself.

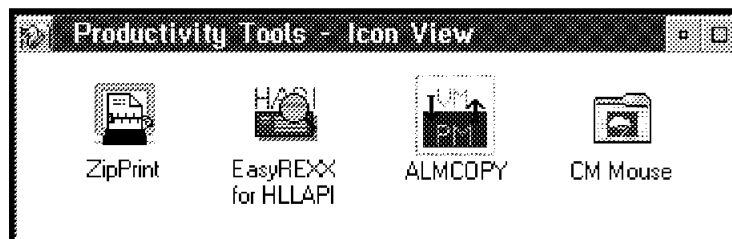


Figure 9. Personal Communications Productivity Tools for OS/2

2.13 Personalization

Personal Communications provides many functions that increase overall productivity and ease of use; most are available for both Windows and OS/2 users and some for DOS.

Menu-Bar

The menu bar at the top of your emulator session window gives you access to a variety of emulator functions. You can hide it if you want to.

Iconic Tool-bar

The Toolbar is normally displayed below the menu-bar, though it can be hidden. It is provided to allow quick access to functions, commands, and macros. When you put the cursor on a tool-bar button, a short description of the button's function appears. You can change, remove or move the buttons, or create your own. You can add or remove space between the buttons. Under OS/2, you can start other programs - eg. a Web browser (an icon is supplied for the IBM browser) - from a button.

Macro Function

A macro is a sequence of key or mouse actions, host commands, or labels, that can be executed in a single action. A macro can be assigned to a specific pop-pad or Icon-Toolbar button, to a hotspot, or to a key, so that it can be executed easily. You can also arrange that a macro be executed automatically when a session starts.

Keyboard Remapping

The keyboard-remap utility enables you to change key-assignments on the PCOMM keyboard. You can assign key-functions, characters or macros to keys. You *cannot* assign strings of characters and commands to a key (as you can in CM/2). that .*layout, functions are assigned, or mapped, to keys.

Color Customizing

You can change the foreground and background colors of display sessions at any time. Session-windows are usually made up of several sections that have different attributes - Unprotected Normal, Protected Intensified, Base or Extended etc for 3270, Field Colors for 5250, as well as the Operator Information Area, Rule Line, 5250 Column Separator etc. You can change the color of any of these; the change is effective immediately, so you can see the effect straight away. When you close the color-mapping utility, the colors are saved in the profile for the session.

There are three ways of changing colors:

- By clicking the attribute in the list and then choosing a color
- By clicking a point on the screen and then choosing a color
- By dragging a color to a point on the screen

Automatic Font Adjustment

With automatic font selection in operation, the font size that is used within an emulator window is adjusted to fit the window size that you choose, so you can always see as much as possible. The font size changes as you adjust the window size.

Pop-up Keypad

A pop-up keypad is a small window containing push buttons that can be clicked with a mouse to perform operations that would otherwise need a keyboard. Its purpose is to make often-used functions available quickly and conveniently. Two pads are provided but you can create as many as you like by saving them in .PMP files. Each pad can have up to 64 buttons. You can put a key-action, a character or a macros onto a button, and you can customize the colors of all aspects of a pad.

To make a pad appear, you must click the right-hand mouse-button anywhere on the host screen; the pad normally disappears when you have clicked a button but you can make it stay on the screen if you wish - this is called a 'sticky' pad.

Hotspots

A hotspot is the area on a host screen that allows you to use your mouse to execute a host function or host command without pressing a function key or typing a command.

A character string can be defined as a hotspot. This means that you can click on the string with the mouse and execute the macro associated with that string. Some hotspots are predefined and can be shown as three-dimensional buttons in the session window (for example, the function keys) but you can also define your own hotspots and set them to execute any macro you wish.

Mouse-Button Customizing

Mouse-button setup lets you allocate functions to the right and left buttons of the mouse. This enables you to perform the following processing without having to use the keyboard; you can put only one function on each button:

- Execution of PC/3270 or PC400-supplied key functions
- Execution of user-defined macros
- Input of character strings

Record/Play Macro

You can record a series of host-session keystrokes in a macro and then play the macro to reproduce those keystrokes. You might do this, for example, with your logon sequence, which you use every day.

2.13.1 Clipboard Edit

Personal Communications provides the following edit functions; most are common to many applications but Copy Append and Paste Next are unusual:

Copy	Copy copies the marked area into the Windows clipboard without removing (clearing) it from the session window.
Copy Append	Copy Append copies the marked area into the clipboard without removing it from the session window. If there is already data in the clipboard, the new data is appended to it.
Undo	Undo cancels the most recent Edit operation (except for Copy Link) and restores the session window and/or the clipboard accordingly.
Cut	Cut copies the marked area into the clipboard and removes it from the session window.
Paste	Paste overlays the current contents of the clipboard onto the selected session window, starting at the position of the cursor.

Paste Next	Paste Next overlays consecutive parts of the contents of the clipboard onto the session window, starting at the position of the cursor. If there is not enough room, you can make more until the whole contents of the clipboard have been pasted; at the end of each paste, PCOMM remembers how much of the clipboard has been pasted. This lets you paste the whole contents of the clipboard without having to worry about the amount of viewable target space.
Clear	Clear removes the contents of the marked area of the session window. The clipboard's contents is not altered.
Copy Link	This uses the DDE interface to interactively exchange data between a host session and a PC program through the clipboard.
Unmark	Unmark removes the marking rectangle. The session window and the clipboard's contents are not altered.
Select All	Select All marks the entire session window.

2.13.2 Special Facility Options for DOS (Full-Function Mode)

PCOMM Full-function DOS mode has a number of facilities that enhance usability:

Automatic Logon Facility

The automatic logon facility lets you write and run a script to log on to a host system without manual intervention.

Record/Play Facility

This function allows you to store (record) and retrieve (play) frequently-used keystroke sequences. Up to 12 sequences can be stored; they can contain up to a total of 2KB (1000 keystrokes).

Rule Line

The rule line is a reference line on the display to assist in data alignment. Only one rule can be generated but you can choose from three styles - vertical, horizontal or both (cross).

Mouse Enabled for GIWS

Leave mouse enabled while a host session is being displayed. This allows you to use a mouse-enhancement program in your host sessions, such as GIWS or CM Mouse.

DOS background execution

DOS background execution dictates whether the function is enabled that allows an application in the DOS session to continue when you hot-key to a host session, even if there is no display screen allocated to it (resume mode).

SNA Data Compression/Decompression

Data Compression is a useful tool in SNA networks, especially when the line speed limits application throughput and if the benefit outweighs the cost (typically CPU CYCLES and STORAGE).

Copy to Buffer

Formally called Presentation-Space Copy, this is a new customizable function for PC/3270 V4.1. It provides you with a means to copy all or a portion of the active host session to the same or another host session. Prior to PC/3270 V4.1, this function was available as a single operation, in that the copy and paste were toggled functions. PC/3270 V4.1 divides the copy and paste operations, so the pasting of copied data can be deferred.

3270 Setup and Utility

The 3270 Setup and Utility is a menu-driven interactive utility that provides you with the following functions:

- 3270 Display Setup
- 3270 Keyboard-Definition Utility
- File-Transfer Utility
- Enhanced Host Directed Print Utility
- Vital Product Data Setup
- Extended Vital Product Data Setup

2.14 National Language Support (NLS)

National language versions are, in general, versions of a given software product that are for the most part (panels, messages, help information) translated into a foreign language.

If the translated software is an application, the underlying operating system that supplies basic routines and determines the code pages and keyboard settings will also influence the behavior of a national language version.

The Multi-Language version of PCOMM accommodates the following languages: Cyrillic, Greek, Latin-1, Latin-2, and Turkish.

The Bi-Directional language version accommodates the following languages: Arabic, English, French, German, Hebrew, and other Latin-1 languages.

Both the Multi-Language and Bi-Directional language versions contain English menus, messages, and documentation.

2.14.1 Keyboard Functions

Personal Communications supports the IBM 122-key host-connected keyboard, the Space-Saving keyboard, the enhanced keyboard and Microsoft's Natural keyboard. In DOS mode, it also supports the PC AT and XT keyboards.

The IBM host-connected keyboard enables 3270 dependent display (for example, IBM 3278, 3279, 3471 or 3472) and AS/400 users to be immediately productive without the need for referring to keyboard templates. This keyboard, which is the most popular keyboard used by 3270/5250-dependent display users today, is supported by PC/3270 V4.1 and PC400 V4.1 many older PCs and on the newer PC 300 and 700 Models, with DOS 5.0 or later for national language support. Larger than this, so it has no value. Non-US English users can see a keyboard graphic that more closely resembles their own keyboard when they customize their keyboard.

2.15 Online Information

Personal Communications Version 4.1 for OS/2 provides a new Information Notebook icon in its folder. This useful utility provides you with an online interface to the Personal Communications library. You can locate information by task, or you can search for specific topics. The topics are installed in the notebook by default but you have the option to install the remaining information.

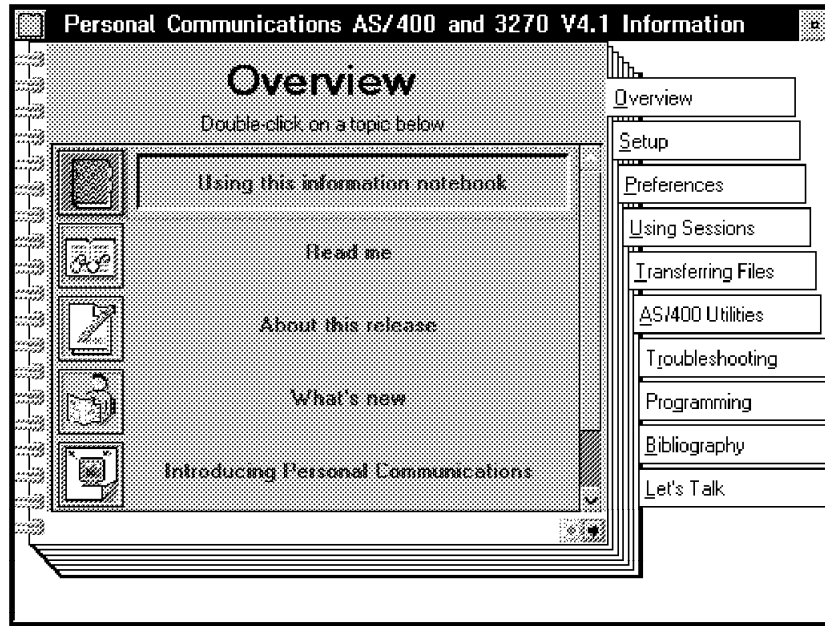


Figure 10. Information Notebook for OS/2

The Personal Communications family provides, for all environments, a powerful online Help facility that describes how to install, configure and use PC/3270 and PC400. The Help is very extensive and includes information about every aspect of configuring and using Personal Communications.

A complete Personal Communications library is included in the CD-ROM package; the books are available in Book-Manager and List-3820-Print format.

Chapter 3. Hardware and Software Requirements

There are a number of hardware and software requirements, as well as required memory and storage requirements, to consider when planning the installation of Personal Communications Version 4.1.

The following sections describe the technical information about the specified operating environment.

3.1 Hardware Requirements

Personal Communications supports a wide range of IBM workstations that use different bus architectures and peripheral components.

3.1.1 System Unit

Personal Communications supports most PC/AT, PS/2, PS/ValuePoint, IBM PC Series Aptiva, 300 and 700, and ThinkPad systems as well as many IBM-compatible systems from other vendors dependent of the operating environment.

IBM Operating System/2 (OS/2)

The recommended workstation has an Intel 80486 SX or higher microprocessor, 12 MB memory, 212 MB harddisk drive and at least one 1.44 MB 3.5-inch diskette drive.

Microsoft Windows

The recommended workstation has an Intel 80386 SX or higher microprocessor, 4 MB memory, 80 MB hard-disk drive and at least one 1.44 MB 3.5-inch diskette drive.

IBM Disk Operating System (DOS)

The recommended workstation has an Intel 80286 or higher microprocessor, 1 MB memory, 30 MB hard-disk drive and at least one 1.44 MB 3.5-inch diskette drive.

Note: Our recommendation is based on a number of factors, including the operating system and other LAN/WAN services and/or applications that may be currently running together. The recommended workstations provides a balanced platform with an acceptable overall performance for the users. For further information about supported system units, see the operating system environment related documentation.

3.1.2 Display and Video Adapter

Personal Communications supports display monitors and video adapter cards that are supported by the operating system environment that you are using. There are some restrictions in screen models (Model 2, 3, 4, and 5) and display/adapter combinations.

In general, VGA fully compatible video adapters are supported, but the following video adapters have been tested.

<i>Table 8. Video Adapter Support</i>			
Video Adapter	for DOS	for Windows	for OS/2
IBM Monochrome Display and Printer Adapter (MDPA)	X		
IBM Color Graphics Adapter (CGA)	X		
Enhanced Graphics Adapter (EGA)	X		
IBM PS/2 Display Adapter (VGA)	X	X	X
IBM PS/2 Display Adapter 8514/A1	X	X	X
IBM PS/2 XGA Display Adapter/A	X	X	X
PS/2 XGA-2 Display Adapter/A	X	X	X
IBM Image Adapter/A		X	X
IBM Image Adapter/A 3MB 60911		X	X
ATI Technologies Mach 32 (68800) (*1)	X	X	X
Cirrus Logic GD5426 (*1)	X	X	X
S3 Corp. S3 86C805 (*1)	X	X	X
Tseng Laboratories ET40001 (*1)	X	X	X
Notes:			
X has been tested			
(*1) Only VGA-compatible mode is supported			

3.1.3 Keyboard

The following table shows the keyboard support:

<i>Table 9. Keyboard Support</i>			
Keyboard	for DOS	for Windows	for OS/2
XT keyboard	X		
AT keyboard	X		
Enhanced keyboard (101-key)	X	X	X
Space-Saving keyboard	X	X	X
IBM Host-Connected keyboard (122-key)	X	X	X
Microsoft natural keyboard		X	
Note:			
X supported			

3.1.4 Printer

Personal Communications supports printers in two different print modes as follows:

- PDT print mode, which is supported by the Personal Communications provided Printer Definition Tables (PDT)
- Non-PDT (GPI) print mode, which is supported by the operating system environment you are using (Windows and OS/2 environments)

Personal Communications Version 4.1 supports the following printers and provides these Printer Definition Tables (PDT) and Printer Definition Files (PDF) for the full-function DOS, Windows and OS/2 environments. The following list shows you the PDT files and its supported printers, if Personal Communications is customized to use the PDT (raw data) print mode.

Note: For each PDT file there is an ASCII PDF file available for your own modifications.

Table 10 (Page 1 of 5). Printer and Plotter Support

PDT/PDF	Printer	AC400	PC/3270
IBM3812.PDT	IBM 3812 Pageprinter Model 2	X	X
IBM3816.PDT	IBM 3816 Pageprinter II	X	X
PRN3812.PDT	IBM 3812 Pageprinter Model 2		X
	IBM 3816 Pageprinter II		X
IBM38521.PDT	IBM 3852 Color Printer	X	X
PRN38521.PDT	IBM 3852 Color Printer		X
IBM38522.PDT	IBM 3852 Color Jetprinter Model 2	X	X
PRN38522.PDT	IBM 3852 Color Jetprinter Model 2		X
IBM4019.PDT	IBM 4019 LaserPrinter (*1)	X	X
	IBM 4019 LaserPrinter E (*1)	X	X
	IBM 4029-010 LaserPrinter 5E (*1)	X	X
	IBM 4029-020 LaserPrinter 6 (*1)	X	X
	IBM 4029-021 LaserPrinter 6A (*1)	X	X
	IBM 4029-022 LaserPrinter 6P (*1)	X	X
	IBM 4029-030 LaserPrinter 10 (*1)	X	X
	IBM 4029-040 LaserPrinter 10L (*1)	X	X
PRN4019.PDT	IBM 4019 LaserPrinter (*1)		X
	IBM 4019 LaserPrinter E (*1)	X	X
	IBM 4029-010 LaserPrinter 5E (*1)	X	X
	IBM 4029-020 LaserPrinter 6 (*1)	X	X
	IBM 4029-021 LaserPrinter 6A (*1)	X	X
	IBM 4029-022 LaserPrinter 6P (*1)	X	X
	IBM 4029-030 LaserPrinter 10 (*1)	X	X
	IBM 4029-040 LaserPrinter 10L (*1)	X	X
IBM4070.PDT	IBM 4070 InkJet	X	X
IBM4070E.PDT	IBM 4070 InkJet (Epson mode)	X	X
IBM4072.PDT	IBM 4072-001 ExecJet Printer (*1)	X	X
PRN4072.PDT	IBM 4072-001 ExecJet Printer (*1)		X
IBM4201.PDT	IBM 4201 ProPrinter	X	X
	IBM 4201 ProPrinter II	X	X
	IBM 4201 ProPrinter III Model 3	X	X
	IBM 2380-001 Personal Printer Series II (*3)	X	X

<i>Table 10 (Page 2 of 5). Printer and Plotter Support</i>			
PDT/PDF	Printer	AC400	PC/3270
IBM4202.PDT	IBM 4202 ProPrinter XL Model 1	X	X
	IBM 4202 ProPrinter XL Model 2	X	X
	IBM 4202 ProPrinter III XL Model 2	X	X
	IBM 4202 ProPrinter III XL Model 3	X	X
	IBM 4216 Personal Pageprinter (*2)	X	X
	IBM 2381-001 Personal Printer Series II (*3)	X	X
IBM4207.PDT	IBM 4207 ProPrinter X24	X	X
	IBM 4207 ProPrinter X24E	X	X
	IBM 2390-001 Personal Printer Series II (*4)	X	X
IBM4207.PDT	IBM 4208 ProPrinter XL24	X	X
	IBM 4208 ProPrinter XL24E	X	X
	IBM 2391-001 Personal Printer Series II (*4)	X	X
PRN4202.PDT	IBM 4201 ProPrinter		X
	IBM 4201 ProPrinter II		X
	IBM 4201 ProPrinter III		X
	IBM 4202 ProPrinter XL		X
	IBM 4202 ProPrinter III XL		X
	IBM 4207 ProPrinter X24		X
	IBM 4207 ProPrinter X24E		X
	IBM 4208 ProPrinter XL24		X
	IBM 4208 ProPrinter XL24E		X
	IBM 4216 Personal Pageprinter (*2)		X
	IBM 2380/1 Personal Printer Series II (*3)		X
IBM 2390/1 Personal Printer Series II (*4)		X	
IBM4212.PDT	IBM 4212-001 ProPrinter 24P	X	X
IBM4226.PDT	IBM 4226 model 302 (4226-302)	X	X
IBM5151.PDT	IBM 5152 Graphics Printer Model 2	X	X
PRN5151.PDT	IBM 5152 Graphics Printer Model 2		X
IBM5182.PDT	IBM 5182 Color Printer (*6)	X	
IBM5201.PDT	IBM 5201 Quietwriter Printer Model 1	X	X
	IBM 5201 Quietwriter Printer Model 2	X	X
IBM5202.PDT	IBM 5202 Quietwriter III	X	X
	IBM 5204 Quickwriter Printer	X	X
PRN5202.PDT	IBM 5201 Quietwriter Printer Model 1 & 2		X
	IBM 5202 Quietwriter III		X
	IBM 5204 Quickwriter Printer (*5)		X
IBM5216.PDT	IBM 5216 Wheel Printer	X	X
PRN5216.PDT	IBM 5216 Wheel Printer		X
IBM5223.PDT	IBM 5223 Wheel Printer E	X	X
PRN5223.PDT	IBM 5223 Wheel Printer E		X

<i>Table 10 (Page 3 of 5). Printer and Plotter Support</i>			
PDT/PDF	Printer	AC400	PC/3270
HPDSKJT.PDT	Hewlett-Packard DeskJet 550	X	X
HPDJ550C.PDT	Hewlett-Packard DeskJet 550 C	X	X
HPLJII.PDT	Hewlett-Packard LaserJet Printer	X	X
	Hewlett-Packard LaserJet Printer II	X	X
	Hewlett-Packard LaserJet Printer II P	X	
	Hewlett-Packard LaserJet Printer II D	X	
	IBM 4019 LaserPrinter (HP mode)		X
	IBM 4019 LaserPrinter E (HP mode)	X	X
HPLJIII.PDT	IBM 4216-010 Personal Pageprinter (HP mode)	X	X
	Hewlett-Packard LaserJet Printer III	X	X
	Hewlett-Packard LaserJet Printer III P	X	
	Hewlett-Packard LaserJet Printer III Si	X	X
	IBM 4029-010 LaserPrinter 5E (HP mode)	X	X
	IBM 4029-020 LaserPrinter 6 (HP mode)	X	X
HPLJIIID.PDT	IBM 4029-021 LaserPrinter 6A (HP mode)	X	X
	IBM 4029-022 LaserPrinter 6P (HP mode)	X	X
	IBM 4029-030 LaserPrinter 10 (HP mode)	X	X
	IBM 4029-040 LaserPrinter 10L (HP mode)	X	X
	IBM 4029-041 LaserPrinter 10A (HP mode)	X	X
	Hewlett-Packard LaserJet Printer III D	X	
	IBM 4029-042 LaserPrinter 10P (HP mode)	X	X
	IBM 4039-10R LaserPrinter 10R (HP mode)	X	X
	IBM 4039-10D LaserPrinter 10D (HP mode)	X	X
	IBM 4039-12R LaserPrinter 12R (HP mode)	X	X
HPLJ4.PDT	IBM 4039-12L LaserPrinter 12L (HP mode)	X	X
	IBM 4039-16L LaserPrinter 16L (HP mode)	X	X
HPLJ4.PDT	Hewlett-Packard LaserJet Printer 4	X	X
	Hewlett-Packard LaserJet Printer 4 Si	X	X
ACTLZR2.PDT	Epson ActionLaser II (LQ2500 mode)	X	X
EAP2250.PDT	Epson AP2250	X	X
EAP3250.PDT	Epson AP3250	X	X
EAP5500.PDT	Epson AP5000	X	X
	Epson AP5500	X	X
LQ870.PDT	Epson LQ-870	X	X
	Epson LQ-1170	X	X

<i>Table 10 (Page 4 of 5). Printer and Plotter Support</i>			
PDT/PDF	Printer	AC400	PC/3270
EFX1170.PDT	Epson FX-1170	X	X
ESQ1170.PDT	Epson SQ-1170	X	X
EFX5000.PDT	Epson DFX-5000	X	X
	Epson DFX-8000	X	X
EFX850.PDT	Epson FX-850	X	X
ELQ1070.PDT	Epson LQ-570	X	X
	Epson LQ-1070	X	X
ELQ2550.PDT	Epson LQ-2550	X	X
ELQ510.PDT	Epson LQ-510	X	X
ELQ860.PDT	Epson LQ-860	X	X
ELX810.PDT	Epson LX-810	X	X
EPLPCL4.PDT	Epson EPL-7000 (HP mode)	X	X
EPLPCL5.PDT	Epson EPL-8000 (HP mode)	X	X
BJ300.PDT	Canon BJ-300 (CAPSL mode)	X	X
LBP4.PDT	Canon LBP-4 Laserprinter (ISO mode)	X	X
CPQPM20.PDT	Compaq PageMarq 15 (HP mode)	X	X
	Compaq PageMarq 20 (HP mode)	X	X
NEC6300.PDT	NEC Pinwriter P-6200	X	X
	NEC Pinwriter P-6300	X	X
PAN1123.PDT	Panasonic KX-P1123 (Epson mode)	X	X
PAN1124.PDT	Panasonic KX-P1124 (Epson mode)	X	X
	Panasonic KX-P1164 (Epson mode)	X	X
PAN1180.PDT	Panasonic KX-P1180 (Epson mode)	X	X
	Panasonic KX-P1180i (Epson mode)	X	X
	Panasonic KX-P1191 (Epson mode)	X	X
PAN1695.PDT	Panasonic KX-P1695 (Epson mode)	X	X
PAN2123.PDT	Panasonic KX-P2123 (Epson mode)	X	X
PAN2124.PDT	Panasonic KX-P2124 (Epson mode)	X	X
PAN2180.PDT	Panasonic KX-P2180 (Epson mode)	X	X
PAN2624.PDT	Panasonic KX-P1124i (Epson mode)	X	X
	Panasonic KX-P1654 (Epson mode)	X	X
	Panasonic KX-P2624 (Epson mode)	X	X
PANLBP4.PDT	Panasonic KX-P4410 (HP mode)	X	X
	Panasonic KX-P4420 (HP mode)	X	X
	Panasonic KX-P4450i (HP mode)	X	X

<i>Table 10 (Page 5 of 5). Printer and Plotter Support</i>			
PDT/PDF	Printer	AC400	PC/3270
PANLBP5.PDT	Panasonic KX-P4430 (HP mode)	X	X
	Panasonic KX-P4451 (HP mode)	X	X
Notes: X supported. (*1) 4208 or 5202 emulation mode. (*2) 4202 emulation mode. (*3) The IBM 2380 and 2381 will run in 4201 or 4202 mode and may be used with the 4201 or 4202 Printer Definition Table. (*4) The IBM 2390 and 2391 will run in 4207 or 4208 mode and may be used with the 4207 or 4208 Printer Definition Table. (*5) The IBM 5204 Quickwriter* Printer will run in 5202 mode and may be used with the 5202 Printer Definition Table. (*6) Supported for DOS (Full-Function Mode) only. (HP mode) Supported as HPLJ (LaserJet) in PDT mode. and as HPLJ or PostScript Driver in non-PDT (GPI) mode (Epson mode) Supported as Epson datastream printer in PDT mode.			

3.1.5 Plotter

Personal Communications supports the following plotters, which are supported by Windows and OS/2 modes:

- IBM plotters which supports IBM GL
- HP plotters which supports HP GL

Note: Plotters are supported in non-PDT (GPI) mode, which is supported by the operating system environment that you are using (Windows and OS/2 environments). For the DOS environment, Plotters are supported by IBM GDDM-PCLK Version 1.1.

3.1.6 Communication Adapters

The following section deals with the communications adapter supported by Personal Communications Version 4.1.

First, all communications adapters are the IBM LAN adapters, such as token-ring, Ethernet, IBM PC Network and FDDI adapters. All OEM LAN adapters (non-IBM), are supported by the *Local Area Network Support Program (LSP) Version 1.3* or later for the DOS and Microsoft Windows 3.1 environment. They are also supported by the *Network Transport Services/2 (NTS/2) (LAPS)* or the *MultiProtocol Transport Services (MPTS)* provided in LAN Server V4.0, OS/2 Warp Connect and Warp Server Version 3.0. For further information on or about supported LAN adapters, see the related documentation.

Note: Newer LAN adapters, such as from IBM or OEM manufacturers, provide the NDIS device driver for each environment on their own option diskette.

Family-1 Machines Communications Adapter (ISA): The following table contains the adapter requirements for the listed operating systems.

<i>Table 11. Family-1 Machines Communications Adapter (ISA)</i>			
Communications Adapter	for DOS	for Windows	for OS/2
IBM PC Asynchronous Communications Adapter	X	X	X
IBM PC AT Serial/Parallel Adapter	X	X	X
IBM SDLC Communications Adapter (*1)	X	X	X
IBM Multiprotocol Communication Adapter (ISA)	X	X	X
IBM X.25 Interface Co-Processor (ISA) (*2)	X		X
IBM ISDN Interface Co-Processor (ISA) (*2)			X
IBM PC 3278/79 Emulation Adapter	X	X	X
Advanced IBM PC 3278/79 Emulation Adapter	X	X	X
Attachmate 3270 Adapter (*3) (*5)	X	X	X
Attachmate ADVANCE 3270 Adapter (*3) (*5)	X	X	X
DCA IRMA3 Convertible 3270 Adapter (*4) (*5)	X	X	X
IBM 5250 Adapter	X	X	X
IBM Enhanced 5250 Display Station Emulator Adapter (*6)	X	X	X
IBM WaveRunner ISDN and Analog Modem (ISA)	X	X	X
IBM Mwave* WindSurfer* Communications Adapter (ISA)	X	X	X
IBM Wireless LAN Adapter (ISA)	X	X	X
IBM Token-Ring Network 16/4 Trace and Performance Adapter	X	X	X
IBM Token-Ring Network Trace and Performance Adapter II	X	X	X
Notes: X supported (*1) SDLC AutoDialing is not supported (*2) Supported in combination with CM/2 (for OS/2) (*3) No support for DOS (Entry-Level Mode) (*4) Support for DOS (Entry-Level Mode) without EAB support (*5) Supported for 3270 terminal emulation only (*6) Supported for 5250 terminal emulation only			

Family-2 Machines Communications Adapter/A (MCA): The following table contains information related to the adapter requirements for the listed operating systems.

<i>Table 12. Family-2 Machines Communications Adapter/A (MCA)</i>			
Communications Adapter/A	for DOS	for Windows	for OS/2
IBM PS/2 Dual Asynchronous Adapter/A	X	X	X
IBM PS/2 Multiprotocol Adapter/A	X	X	X
IBM X.25 Interface Co-Processor/2 (*1)	X		X
IBM ISDN Interface Co-processor/2 (*1)			X
IBM 3270 Connection	X	X	X
Attachmate 3270 Adapter (*2) (*4)	X	X	X
Attachmate ADVANCE 3270 Adapter/2 (*2) (*4)	X	X	X
DCA IRMA3 Convertible 3270 Adapter (*3) (*4)	X	X	X
IBM 5250 Adapter/A (*5)	X	X	X
IBM 5250 Emulation Adapter/A (*5)	X	X	X
IBM WaveRunner ISDN and Analog Modem (MCA)	X	X	X
IBM WindSurfer Communication Adapter (MCA)	X	X	X
IBM S/36/38 Workstation Emulation Adapter/A	X	X	X
IBM Asynchronous/SDLC V.32 Modem/A (MPA Card with modem)	X	X	X
IBM Token-Ring Network 16/4 Trace and Performance Adapter/A	X	X	X
IBM Token-Ring Network Trace and Performance Adapter II/A	X	X	X
IBM Token-Ring Network PS/2 Model P70 386 Adapter/A	X	X	X
IBM Wireless LAN Adapter/A	X	X	X
Notes:			
X supported			
(*1) Supported in combination with CM/2 (for OS/2)			
(*2) No support for DOS (Entry-Level Mode)			
(*3) Support for DOS (Entry-Level Mode) without EAB support			
(*4) Supported for 3270 terminal emulation only			
(*5) Supported for 5250 terminal emulation only			

PCMCIA Type-II Slots Support: A PCMCIA adapter is a credit-card-sized adapter designed to function in machines with *Personal Computer Memory Card International Association (PCMCIA) Type II* slots. The function of a full-sized adapter is offered in a package of credit-card size. Systems with slots conforming to the PCMCIA Release 2.0 standard can operate with this adapter and appropriate software support.

Personal Communications will work with any adapter, but the following have been tested:

<i>Table 13. PCMCIA Type-II Slots Communications Adapter</i>			
Communications Adapter	for DOS	for Windows	for OS/2
IBM 3270 Emulation Credit Card Adapter	X	X	X
IBM Token-Ring 16/4 Credit Card Adapter	X	X	X
IBM Wireless LAN PCMCIA Adapter	X	X	X
IBM Credit Card Adapter for Ethernet	X	X	X
IBM PCMCIA Modem and Ethernet Adapter	X	X	X
IBM PCMCIA Data/Fax Modem	X	X	X
IBM PCMCIA High Speed Data/Fax Modem	X	X	X
IBM WaveRunner PCMCIA ISDN or Analog Modem	X	X	X
Xircom Credit Card Ethernet Adapter	X	X	X
Note: X supported			

Parallel Port

<i>Table 14. Parallel Ports Communications Adapter Support</i>			
Communications Adapter	for DOS	for Windows	for OS/2
Build-in Parallel Port (*1)			X
ACCTON Ether Pocket CX-TW (*2) (*3)	X	X	
Xircom Pocket 3270 Adapter (*2) (*4)	X	X	
Xircom Pocket Token-Ring Adapter (*5)	X	X	
Xircom Pocket Ethernet Adapter (*4) (*5)	X	X	
Notes: X supported. (*1) OS/2 Warp Connect V3.0 provides NDIS support directly to the parallel. (*2) Supported in for DOS (Full-Function Mode) and Windows enhanced mode only. (*3) Windows 286 Standard Mode only. (*4) Windows 386 enhanced mode only. (*5) TCP/IP is not supported.			

3.1.7 Modems

The following is a list of modems supported by Personal Communications Version 4.1. Communications Manager/2-supported modems are available when Personal Communications Version 4.1 is configured to use CM/2 communication stack. A list of the modems, which will be regularly updated, may be obtained online from:

- MKTTOOLS (file name CM2MODEM in the CM2111 package)
- The CM/2 section of the OS2DF2 forum on CompuServe (file name CMMODM.TXT)

Note: Personal Communications allows you to add any modems that are not listed in the Automatic Dial Facility. You can specify modem commands, response, etc. by referring to your modem manual.

Asynchronous Modems

<i>Table 15 (Page 1 of 2). Asynchronous Modems Provided by Personal Communications</i>			
Modem	for DOS	for Windows	for OS/2
IBM 5841 (1200 bps)	X	X	X
IBM 5842 (2400 bps)	X	X	X
IBM 5853 (2400 bps)	X	X	X
IBM 7855 V.32	X	X	X
IBM Internal Data/FAX (2400 bps)	X	X	X
IBM High Speed Internal Data/FAX	X	X	X
IBM 14.4/14.4 PCMCIA Data/FAX	X	X	X
IBM PCMCIA Data/FAX (2400 bps)	X	X	X
IBM PCMCIA 2400bps Data (Japan version)	X	X	X
IBM WaveRunner Digital Internal Modem	X	X	X
IBM WindSurfer 14400 Modem	X	X	X
IBM Wireless Modem for Cellular/CDPD		X	X
IBM ASYNC/SDLC V.32 Modem/A	X	X	X
IBM Candlestick Modem for Normal Mode		X	X
Hayes Smartmodem 1200 compatible	X	X	X
Hayes Smartmodem 2400 compatible	X	X	X
Hayes Smartmodem Ultra 9600	X	X	X
Hayes Smartmodem Ultra 14400	X	X	X
Hayes Smartmodem Optima 9600	X	X	X
Hayes Smartmodem Optima 14400	X	X	X
Hayes Smartmodem Optima 28800		X	X
Hayes Smartmodem Optima 144 for PCMCIA	X	X	X
APEX PCMCIA PCR-9696	X	X	X
APEX PCMCIA PCR-1414	X	X	X
ARN DX-MC2	X	X	X

<i>Table 15 (Page 2 of 2). Asynchronous Modems Provided by Personal Communications</i>			
Modem	for DOS	for Windows	for OS/2
AT&T Paradyne PCMCIA 14.4K Data/Fax for Cellular		X	X
AT&T Paradyne PCMCIA 14.4K Data/Fax for Normal		X	X
Com1 MC217	X	X	X
Communicate PCMCIA 14400 Fax & Data Modem		X	X
Data Race RediCard High Speed PCMCIA Data/FAX		X	X
Digicom Systems Eagle	X	X	X
Gold Card PCMCIA Modem		X	X
Intel SatisFAXtion 400e	X	X	X
Megahertz PCMCIA XJ1144	X	X	X
Microcom QX/4232bis	X	X	X
MultiTech MultiModem MT1432BLK		X	X
MultiTech MultiModem ZDX for Data & Fax		X	X
Nokia NMP V32bis Data/Fax PCMCIA Modem		X	X
Practical Peripherals PM14400FXSA	X	X	X
Universal Data Systems FasTalk FAX32	X	X	X
US Robotics Courier HST Dual Standards	X	X	X
US Robotics Courier 28800 external Modem		X	X
US Robotics Sportster 14.4 external Modem		X	X
Zoom V.32bis	X	X	X
Zyxel U1496E 9600		X	X
Notes:			
X supported			

Hayes AutoSync Modems

<i>Table 16 (Page 1 of 2). Hayes AutoSync Modems Provided by Personal Communications</i>			
Modem	for DOS	for Windows	for OS/2
IBM 14.4/14.4 PCMCIA Data/FAX	X	X	X
IBM Wireless Modem		X	X
Hayes Ultra 9600	X	X	X
Hayes Ultra 14400	X	X	X
Hayes Optima 9600	X	X	X
Hayes Optima 14400	X	X	X
Hayes Optima 144 for PCMCIA	X	X	X
APEX PCMCIA PCR-9696	X	X	X
APEX PCMCIA PCR-1414	X	X	X
ARN DX-MC2	X	X	X

<i>Table 16 (Page 2 of 2). Hayes AutoSync Modems Provided by Personal Communications</i>			
Modem	for DOS	for Windows	for OS/2
AT&T Paradyne PCMCIA 14.4K Data/Fax		X	X
Com1 MC217	X	X	X
Notes: X supported			

Synchronous Modems (V.25bis AutoDial-Capable)

<i>Table 17. Synchronous AutoDial (V.25bis) Modems Provided by Personal Communications</i>			
Modem	for DOS	for Windows	for OS/2
IBM 7855		X	X
NEC ITM2400mkII		X	X
HITACHI Hybrid Phone		X	X
Notes: X supported			

3.2 Software Requirements

This section covers the software level prerequisites at the workstation, controllers and host systems, for operation of, or compatibility with, Personal Communications Version 4.1.

The following is the key used to denote restrictions based on mode of operation:

Key:

- D** supported in PC/3270 V4.1 for DOS only
- W** supported for Windows environment only
- O** supported for OS/2 environment only

3.2.1 Workstation Software for DOS/Windows Environment

Software requirements for Personal Communications Version 4.1 are based on the operating system and connectivity type. The following is a list of the software levels for prerequisite software:

Operating Systems

- IBM Personal Computer Disk Operating System (PC-DOS), Version 3.3, Version 4.0 with PTF UR24270 or later release **D**
- IBM Personal Computer Disk Operating System (PC-DOS), or Version 5.0, Version 6.1/3, Version 7.0 or later
- Microsoft Disk Operating System (MS-DOS), or Version 5.0, Version 6.0/2
- Novell DOS Version 7.0
- IBM IBM Operating System/2 (OS/2) Version 2.0, 2.1 or 2.11 (all packages)
- IBM IBM Operating System/2 (OS/2) Warp Version 3.0 or Warp Connect Version 3.0 (all packages)

Optional Communication Support Programs

- IBM Local Area Network (LAN) Support Program Version 1.3 (5621-30 0) or higher (LAN Support Program V1.33 or higher is required with PCMCIA adapters)
- The most current release of the LAN enabler (5621-253) (under OS/2 Version 2.0 or 2.1 when the adapter will be shared)

- IBM X.25 Co-Processor Support Program (5604-154) **D**
- IBM Real-Time Interface Co-Processor DOS Support Package (5686-001) **D**
- IBM 3174 Workstation Peer Communication Support Program (5799-PHL, RPQ# P85114) for 3174 Peer Communication or latest IBMXLN.DOS Workstation Peer Communications NDIS device drivers
- Microsoft Windows Version 3.1 **W** (*1)
- Microsoft Windows for Workgroups Version 3.11 **W** (*2)
- NetWare for SAA Version 1.2, 1.3
- IBM TCP/IP Version 2.1 (5621-219) for DOS
- FTP Software Inc. PC/TCP Software for DOS V2.3
- NetManage Inc. Chameleon TCP/IP for Windows V3.1 **W** (*3)
- Trumpet Software Int. PTY Ltd. Trumpet Winsock V2.1 **W**
- Novell Inc. LAN Workplace for DOS V4.1 **W**

Notes:

- (*1) Microsoft Windows Version 3.0 is not supported by PC/3270 V4.0 and PC/3270 V4.1. PC/3270 V3.1 is required for Windows 3.0.
PC400 does not support Microsoft Windows Version 3.0.
- (*2) MSDLC is required for LAN connections. IBM LAN Support Program is not supported. Only DFT, IEEE 802.2, IPX/SPX, TCP/IP, and FMI client to SNA Server for Windows-NT connectivities are supported in LAN with Windows for Workgroups V3.11.
- (*3) With that restriction the Chameleon NFS cannot be used.

3.2.2 Workstation Software for OS/2 Environment

Software requirements for Personal Communications Version 4.1 are based on their IBM Operating System/2 (OS/2) and connectivity type. The following is a list of the software levels for prerequisite software:

Operating Systems

- IBM Operating System/2 (OS/2) Version 2.1 or 2.11 (all packages)
- IBM Operating System/2 (OS/2) Warp Version 3.0 or Warp Connect Version 3.0 (all packages)

Optional Communication Support Programs

- IBM LAN Adapter and Protocol Support version 2.0 (NTS/2) or higher (*1)
- IBM Communications Manager/2 Version 1.1 or later
- IBM TCP/IP Version 2.0 for OS/2 (*2)
- NetWare for SAA Version 1.3 and NetWare Client for OS/2 Version 2.1 or later (3270 only)

Notes:

- (*1) When using LAN connections and not using MPTS from OS/2 LAN Server V4.0 or OS/2 Warp Connect V3.0, NTS/2 is included with this package for OS/2.
- (*2) IBM TCP/IP Version 3.0 for OS/2 is part of OS/2 Warp Connect V3.0.

3.2.3 S/390 Host Software for Communication

IBM System/390 host computers communicating via SNA with Personal Communications/3270 Version 4.1 require the following:

For the MVS Environment:

- ACF/VTAM Version 3 or a higher level release or ACF/VTAM Version 3 Release 4.2 for Dynamic Definition of Dependent LUs and Data Compression, is as follows:
 - ACF/VTAM V3 for MVS/XA (5665-289)
 - ACF/VTAM V3 for MVS/370 (5665-313)
 - ACF/VTAM V3 for MVS/ESA (5685-085)
- ACF/VTAM Version 4 Release 2 (5695-117) for APPC3270 connection
- ACF/NCP V4 R3.1 (5668-854) for token-ring connection
- ACF/NCP V6 R2 (5688-231) for Data Compression of XRF sessions

For the VM Environment:

- ACF/VTAM Version 3 or higher level release or ACF/VTAM Version 3 Release 4 for Dynamic Definition of Dependent LUs
 - ACF/VTAM V3 for VM/9370 (5684-052)
 - ACF/VTAM V3 for VM/ESA (5684-095)
- ACF/VTAM Version 4 Release 2 (5654-010) for APPC3270 connection
- ACF/VTAM V3 R4.1 for VM/SP and VM/ESA (5684-095) for Data Compression
- ACF/NCP V4 R2 (5668-854) or higher level release for token-ring connection

For the VSE environment:

- ACF/VTAM Version 4 Release 2 (5686-065) for APPC3270 connection
- ACF/NCP V4 R1 (5668-854) or higher level release for token-ring connection
- ACF/VTAM V3 R4 for VSE/ESA (5666-363) for Dynamic Definition of Dependent LUs

Notes:

- The software release levels shown are the recommended minimum.
- The Personal Communications/3270 Version 4.1 is data stream compatible with 3270 base data stream alphanumeric application environments that support the IBM 3278 Model 2, 3, 4 or 5 or the IBM 3279 Model 2 or 3, with certain restrictions.
- Refer to the individual host operating system information for the correct level of release that supports the above listed ACF/VTAM and ACF/NCP versions.

Host Software for File Transfer

The licensed programs required to be installed on the IBM System/390 host computers for file transfer are as follows:

- For MVS/TSO - IBM 3270 PC File Transfer Program, Release 1.1.1 (5665-311)
- For VM - IBM 3270 PC File Transfer Program, Release 1.1.1 (5664-281)
- For CICS - IBM CICS to 3270PC File Transfer Program, Release 1 (5798-DQH)
- For VSE - VSE/SP Version 3 (5750-AAV), VSE/SP Version 4 (5750-ABF) or VSE/ESA (5750-ACD) (VSE/SP and VSE/ESA have no prerequisite programming requirements for file transfer)

Host Software for DOS Office Mail

The licensed host programs required for support of the following DOS office mail products are covered in their respective announcement letters and documentation:

- IBM Personal Services/Personal Computer Version 1.3 **D**
- IBM PROFS Application Support Feature (PASF) Version 2.2.2 PC Interface **D**
- IBM OfficeVision/VM DOS Office Direct Connect Feature (host requirements are covered under the announcement letter for IBM OfficeVision/VM and documentation) **D**
- IBM OfficeVision/MVS DOS Office Direct Connect Feature (host requirements are covered under the announcement letter for IBM OfficeVision/MVS and documentation) **D**

Host Graphics Support

The host GDDM to be used must be Release 2.3 or later, or Release 2.2 and have one of the following APAR fixes applied to it:

- PL49183 (PTF UL90330) for MVS
- PL49248 (PTF UL90345) for VSE
- PL49249 (PTF UL90347) for VM/370
- PL49259 (PTF UL90348) for VM/XA

TCP/IP

To use Personal Communications in a TCP/IP environment, you need TCP/IP for VM or TCP/IP for MVS on your host system. Requirements are covered under the announcement letter for the related TCP/IP products.

3.2.4 AS/400 Hardware and Software Requirements

Personal Communications Version 4.1 supports all AS/400 models (9402, 9404, 9406). The specific requirements for the attachment types shown are as follows:

Connection	Communication Hardware
Token-Ring	Token-Ring Network Subsystem
	16/4Mbps Token-Ring Network Subsystem
	16/4Mbps Token-Ring Network Adapter
	16/4Mbps Token-Ring Network Adapter/A
	16/4Mbps Token-Ring Network Adapter/HP
Ethernet	Ethernet/IEEE 802.3 CSMA/CD LAN Adapter
	Ethernet/IEEE 802.3 Adapter/HP
Twinax (TDLC)	Base Twinaxial Workstation Feature
	Optional Workstation Controller
SDLC	EIA232/V.24 Communication Adapter
Asynchronous	ASCII Workstation Controller
Controllers	5394 Remote Workstation Controller
	5494 Remote Workstation Controller

AS/400 Software Requirements

PC400 V4.1 requires AS/400 LPPs listed below (depending upon desired system configuration):

- IBM OS/400 Version 2 (5738-SS1) Release 2.0 or later
- IBM OS/400 Version 2 (5738-SS1) Release 3.0 or later is required for ENPTUI and Host Print Transform
- For Text Assist and PC Organizer functions, use either of the following:
 - IBM OS/400 Version 2 (5738-SS1) Release 2.0 or later with cumulative PTF C3285220 with PTF SF14687
 - IBM OS/400 Version 2 (5738-SS1) Release 3.0 or later with PTF SF14495
- For Virtual Printer function, use the following:
 - IBM OS/400 Version 2 (5738-SS1) Release 3.0 or later with
- For Data Transfer and Shared Folders functions and the NetWare for SAA attachment, use the following:
 - PC Support/400 Version 2 Release 2 or later

3.2.5 LAN Controllers and Gateway Requirements

The following controllers and host systems are supported for LAN attachment:

- IBM 3172 Interconnect Controller
- IBM 3174 Establishment Controller
- IBM 3720 Communications Controller
- IBM 3725 Communications Controller
- IBM 3745 High-Speed Communication Controller
- IBM 9370 Information System
- IBM 940X AS/400 System

PC/3270 V4.1 workstations can communicate through gateways that have one of the following programs installed:

- IBM OS/2 Extended Edition Version 1.1 or later
- IBM Extended Services Version 1.0
- IBM Communications Manager/2 Version 1.0 or later
- IBM Personal Communications/3270 Version 1.0 or later
- IBM PC 3270 Emulation Program Version 3.0
- NetWare for SAA Version 1.3 or 2.1
- Microsoft SNA Server for Windows NT Version 2.0

3.2.6 3274 Control Unit/3174 Establishment Controller

For DFT attachment you need either an IBM 3274 Control Unit with a microcode level Release 65.0 or later or an IBM 3174 Establishment Controller with microcode level Release 2 or later.

3174 Peer-to-Peer Communication

The IBM 3174 Workstation Peer Communication Support Program (5799-PHL, RPQ# P85114) for 3174 Peer Communication or the latest IBMXLN.DOS and/or IBMXLN.OS2 Workstation Peer Communications NDIS device drivers, provides a unique capability to support DOS and/or OS/2 workstations attached to the 3174 Establishment Controller.

Together with the co-requisite 3174 Peer Communication RPQ 8Q0718 (3174 PEER RPQ) in the 3174 Establishment Controller, the 3174 provides peer communications between workstations directly attached to the 3174 and access to workstations, servers and host systems attached to IBM Token-Ring Local Area Networks.

To communicate in a 3174 Peer Communication environment, the following is required:

- The PC/3270 V4.1 workstation needs a 3270 Connection adapter (on Micro Channel machines), or a 3278/79 Emulation Adapter (on non-Micro Channel machines) for the coax attachment to a 3174 port.
- The PC/3270 V4.1 workstation needs the 3174 Workstation Peer Communication Support Program PRPQ No. P85114 (3174-WPCSP) or
- The 3174 needs the Peer Communication Licensed Internal Code feature with Configuration Support-C Release 1 (or later), or the Peer Communication RPQ 8Q0718 with Configuration Support-B.

3.2.7 Asynchronous Gateways

For ASYNC (Advantis IIN) attachment, you need an asynchronous modem and an IBM Information Network subscription for a Serie/1 Gateway.

For Home3270 attachment, you need an asynchronous modem and one of the following protocol converters:

- IBM 3174 Asynchronous Emulation Adapter (AEA)
- IBM 3708 Network Conversation Unit
- IBM 7171 ASCII Device Attachment Control Unit
- IBM 9370 ASCII Subsystem

For Advantis (Passport) attachment, you need an asynchronous modem and an IBM Information Network subscription.

For SNA-A attachment, you need an asynchronous modem and an IBM Communications Manager/2 Version 1.11 SNA-A gateway or an AS/400 with an ASCII Workstation Controller.

For Hayes AutoSync attachment, you need a Hayes AutoSync compatible modem and a S/390 or AS/400 host system with SDLC communication attachments.

Chapter 4. Compatibility and Limitations

Personal Communications Version 4.1 has been tested for compatibility with the following programs. However, compatibility should not be assumed for all environments (host connections and emulation functions provided by PC/3270 V4.1, PC400 V4.1 and PC400 and 3270 V4.1).

4.1 Personal Communications Compatibility

Users of Personal Communications Version 4.1 *must* verify the availability of sufficient application memory space based upon the host connection, emulation functions configured and other DOS or OS/2 requirements and system extensions selected.

4.1.1 Operating Systems

The following are the operating systems that are compatible:

- Disk Operating System Version 5.0 or later release
- Microsoft Windows Version 3.1 **W**
- Novell DOS 7
- IBM Operating System/2 (OS/2) Version 2.1 or 2.11 **0**
- IBM Operating System/2 (OS/2) for Windows Version 2.1 or 2.11 **0**
- IBM Operating System/2 (OS/2) Warp Version 3.0 and Warp Version 3.0 (Full-Pack) **0**
- IBM Operating System/2 (OS/2) Warp Connect Version 3.0 or later release **0**

4.1.2 Application Programs

The following are the application programs:

- IBM Professional Office System (PROFS) Application Support Feature (PASF) Version 2.2.2 PC Interface **D** (*3)
- IBM OfficeVision/VM DOS Office Direct Connect **D** (*3)
- IBM OfficeVision/MVS DOS Office Direct Connect **D** (*3)
- IBM Personal Services/Personal Computer (PS/PC) Version 1.3 **D** (*2)
- IBM GDDM-PCLK Version 1.1 **D** (*2)
- IBM EZ-VU II Version 1.0
- IBM Host Database View Version 2.1.1
- IBM DisplayWrite 3 Version 1.1
- IBM DisplayWrite 4 Version 2.0 (*4)
- IBM DisplayWrite 5 Version 1.0 or later
- IBM Personal Editor II Version 1.0
- IBM Assistant Series
- IBM Personal Application System/DOS for Windows
- IBM PC Local Area Network Program (LAN) Version 1.32, 1.33 or later (*5)

- The most current release of the LAN enabler (such as Network Transport Services/2) under OS/2 Version 2 when the adapter will be shared
- IBM TCP/IP Version 2.1 for DOS or later
- NetWare for SAA Version 1.3 or 2.1
- IBM DOS LAN Requester packaged with IBM OS/2 LAN Server Version 3.0 or later.
- Novell NetWare 386 Version 3.1 or higher (*6)
- IBM Communication Manager/2 Version 1.1, or later **O**
- IBM LAN Adapter and Protocol Support Version 2.0(NTS/2) or later for LAN connectivity **O** (*7)
- IBM TCP/IP Version 2.0 for OS/2 **O** (*8)
- Novell NetWare Version 1.2 or 1.3, and NetWare Client for OS/2 Version 2.1 or later **O**
- IBM PC Network Bridge Program
- IBM Token-Ring Network Bridge Program Version 2.1
- IBM Token-Ring Network Bridge Program Version 2.2
- IBM Workstation Connectivity Memory Management Enhancement **D**
 - Software Carousel Version 3, when used in conjunction with the IBM Workstation Connectivity Memory Management Enhancement. (*9)
- IBM Remote NetBIOS Access Facility Program Version 2.1 (RNAF 2.1) **D** (*10)
- IBM X.25 Co-Processor Support Program (5604-154) **D**
- IBM Real-Time Interface Co-Processor DOS Support Package (5686-001) **D**
- IBM 3174 Workstation Peer Communication Support Program (5799-PHL, RPQ# P85114) for 3174 Peer Communication or latest IBMXLN.DOS Workstation Peer Communications NDIS device drivers
- WordPerfect
- WordPerfect for Windows
- Excel for Windows
- Word for Windows
- Lotus 1-2-3
- Lotus 1-2-3 for Windows
- Freelance for Windows

The following programs are supported as local area network stations connecting to a System/370 host through the gateway services of IBM Personal Communications/3270 Version 3.1 via a token-ring adapter and the IEEE 802.2 interface of the IBM LAN Support Program:

- IBM Personal Communications/3270 Version 1.0 or later
- IBM PC 3270 Emulation Program Version 3.x
- IBM 3270 Workstation Program Version 1.1x
- IBM OS/2 Extended Edition Version 1.2 or 1.3
- IBM OS/2 Extended Services Version 1.0
- IBM OS/2 Communications Manager/2 Version 1.0

The above programs *must* be configured to communicate via IEEE 802.2 LAN and be installed with the most current LAN enabler or support program based on the operating system, physical adapter and co-resident program requirements.

Key:

D supported for DOS only

W supported for Windows only

O supported for OS/2 only

Notes:

- (*2) The PCSPCLK or LLAPI module of PC/3270 V4.1 (full-function mode) is required when running with these programs.
- (*3) The EHLLAPI interface is required when running with Professional Office System (PROFS) Applications Support Feature (PASF) PC Interface, IBM OfficeVision/VM DOS Office Direct Connect, or IBM OfficeVision/MVS DOS Office Direct Connect.
- (*4) If DisplayWrite Version 4.2 is required, the memory relief is provided by Personal Communications/3270 Version 4.1 usage of EMS by IBM DOS 5.0:- provided task swapper, or by PC/3270 V4.1 full-function mode provided task swapper could be considered to provide a DOS partition large enough for the DisplayWrite applications.
- (*5) LAN Support Program Version 1.33 or higher is required for PCMCIA adapters.

Users running the IBM PC LAN Program Redirector or DOS LAN Requester Program concurrently with PC/3270 V4.1 for DOS (Full-Function Mode) have between 282 and 337 KB of application space available, depending upon the emulation program configuration, the DOS version being used and other possible system overheads. The IBM DOS V5.0 task swapper or PC/3270 task swapper could be of benefit in this environment to provide available application space of 400-500 KB.

- (*6) For use with DOS 5.0 and IBM Token-Ring Adapters and Ethernet adapter.
 - Select Enable timeout :**Yes** and specify Timeout count properly on Edit Print Job Configurations menu of NetWare PRINTCON utility. The Timeout count is automatically set to **5** if Enable timeout :**Yes** is selected, and this value is recommended. If this timeout count is not specified, Print Server does not start printing.
 - In case of Host Directed Printing, the count should be increased properly depending on data transmission speed of the host. If this timeout count is too small, Printer Server will split one print job into several files.
- (*7) When using LAN connections and not using MPTS from OS/2 LAN Server V4.0 or OS/2 Warp Connect V3.0, NTS/2 is included with this package for OS/2.
- (*8) IBM TCP/IP Version 3.0 for OS/2 is part of OS/2 Warp Connect V3.0.
- (*9) If you configure Software Carousel Version 3 to use EMS, do not customize PC/3270 for EMS.
- (*10) This program allows remote PC users, once communications to the local area network has been established via RNF facilities, to use IBM Personal Communications/3270 Version 4.1 configured as a NetBIOS connection, to communicate to the System/370 host via a PC 3270 Emulation Program Version 3.0 gateway. With the combined functions of these two programs, users remote from an establishment's local area network can access the services of the network for file server capabilities and use the networks' PC 3270 Emulation Program Version 3 gateway connection for access to a System/370 host applications as a 3270 display device. If the LAN's primary gateway is a Personal Communications/3270 Version 4.1 system, an additional workstation *must* be installed on the LAN with IBM PC 3270 Emulation Program Version 3 configured as a token-ring gateway for the remote users' access. This system will provide to the remote users the NetBIOS interface needed while communicating via 802.2 through the Personal Communications/3270 Version 3.1 gateway to the host. This PC 3270 Emulation gateway appears to the Personal Communications/3270 Version 4.1 gateway as a single PU with multiple LUs attached.

4.2 General Limitations

However, when Personal Communications Version 4.1 is used, the following are not supported in those specified environments:

Key:

- D** supported for DOS only
- W** supported for Windows only
- O** supported for OS/2 only

4.2.1 3270 Limitations

Personal Communications/3270 Version 4.1 supports commonly used 3274 Control Unit features and capabilities. The following are the limitations for Personal Communications/3270 Version 4.1:

- Full APL characters are not printed by the print function, (only subset PC-APL is supported). **D**
- APL characters are not copied to the Clipboard by Cut, Copy, or Cpy Link functions as APL characters. APL characters are not printed by the print function. They are copied to the clipboard or printed as ANSI characters that have the same code points. **W**
- Graphic escape (full data stream, subset display support). **D**
- Host direct printing in APPC3270 Connection. **O**
- Coexistence of IBM 3270 PCMCIA adapter and IBM 3270 AT-bus communication adapter, or IBM 3270 connection adapter.
- Change of Printer Control Parameter in using PDT File.
- The Messenger and Server mode of IBM PC LAN Program are not supported. **W/O**
- Configuration C features:
 - Structured field and attribute processing (SFAP) (EBCDIC only)
 - Programmed symbols (PS) on attached workstations **W/O**
 - Decompression of PS load data
 - Attachment of local or remote R-Loop
 - Explicit partitions
 - X.21 communication protocol
- All functions of Entry Assist (only subset is supported).
- All IBM 3278 keyboard types except the IBM 3278 Typewriter keyboard.
- Certain IBM 3278 keys:
 - Extended attribute selection keys: color, highlighting, programmed symbols
 - Ident
- Magnetic stripe reader.
- Certain IBM 3287 Printer capabilities:
 - Mono/dual case switch/light
 - Test switch/light
 - Reset switch
 - Setup switch
 - Index switch
 - Control unit signal light
- Security keylock.
- Selector light pen.

- The following connectivities do not support multiple physical adapters including two RS232-C ports:
 - ASYNC IIN (IBM Information Network)
 - Home3270
 - SNA-over Async
 - Hayes AutoSync
- CUT function is provided with US English or Austria/German only and does not support the following: **W/O**
 - File Transfer
 - API (DDE, EHLLAPI, SRPI, PCSAPI)
 - ZipPrint
 - Host graphic
 - Editing functions other than Copy
 - Host direct printing
 - ALMCOPY **0**
- Home3270 does not support the following: **W/O**
 - Graphics
 - Passthru Print
 - SRPI
 - ALMCOPY **0**
- ASYNC/IIN, SNA-over-Async, and Home3270 line speed
 - ASYNC/IIN and SNA-over-Async up to 38.4 Kbps depending on workstation and configuration
 - Home3270 up to 57.6 Kbps depending on workstation and configuration
- Printer Definition Tables (PDT) are supported by PC/3270 V4.1 for OS/2, Windows and Full-Function DOS version. Unless PDTs are used Personal Communications/3270 Version 4.1 depends on the Windows and OS/2 environments printer device drivers to print data. Some printer device drivers do not support all characters that are used by PC/3270 V4.1. Such printer device drivers print an unsupported character as the most similar character (for example C instead of Copyright symbol) or as the default character of the printer driver (for example "_"). Personal Communications prints characters as well as the other applications.

In addition to the above restrictions, when using DFT communications attachment, the following features and capabilities of the IBM 3274 Control Units or the IBM 3174 Establishment Controller are not supported:

- Attachment to port 0 of the 3274
- Database operations
- 3270 Diagnostic Reset Dump
- Patch facility

Subsystem Local Copy is not supported by the IBM 3278 and IBM 3279 Display Stations and the IBM 3287 Printer.

Home3270 does not support the use of GDDM-PCLK.

TCP/IP connectivity has the following restrictions:

- The following functions are not available:
 - SDDLU (self-defining dependent LUs)
 - SNA session-level compression and decompression
 - LU type 1/3 host-directed printing **D**
- The maximum packet size must be less than 8,000 bytes for the file transfer.
- The following functions are not available in a DOS/Windows environment:
 - PC/3270 TCP/IP connection does not coexist with any TCP server applications such as FTPD and LPD. **D/W**
 - If another TCP client application works the background in the DOS session, PC/3270 TCP/IP connection must be in Resume Mode **D**
 - If another TCP client application in the DOS session is not closed, 3270 session cannot be logged-off or disconnected, and the PC/3270 TCP/IP connection cannot be terminated by Ctrl+Esc or PCSEND. **D**
 - PC/3270 TCP/IP does not coexist with the stealth mode of Quarterdeck's Expanded Memory Manager. **D/W**

IPX/SPX connectivity has the following restrictions:

- The following functions are not available:
 - SDDLU (self-defining dependent LUs)
 - SNA session-level compression and decompression
 - FMHI in an LU1 printer session **D/W**
- PC/3270 LAN via IPX/SPX cannot coexist with any other connection. **D/W**
- Hayes AutoSync connectivity requires a PC with 486 33 MHz or better. Maximum supported line speed is 9,600 bps.

Personal Communications/3270 Version 4.1 for Windows has the following limitations: **W**

- PC/3270 V4.1 runs in Enhanced mode of Windows.
- EHLLAPI support in the DOS virtual machine:
 - Storage manage(17) function is not supported.
 - Trace facility is not supported.
 - CONPHYS is not supported.
- ASYNC/IIN and Home3270 line speed.
 - 80286 with FIFO, not supported
 - 80386 without FIFO, up to 2,400 bps
 - 80386 with FIFO, up to 9,600 bps
 - 80486 without FIFO, up to 9,600 bps
 - 80486 with FIFO, up to 38,400 bps
- OS/2 Version 2.1, supported only WINOS2 Standard mode:
 - Host-addressable printing in the COAX (DFT) and SDLC environments is not fully supported when running PC/3270 V4.1 under OS/2 in a Windows virtual machine.
 - DOS mode API should be disabled under WINOS2 (PC/3270 does as a default).
- 3270 Passthru does not support AT Bus adapter card (Twinaxial)

The following IBM 3270 Workstation Program Version 1.1 functions are not supported:

- HLLAPI
 - Define/Delete/Display/Switch Presentation Space
 - Display Cursor
 - DOS Redirect
 - Get 3270 AID key
 - Invoke DOS program
 - Storage Manager (W)
 - Workstation Control
- LLAPI
 - Windows-Related Session Service Requests
 - Windows Manager Service Requests
 - Structured Field Related Host Interactive Service Requests
 - Presentation Space Service Requests
 - Keystroke Emulation Service Requests
 - Translate Service Requests
 - Multi-DOS Support Service Requests
- Subsystem Local Copy

4.2.2 5250 Limitations

The following are the limitations for Personal Communications AS/400:

- Printer Definition Tables (PDT) are supported by PC400 V4.1. Unless PDTs are used, the SCS control codes may not always be handled correctly, depending on the printer drivers and fonts being used. Personal Communications AS/400 Version 4.1 depends on the Windows and OS/2 environments printer device drivers to print data when the print driver is used. Some printer device drivers do not support all characters that are used by PC400 V4.1. Such printer device drivers print an unsupported character as the most similar character (for example C instead of Copyright symbol) or as the default character of the printer driver (for example "_"). Personal Communications prints characters as well as the other applications.
- The Messenger and Server mode of IBM PC LAN Program are not supported.
- The following connectivities do not support multiple physical adapters including two RS232-C ports:
 - SNA over Async
 - Hayes AutoSync
- Twinax Console attachment does not support the following:
 - File Transfer
 - Edit (except COPY) function
 - APIs (DDE/EHLLAPI/PCSAPI)
 - ENPTUI
 - Data Transfer
 - Shared Folder
 - PC Organizer
 - 132 column mode
 - Printer session

- Multiple sessions per one Twinax address
- Data Transfer does not support multiple invocations at a time
- SNA over Async line speed:
 - Up to 38.4 kbps, but actual results depend upon PC configuration **0**

Personal Communications AS/400 Version 4.1 for Windows has the following limitations: **W**

- PC400 V4.1 runs in Enhanced mode of Windows.
- The number of sessions currently supported is 16.
- SNA over Async line speed:
 - 80386 without FIFO, up to 2,400 bps
 - 80386 with FIFO, up to 9,600 bps
 - 80486 without FIFO, up to 9,600 bps
 - 80486 with FIFO, up to 38,400 bps
- Shared Folders does not support the following (Windows limitation):
 - MS-DOS prompt can not be used when the Shared Folder is used for the LAN, SDLC, and SNA over Async attachment.
 - Novell DOS prompt can not be used when the Shared Folder is used for the LAN, SDLC, and SNA over Async attachment.
 - MS-DOS prompt with full screen cannot be used when Shared Folders are in use (Use a window screen instead of full screen).
 - Novell DOS prompt with full screen cannot be used when Shared Folders are in use (Use a window screen instead of full screen).
 - A DOS program within a Shared Folder cannot be executed from the MS-DOS prompt.
 - A DOS program within a Shared Folder cannot be executed from the Novell DOS prompt.

Response time in a terminal environment depends upon a variety of system unit and data-communication load factors such as, line speeds, the number, type, and organization of terminals, the number and type of IBM PC Network commands and exits used, and the amount of processing done by the application program.

4.3 Performance Considerations

Response time in a terminal environment depends upon a variety of system unit and data-communication load factors. These include the type of the system unit processor, the number and type of communication adapters installed, the line speeds of the communication service, the organization of terminals, the number and type of network commands used, and the amount of processing done by the applications utilizing Personal Communications.

Chapter 5. Installation and Customization for DOS

Personal Communications/3270 Version 4.1 for DOS consists of the Full-Function Mode and Entry-Level Mode. PC/3270 V4.1 for DOS (Full-Function Mode) and for DOS (Entry-Level Mode) are two components of the Personal Communications AS/400 and 3270 Version 4.1 for Windows package that provide emulation of 3270 devices through connection to one or more S/390 hosts for use on PS/2 and PCs.

This chapter provides guidance, hints and tips on installing Personal Communications for DOS (Entry-Level Mode) and Dos (Full-Function Mode).

For a complete description of the installation procedure, please see the applicable publication for the desired PC/3270 V4.1 mode of operation. The following publications are shipped as a part of the product package:

for DOS (Entry-Level Mode)

- *Personal Communications AS/400 and 3270 Version 4.1 Full Function for DOS Up and Running*, SC31-8262

for DOS (Full-Function Mode)

- *Personal Communications AS/400 and 3270 Version 4.1 Entry Emulator for DOS Up and Running*, SC31-8263

The following sections assume a new installation is being performed, and shows a configuration example.

For each Personal Communications environment of operation, the installation program will use a different directory as follows:

PCS3270 for DOS (Entry-Level Mode)

PC3270 for DOS (Full-Function Mode)

Installation is simplified by making the program more intelligent about its operating environments and by choosing optimum defaults for most users. If you use the default names, you will have no conflict when you install Personal Communications for more than one environment of operation.

5.1 Installation Overview

Personal Communications is an easy-to-install application package running in an SNA or non-SNA environment. If PC/3270 is running in conjunction with a 3270 host system, the following host software is required:

- For a 3270 host system, it needs ACF/VTAM Version 3 (for SNA/SDLC) or ACF/NCP Version 4 Release 2 or later.

Personal Communications is subdivided into many different application programs all in one package for your target environment. It has many installation options to make it easy to install or migrate on a single workstation or over the network. Partitional installation as well as uninstall is possible.

First of all Personal Communications/3270 Version 4.1 for DOS has an Auto3270 starter diskette. This bootable Auto3270 starter diskette is provided for users who wish to use a PC workstation as a 3270 dependent display, without having to install the product. All the user has to do is to insert the Auto3270 starter diskette and start/reboot the machine.

The Auto3270 feature comes with Personal Communications for DOS (Full-Function Mode) on diskette #3. It supports the DFT attachment to the 3174 Establishment Controller.

The following limitations should be noted:

- A maximum of five host sessions, depending on the customization of the attached 3174.
- Screen size is 24 rows by 80 columns.
- No utilities are provided.
- A DOS session is not provided.
- Printer options are not supported.
- Expanded memory is not supported.

PC/3270 V4.1 for DOS (Entry-Level Mode)

It provides the coaxial Control Unit Terminal (CUT) attachment and the Home3270 asynchronous communication attachment through protocol converter for the DOS environment.

PC/3270 V4.1 for DOS (Entry-Level Mode) needs around 1.5 MB of disk space on the hard disk.

For the detailed installation procedure refer to 5.2, "Installation and Customization for DOS (Entry-Level Mode)" on page 97.

PC/3270 V4.1 for DOS (Full-Function Mode)

It provides support for all other connectivities for the DOS environment. PC/3270 V4.1 for DOS (Full-Function Mode) provides two installation methods:

- Quick Installation, whereby default parameters are used. It needs around 1.2 MB of disk space on the hard disk.
- Flexible Installation, whereby the end user specifies the parameters to be used. It needs around 1.2 MB or 3.3 MB of disk space on the hard disk depending on whether it is a full installation or not.

Flexible installation lets the user choose either of the following:

- a normal Network Station
- or Gateway Station

For the detailed installation procedure refer to 5.3, "Installation and Customization for DOS (Full-Function Mode)" on page 102.

5.1.1 General Installation Considerations

For some connection types it is necessary to install prerequisite software or device drivers in order to achieve communications in Mobile, Coax, LAN and WAN environments.

This document does not cover customizations in Mobile, COAX, LAN and WAN environments. Therefore, two other redbooks will be published for Personal Communications Version 4.1.

The following ITSO redbooks will be available in July 1996:

- Customizations in a mobile environment:
 - *Personal Communications for the Mobile Users.*
PCOMM 4.1 for DOS/Windows, OS/2, SG24-4456.
- Customizations in local (Coax, LAN), and WAN environments:
 - *Personal Communications for the Coax, LAN, and WAN Users.*
PCOMM 4.1 for DOS/Windows, OS/2, SG24-4688.

5.2 Installation and Customization for DOS (Entry-Level Mode)

Personal Communications/3270 Version 4.1 for DOS (Entry-Level Mode) provides the coaxial Control Unit Terminal (CUT) attachment and the Home3270 asynchronous communication attachment through protocol converter for the DOS environment.

In this section, we will provide guidance on installing and customizing Personal Communications/3270 Version 4.1 for DOS (Entry-Level Mode).

Before you start to install or configure PC/3270 V4.1 for DOS (Entry-Level Mode), please note that there are HELP panels for every field in the installation and configuration programs (INSTALL, PCSINST and CONFIG). These panels contain detailed information and we strongly recommend that you read each panel as you go through the configuration for the first time.

Notes:

- Unlike the PC 3270 Emulation Program Entry Level V2.0, it is not possible to install PC/3270 V4.1 for DOS (Entry-Level Mode) simply by copying the contents of the program diskettes onto a fixed disk. This is because some of the files are in a packed format.
- The Auto3270 diskette available with IBM PC 3270 Emulation Program Entry Level Version 2.0 does not exist for DOS (Entry-Level Mode).

To install Personal Communications/3270 Version 4.1 for DOS (Entry-Level Mode) on a fixed disk, do the following:

- Insert diskette #1 into the A: drive.
- Type A: at the DOS prompt and press Enter.
- Type INSTALL at the DOS prompt and press Enter.
- You will see the IBM logo panel and after a few seconds you get the introduction panel, which basically tells you how to use the function keys during the installation/configuration process.
- Press F8 to take you to the Create Configuration File panel.

The Create Configuration File panel is the same panel that will appear whenever you are doing configuration, or re-configuration, using the configuration program CONFIG.EXE.

```

Create Configuration File                                     More: -+
-----
Enter the required information.

Name of an existing configuration
file (optional) . . . . . [

Drive and directory where you will store
PC/3270 programs . . . . . [C:\PCS3270 ]

Name of new configuration file
(This is the name you will type to start
the program)
. . . . . [PCS3270 ]

F1=Help F3=Exit F7=Backward F8=Forward
```

Figure 11. Create Configuration File Panel for DOS (Entry-Level Mode)

The Create Configuration File panel allows you to specify your own subdirectory and startup batch file name. Don't use the same subdirectory that you use for PC/3270 V4.1 for DOS (Full-Function Mode).

Enter your preferred responses, and then press F8. This takes you to the Attachment Types panel.

```

Attachment Types                                           More: -+
-----
Press F10 to change choice.

Control Unit Terminal (CUT) . . . . . ⚡[No ]
ASCII Connection (Home3270) . . . . . ⚡[Yes]

F1=Help F3=Exit F7=Backward F8=Forward F9=Prev Choice F10=Next Choice
```

Figure 12. Attachment Types Panel for DOS (Entry-Level Mode)

The Attachment Types panel allows you to specify the type of attachment by using the F10 (next choice) key. Only one attachment type can be selected.

5.2.1 ASCII Connection (Home3270)

Select **No** for Control Unit Terminal and select **Yes** for ASCII Connection (Home3270).

Pressing F8 will take you to the Emulation Parameters panel.

```
Emulation Parameters                                     More: -+
-----
Press F9 or F10 to change the choice.

PC3270 start automatically after power on . . . . .  [No ]
Font to be used in 3270 session . . . . .          [3270 font]
Keyboard-type . . . . .                            [Enhanced  ]
Country . . . . .                                 [U.S (English) ]
Protocol Converter . . . . .                       [3174 ]

High Level Language Application Program
Interface (HLLAPI) . . . . .                       [No ]

F1=Help F3=Exit F7=Backward F8=Forward F9=Prev choice F10=Next choice
```

Figure 13. Emulation Parameters Panel - Home3270 Connection for DOS (Entry-Level Mode)

PC/3270 starts automatically after power is turned on, if it is set to Yes; the batch file name will be added to the AUTOEXEC.BAT to start PC/3270 for DOS (Entry-Level Mode).

ISO-9241-part3 and DIN-66234-capable font is available when it is used on an ISO-capable video chip/adaptor and monitor; the displayed screen conforms to the standard. To switch the font style to an ISO-capable font, the procedure written in the README file on product diskette #1 is required.

Make your choices for the keyboard type and the country.

The next option lets you choose the protocol converter. To explain this option and the following communication, modem and dial parameters, refer to the ITSO redbook *Personal Communications for Mobile Users. PCOMM 4.1 for DOS/Windows, OS/2, SG24-4456*.

After you did customize the communication, modem and dial parameters, come back to here and see the *End of Customization* panel.

5.2.2 Control Unit Terminal (CUT)

Select **Yes** for Control Unit Terminal if your PS/2 is connected via a coax cable to an IBM 3174 Establishment Controller, and select **No** for ASCII Connection.

Pressing F8 will take you to the Control Unit Terminal (CUT) Configuration panel

```
Control Unit Terminal (CUT) Configuration          More: -+
-----
Press F9 or F10 to change the choice.

PC3270 start automatically after power-on . . . . . ⚡[No ]
Font to be used in 3270 session . . . . . ⚡[PC font ]
Keyboard-type . . . . . ⚡[Enhanced ]
Country . . . . . ⚡[U.S (English) ]
Keyboard layout . . . . . ⚡[Emulation]
3270 Numeric Lock . . . . . ⚡[Yes]

High-Level-Language Application-Program
Interface (HLLAPI) . . . . . ⚡[No ]
Enhanced Connectivity Facilities (ECF) . . . . . ⚡[No ]

F1=Help F3=Exit F7=Backward F8=Forward F9=Prev choice F10=Next choice
```

Figure 14. Control Unit Terminal (CUT) Configuration - for DOS (Entry-Level Mode)

On the Control Unit Terminal (CUT) Configuration panel, select the appropriate options for your country configuration. Note that the selected country *must* be equal to the selected country in the Control Unit Customization Question #121 .

For more details on configuring CUT connections, see the ITSO redbook *Personal Communications for Coax, LAN, and WAN Users PCOMM 4.1 DOS/Windows, OS/2, SG24-4688*.

If you have entered your preferred responses, then press F8 to take you to the End of Customization panel.

```
End of Customization                               More: -
-----
You have now completed your selections and are ready to copy the PC/3270 files.
Press one of the following keys to proceed:

F6: Create configuration file and start to copy
F7: Review and change your selections

F1=Help F3=Exit F6=Install F7=Backward
```

Figure 15. End of Customization for DOS (Entry-Level Mode)

Create the configuration file and start the installation of PC/3270 V4.1 for DOS (Entry-Level Mode), press F6 to run the INSTALL program to copy and unpack all files to the target directory on hard disk. If you are only using the CONFIG program, without running the INSTALL program, then only the configuration batch file will be saved.

5.2.3 Memory Requirements (for DOS (Entry-Level Mode))

The amount of memory used by PC/3270 V4.1 for DOS (Entry-Level Mode) will vary according to a number of factors, including the host connection, font and additional facilities being used, such as HLLAPI and ECF.

Estimating Memory Requirements for CUT Emulation

Perhaps most importantly, these enhancements have been added to PC/3270 for DOS (Entry-Level Mode) CUT emulation without requiring any more memory than IBM PC 3270 Emulation Program, Entry Level Version 2.0. In all cases PC/3270 V4.1 for DOS (Entry-Level Mode) requires even less memory while providing more functions than Entry Level V2.0.

These requirements depend upon the following:

- Customized options
- Release level of IBM 3270 Connection Card or IBM PC 3278/79 Emulation Adapter

An additional 14 KB of memory is required for EEHLLAPI (plus the amount of memory required for your application), and an additional 12 KB memory is required for Enhanced Connectivity Facilities (ECF) (plus the amount of memory required for your requester).

There is no additional memory requirement for using the 3270 font style with a CUT attachment.

Note: Expanded memory is not supported in PC/3270 V4.1 for DOS (Entry-Level Mode).

Estimating Memory Requirements for Home3270 Emulation

When PC/3270 V4.1 for DOS (Entry-Level Mode) is configured for ASCII connection (Home3270), it requires some additional memory. Approximately 33 KB to 45 KB of RAM is required. There is no difference as to what type of protocol converter is used.

An additional 15 KB (plus application space) is required for AHLLAPI, and an additional 8 KB is required for the 3270 font style.

Remember that PC/3270 V4.1 for DOS (Entry-Level Mode) can be removed from memory by use of the Ctrl+5 (numeric keypad 5) keys in a host session.

5.3 Installation and Customization for DOS (Full-Function Mode)

PC/3270 V4.1 for DOS (Full-Function Mode) provides the coaxial Distributed Function Terminal (DFT), LAN via IEEE 802.2 attachments (using various protocols), LAN via TCP/IP, LAN via IPX/SPX, LAN via NetBIOS through an IBM PC 3270 Emulation Program 3.0 Gateway, 3174 Peer Communications, SDLC, X.25 and asynchronous communications such as ASYNCH for IIN, SNA-over-Async and Hayes AutoSync support to PC/3270 users as well as a variety of enhanced selectable functions, options and facilities for DOS (Full-Function Mode).

This program supports a wide variety of communications adapters. Except where precluded by adapter hardware interrupts, any valid combination of adapters may be installed for communicating to an S/390.

In this section, we provide guidance on installing and customizing PC/3270 V4.1 for DOS (Full-Function Mode). If you are familiar with the previous versions of PC/3270 for DOS (Full-Function Mode) installation, Version 4.1 has some enhancements on screens and functions, but its installation and configuration procedures are the same.

PC/3270 V4.1 for DOS (Full-Function Mode) lets you choose from the two following installation methods:

- Quick Installation allows you to install PC/3270 for DOS (Full-Function Mode) with a minimum of installation steps, whereby default parameters are used.
- Flexible Installation provides you a maximum flexibility for the installation of PC/3270 for DOS (Full-Function Mode). We explain this method in 5.3.1, "Flexible Installation for DOS (Full-Function Mode)."

Before you start to install or configure PC/3270 V4.1 for DOS (Full-Function Mode), please note that there are HELP panels for every field in the installation and configuration programs (INSTALL, PCSINST and CONFIG). These panels contain detailed information and we strongly recommend that you read each panel as you go through configuration for the first time.

Note: All files are in packed format on the diskettes; therefore, it is not possible to install PC/3270 simply by copying the files onto your hard disk. You may however, for your convenience, copy the diskettes to the hard disk, by using XCOPY with the /S option, then, install PC/3270 V4.1 for DOS (Full-Function Mode) from there.

5.3.1 Flexible Installation for DOS (Full-Function Mode)

To install PC/3270 V4.1 for DOS (Full-Function Mode) on a fixed disk do the following:

- Insert diskette #1 into the A: drive.
- Type A: at the DOS prompt and press Enter.
- Type INSTALL at the DOS prompt and press Enter.
- You will see the IBM logo panel and after a few seconds you get the introduction panel, which basically tells you how to use the function keys during the installation/configuration process.
- Press F8 to take you to the PC/3270 V4.1 Installation panel.

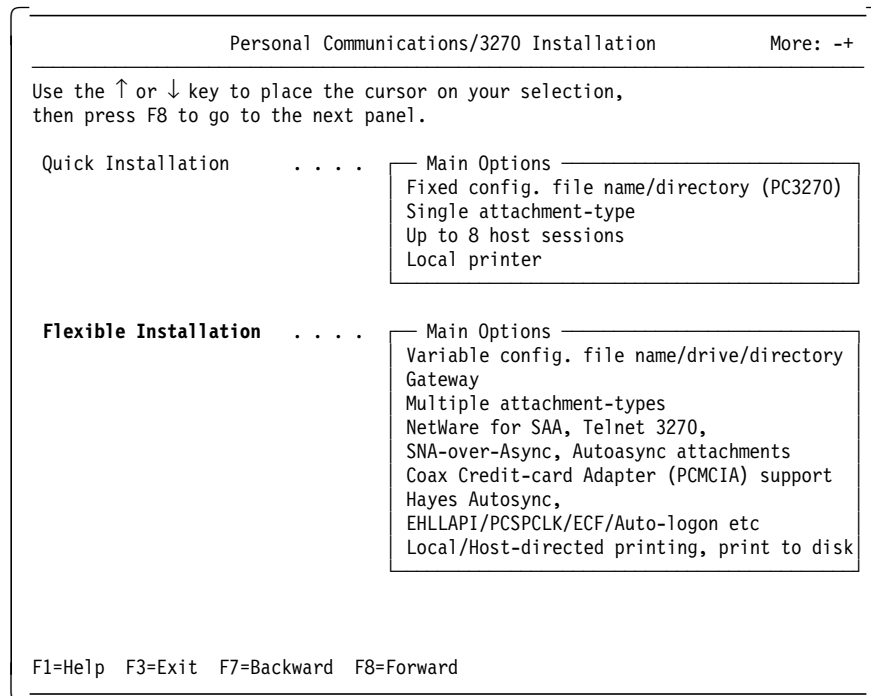


Figure 16. Personal Communications Installation Panel for DOS (Full-Function Mode)

On this panel, it can be seen that you have a choice of two types of installation: Quick Installation or Flexible Installation.

If you select Quick installation, the program will always be installed in a subdirectory named PC3270, and the batch file to start your emulation will always be named PC3270.BAT. You are given an opportunity to specify the drive. Only a single connection type will be allowed, and you will be unable to configure a gateway, a host printer session or an X.25 connection. To make any changes to the configuration, installation diskettes are required.

If you select Flexible installation, you get more configuration options, which we explain here. In this example, Flexible Installation is selected. Press F8 to take you to Create Configuration File panel.

The Create Configuration File panel is the same panel that will appear whenever you are doing configuration, or re-configuration, using the PC/3270 V4.1 for DOS (Full-Function Mode) configuration program CONFIG.EXE.

CONFIG.EXE is only available when you copy *all* of the PC/3270 program files to the target hard disk at the end of a flexible installation.

5.3.2 Configuring PC/3270 for DOS (Full-Function Mode)

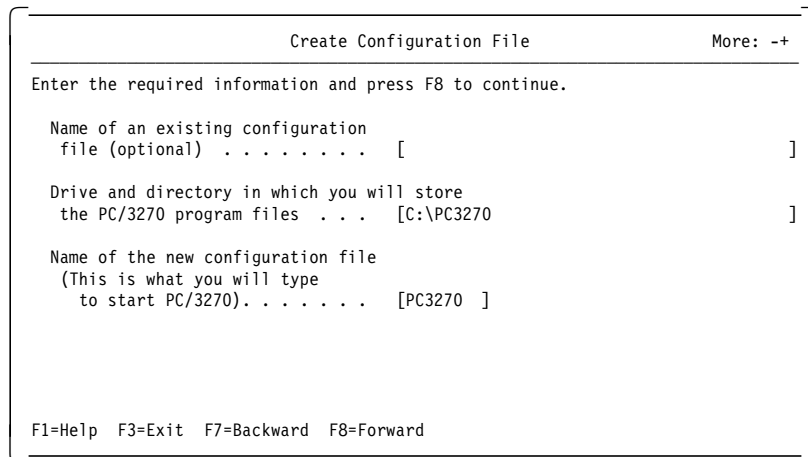


Figure 17. Create Configuration File Panel for DOS (Full-Function Mode)

The Create Configuration File panel allows you to specify your own subdirectory and startup batch file name. Enter your preferred responses, then press F8 to take you to the Choose Configuration panel.

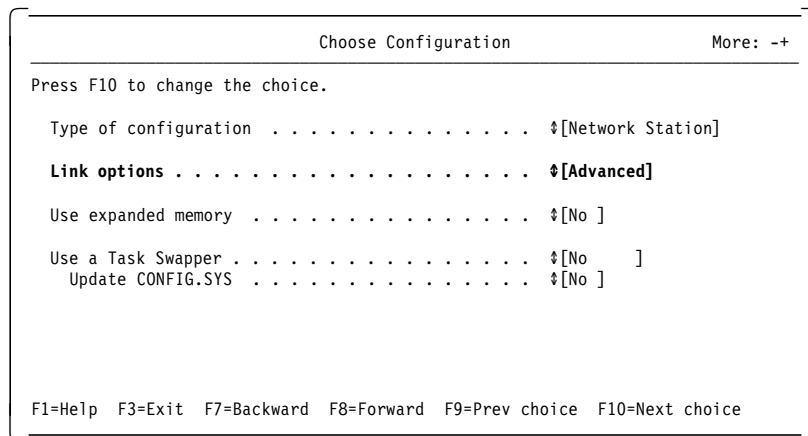


Figure 18. Choose Configuration Panel for DOS (Full-Function Mode)

The Choose Configuration panel allows you to specify the type of configuration you require: Network Station or Gateway.

For further details on configuring a gateway, refer to the redbook *Personal Communications/3270 Version 3.1 Implementation Guide*, GG24-4173, and Appendix D, "Gateway Installation" of *PC/3270 for DOS (Full) V4.1 Up and Running*, SC31-8262.

There are two choices for Link options as follows:

- The Base option will lead you through a simpler and quicker installation, but will allow only one type of host connection and uses default values. No X.25 connection is possible.

- The Advanced option should be selected if one of the following is necessary:
 - More than one LAN or communications adapter
 - More than one type of host connection
 - Connection to more than one gateway
 - Non-default SAP numbers
 - Non-default file-transfer packet size
 - Mapping of LU addresses or LT numbers to specific sessions
 - X.25 connection

Note: NetWare for SAA, TCP/IP and 3174 Peer Communications can not coexist with any other type of connection.

Select **Advanced for Link** options, as we explain in the following area. here.

If expanded memory is to be utilized on your workstation, then you must select **Yes** on the Use expanded memory option.

Two types of task swappers are available; a very small one allows PC/3270 V4.1 for DOS (Full-Function Mode) to swap out from active memory (PCSSWAP) and the DOS Version 5.0 or later task swapper (DOSSWAP) provides a task-switching function via the DOS shell menu panel.

Select **Yes** to update the CONFIG.SYS file when a task swapper is selected.

Pressing F8 will take you to the Attachment Types panel.

Advanced Link Options for DOS (Full-Function Mode)

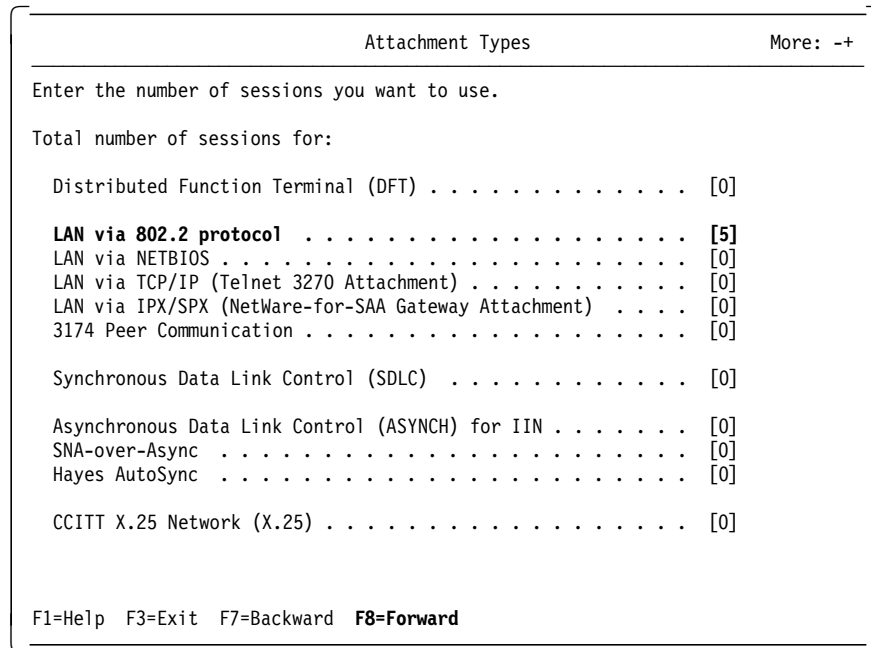


Figure 19. Attachment Types Panel for DOS (Full-Function Mode)

The Attachment Types panel allows you to enter the number of sessions you wish to configure for each attachment type. Type the required number of sessions directly inside the appropriate brackets.

Details on configuring relevant parameters for the different attachment types are given in *Personal Communications for Mobile Users PCOMM 4.1 DOS/Windows, OS/2, SG24-4456* and in *Personal Communications for Coax, LAN, and WAN Users PCOMM 4.1 DOS/Windows, OS/2, SG24-4688*. Please refer to the relevant chapter(s) for your attachment type(s).

Note: If you are configuring for any type of connection, except LAN via TCP/IP (Telnet 3270) and LAN via IPX/SPX (NetWare-for-SAA Gateway Attachment), you will receive the *Advanced Options for Network Stations* panel after you complete the specific panels to your attachment type(s). If you are configuring for LAN via TCP/IP or LAN via IPX/SPX, you will be forwarded to the *Screen Sizes* panel after you complete these attachment related panels.

We chose 5 sessions through a LAN via 802.2 attachment, as shown in Figure 19 on page 105; the Advanced Options for Network Stations panel will be presented, as shown in Figure 21 on page 107. First we show you an example here for the specific LAN via 802.2 attachment panels. Pressing F8 will take you to the Advanced Options for LAN Attachment via 802.2 Protocol panel.

```

Advanced Options for LAN Attachment via 802.2 Protocol  More: -+
-----
Enter the required information.

Total number of LAN sessions . . . . . 5
Link name . . . . . lan1
Destination address . . . . . [400008220210]
Number of sessions for this gateway . . [2]
Physical Unit ID . . . . . [05262]
Adapter number . . . . . [0]
Remote SAP/Local SAP . . . . . [04]/[04]
Block ID . . . . . [05D]
PIU size . . . . . [1929]

F1=Help F3=Exit F7=Backward F8=Forward

```

Figure 20. Advanced Options for LAN Attachment via 802.2 Protocol Panel - for DOS (Full-Function Mode)

The Advanced Options for LAN Attachment via 802.2 Protocol panel has many options that will affect connectivity. Note that Advanced has been previously selected for Link options, and gives you the capability of communicating through more than one gateway or to multiple hosts if required.

Note: The 802.2 connection can be a token-ring, a PC Network, Ethernet or an FDDI connection, depending on the adapter you have installed and how you have configured the LAN Support Program previously.

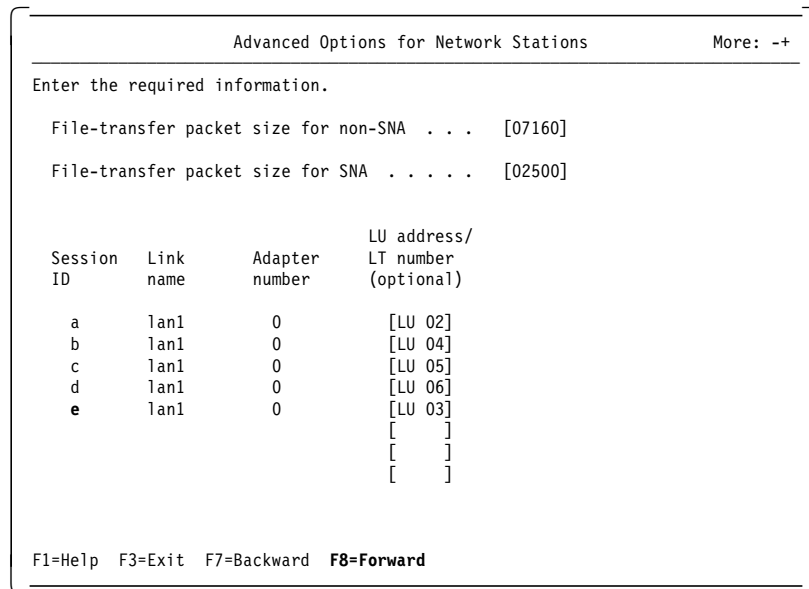


Figure 21. Advanced Options for Network Stations Panel for DOS (Full-Function Mode)

The Advanced Options for Network Stations panel allows you to specify the file transfer packet size. File transfer packet size is the number of bytes in each block of data transmitted or received. Larger values will generally provide better file transfer performance. The value 2500 is provided as default for SNA, and 7160 is provided as default for non-SNA. Only numerics 0-9 are allowed in these fields.

The acceptable range is from 2500 to 13000 for the LAN attachment through a 3270 Emulation Program Gateway attachment, and from 2500 to 8000 for the TCP/IP connection (Telnet 3270). For other attachments, the acceptable range is from 2500 to 32000, but the packet size is limited by the host file transfer program (IND\$FILE) level. Make this value as large as your host file transfer program will allow. A larger packet size value will not use additional memory on the workstation.

In the Advanced Option for Network Station panel, you can find the sessions and their Link name, which is assigned to each session and its adapter number, if more than one of the same name occurs. You may assign specific LU addresses (or LT numbers) to each session if, for some reason, you want the host sessions to appear in a particular order on the workstation. For example, you may want to assign a specific host LU address (maybe 03) which has been defined for a printer-to-printer session at the end, to session ID e.

Note: The Link name can be different for each attachment type. Only the DFT attachment will allow you to start the LT number at 01. All other attachments will begin with LU address 02, except ASYNCH, which does not allow LT/LU mapping.

Pressing F8 will take you to the Screen Sizes panel.

```

Screen Sizes                                     More: -+
-----
Press F9 or F10 to change the choices.

Session ID   Link name       Screen size
a           lan1           [24 x 80 ]
b           lan1           [32 x 80 ]
c           lan1           [43 x 80 ]
d           lan1           [27 x 132]
e           lan1           [24 x 80 ]
           [           ]
           [           ]
           [           ]

F1=Help  F3=Exit  F7=Backward  F8=Forward  F9=Prev choice  F10=Next choice

```

Figure 22. Screen Sizes Panel for DOS (Full-Function Mode)

The Screen Sizes panel allows you to specify screen sizes. PC/3270 V4.1 allows screens such as 24x80, 32x80, 43x80 and 27x132 to be displayed on VGA (or better) displays without scrolling.

Note: If you use a host print session (LU3) for 3270 data stream printing and you want to print 132 characters per line, you need to select the 27x132 screen size for that session.

Pressing F8 will take you to the Keyboard and Code Pages panel.

```

Keyboard and Code Pages                         More: -+
-----
Press F9 or F10 to change the choices.

Keyboard country .  ⚡[U.S. (English)      ]
Keyboard type . . . ⚡[Enhanced      ]
PC code-page . . . ⚡[437]
Host code-page . . ⚡[037 ]
Name of PCSKEY definition file for keyboard,
  colors and alarms (optional) . . [           ]

F1=Help  F3=Exit  F7=Backward  F8=Forward  F9=Prev Choice  F10=Next Choice

```

Figure 23. Keyboard and Code Pages Panel - for DOS (Full-Function Mode)

On the Keyboard and Code Pages panel, select the appropriate options for your country configuration.

It is still possible in PC/3270 V4.1 for DOS (Full-Function Mode) to create a definition file that will predetermine keyboard layout and screen colors, using the PCSKEY utility. However, if you have a VGA adapter or better, it is unlikely that you will do this as the new display setup and keyboard definition utilities makes this type of customization a simple, interactive process.

Note: The IBM Host-Connected keyboard is supported under Keyboard type. If you want to select *Host connected* in this field for France, Italy or United Kingdom, the Country field *must* be set to France #189, Italy #142 or United Kingdom #166 respectively.

Pressing F8 will take you to the PC/3270-Startup Options panel.

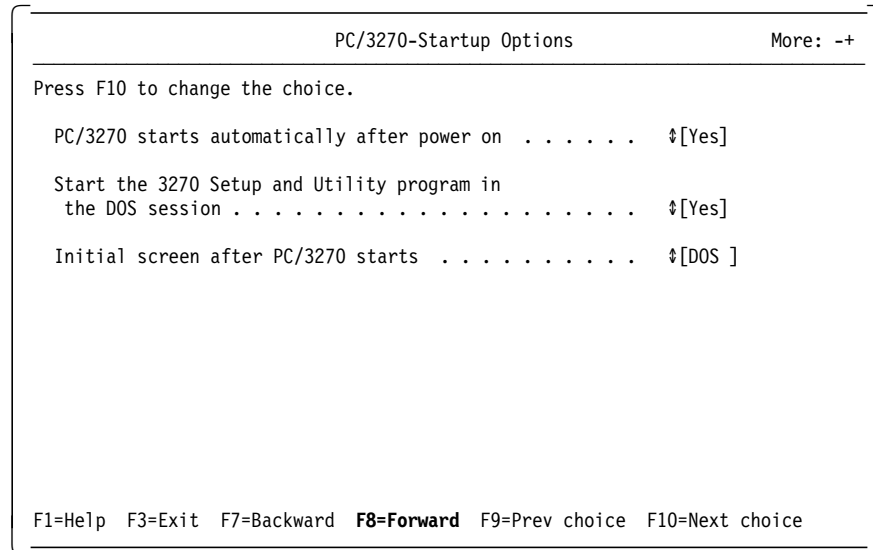


Figure 24. PC/3270-Startup Options Panel for DOS (Full-Function Mode)

The PC/3270-Startup Options panel allows you to specify the following three things:

1. Automatic PC/3270 starting after power on
2. Automatic starting of PCSUTIL (Setup and Utility program)
3. Initial screen after PC/3270 starts (DOS or Host)

If you decide not to start PC/3270 automatically, you will have to start it from the DOS command prompt by typing the name of the configuration file (batch file) you specified during installation (the default name is PC3270).

If you decide not to start the Setup and Utility program together with PC/3270, you can start it from the DOS command prompt by typing PCSUTIL.

After you start PC/3270, use the Ctrl and Esc keys to change between the DOS and host screens.

Now you have completed the configuration of your link options. You can move on to the Advanced Configuration Options panel by selecting **Yes** on the panel shown in Figure 25 on page 110, if required.

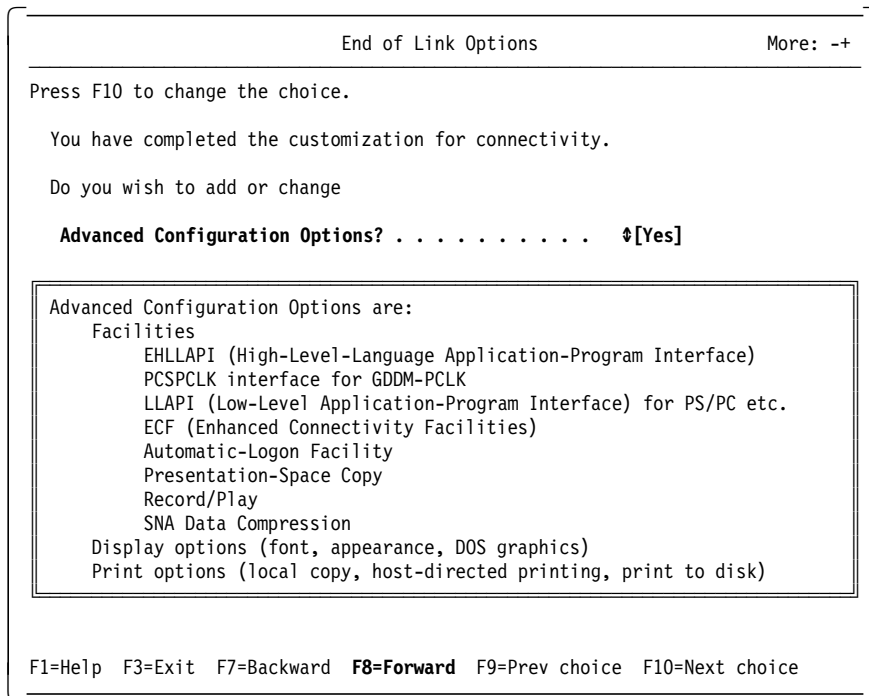


Figure 25. End of Link Options Panel for DOS (Full-Function Mode)

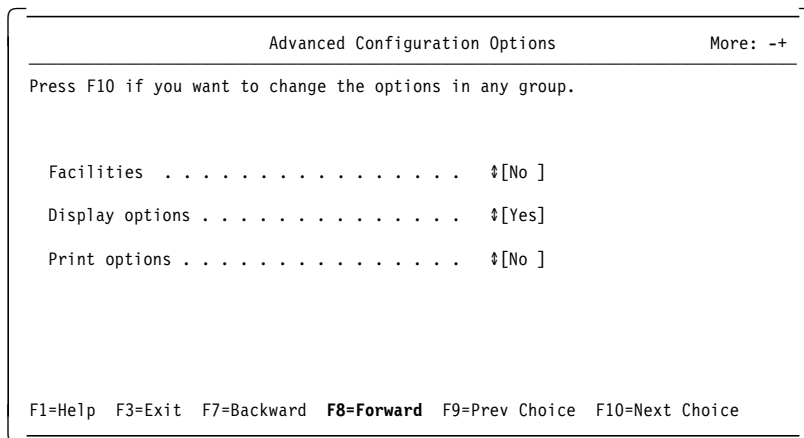


Figure 26. Advanced Configuration Options Panel for DOS (Full-Function Mode)

The Advanced Configuration Options can be selected on the panel above. There are some good facility options available on these panels. The facilities are well documented in the following:

- *Personal Communications/3270 Version 4.0 Installation and User's Guide for DOS (Full-Function Mode)*
- *Personal Communications AS/400 and 3270 Version 4.1 Full Fuction for DOS Up and Running, SC31-8262*

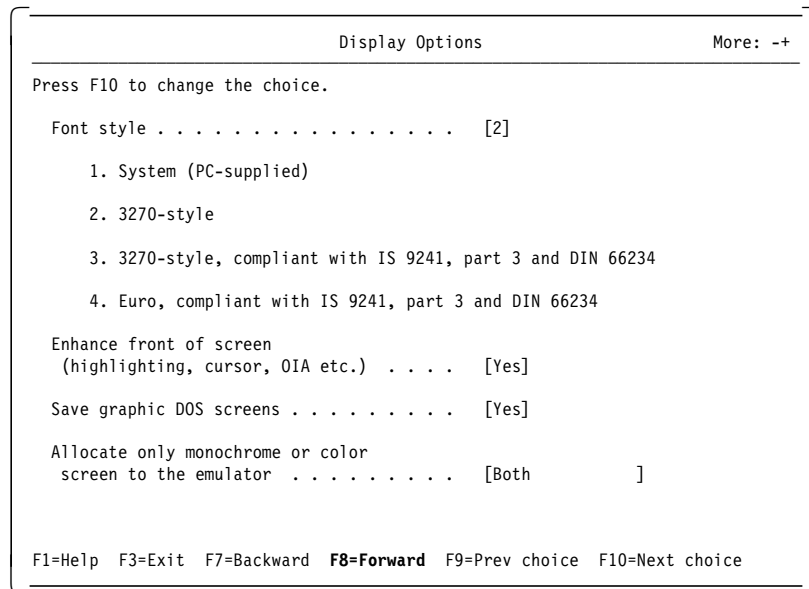


Figure 27. Display Options Panel for DOS (Full-Function Mode)

The Display Options panel has some good features that should be noted. You can now select from four different font styles as follows:

1. System (PC-supplied)

The ordinary PC font, as used in the DOS session. If you want to use the System font for the host sessions, as well as for the DOS session, select **1**.

2. 3270-style

Many people find this easier to read than the ordinary PC font. It is very similar to the font used by IBM 3472 displays and supports all the characters in code-page 850.

With this font, the character size is adjusted according to the screen format; the result is that all the supported screen sizes will be displayed in full, without the need to scroll.

VGA or better video capability is needed to display this font. If your PC's video capability is not good enough, this selection is ignored when PC/3270 is started.

This font is selected by default and uses 15 KB of memory.

3. 3270-style, compliant with IS 9241, part 3 and DIN 66234

This is a special version of the 3270-style font that complies with IS 9241, part 3 and DIN 66234. The PC's video capability and display also comply with these standards.

This font uses 15 KB of memory.

4. Euro, compliant with IS 9241, part 3 and DIN 66234

This font has a slightly different shape from that of the 3270-style font and is sometimes preferred in Europe. It complies with IS 9241, part 3 and DIN 66234 when the PC's video capability and display also complies with these standards.

This font uses 15 KB of memory.

Select 1, 2, 3 or 4 according to the font you want to use.

The Enhance front of screen option gives the emulated display a number of features that make it emulate a 3270 terminal more closely, such as extended attribute support, and a separate Operator Information Area (OIA) at the bottom of the screen. The default selection is **Yes**. If these facilities are not required, and you are trying to conserve usable DOS memory, then change it to **No**.

Notes:

- If you wish to display a complete 3270-M5 (27x132) screen on a VGA or 8514/A display, you *must* have selected one of the 3270 style fonts and you *must* specify **Yes** to for the Enhance front of screen option. If one or both of these options are not specified, then only 80 columns will be displayed and you will need to scroll to see the other columns.
- Before you toggle to a 3270-M5 session, you *must* exit DOS graphic mode applications. This is because the 3270-M5 screen is displayed in graphics mode in the above configurations and the graphic screen in the DOS session cannot be saved correctly.

The Save graphic DOS screens option also defaults to **Yes**. This is only applicable if you are likely to hot-key between a DOS graphics application and a host session. If this is not likely to occur, then change this option to **No**. This will save 5 KB of memory, but the DOS screen might not be restored correctly when you toggle to the DOS session.

The final option on that panel (Figure 27 on page 111), Allocate only monochrome or color screen to the emulator, is only applicable if you have a PC, XT or AT configured with two displays. If you are using a PS/2 then leave this option as both.

You have now completed your advanced configuration options. If you are running the INSTALL Program, pressing F8 will lead you to the Installation Options panel, before the *End of Customization* panel. If you are just using the CONFIG Program, without running the INSTALL program, pressing F8 will lead you directly to the End of Customization panel.

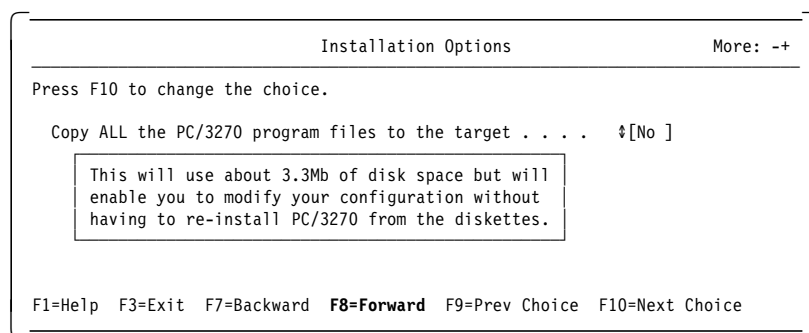


Figure 28. Installation Options Panel for DOS (Full-Function Mode)

If you only want to install a working PC/3270 V4.1 for DOS (Full-Function Mode) system, select **No** for the Copy ALL the PC/3270 program files to the target option. This will take about 1.2 MB disk storage. If you select **Yes** to install the full system, 3.3 MB will be used, but you will have the flexibility to change the configuration and run utility programs without the need for installation diskettes.

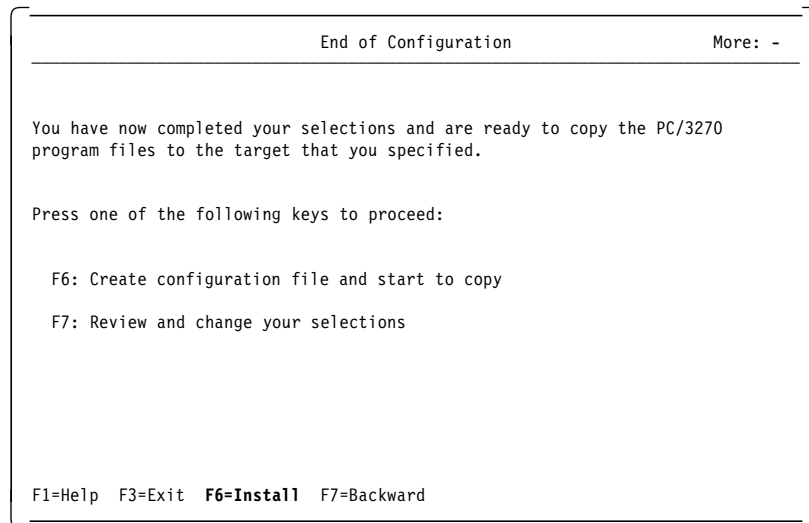


Figure 29. End of Configuration Panel for DOS (Full-Function Mode)

You now have the opportunity to review your configuration before you press F6 to start copying and unpacking the files. If you need to make any changes, be aware they will only be saved when F8 is pressed; that is, if you change an option and press F7 (to go back further), the change will not be saved. We recommend that you scroll back through the configuration panels until you find the earliest panel you need to change; then, make all required changes while you proceed (by pressing F8) to the End of Configuration panel.

Press F6 on the End of Configuration panel, to allow the INSTALL program copy and unpack the files to the hard disk. If you were just using the CONFIG program, then only the configuration batch file would be changed.

5.4 Memory Requirements (for DOS (Full-Function Mode))

The amount of memory used by PC/3270 V4.1 for DOS (Full-Function Mode) will vary according to a number of factors, including the type and number of host sessions, the host connection(s) used, the number of additional facilities being used, such as programming interfaces (for example, EHLLAPI and SRPI) and the value selected for PIU size.

- Gateway

When operating as a PC/3270 V4.1 gateway, a minimum of 512 KB of main memory is required. 640 KB minimum of main memory is required for an X.25 gateway.

- Workstation

The stated minimum requirement for a workstation configuration is 384 KB of main memory to allow for configuration, installation and operation. However, it is recommended that each workstation be equipped with 640 KB to provide flexibility in running emulation tasks and DOS applications. Users of the program are responsible for determining memory requirements for their particular operating environments.

- LAN-connected workstation

When configuring PC/3270 V4.1 for DOS (Full-Function Mode) to communicate via a LAN adapter, the memory used by the IBM LAN Support Program Version 1.3 *must* be taken into consideration. If communication will be via IEEE 802.2, the amount of memory required for the 802.2 interface is as follows:

- Token-ring adapter: 16 KB
- PC Network adapter: 34 KB
- Ethernet or IBM FDDI adapter: 39 KB plus the size of the NDIS driver (19 KB for the IBM Ethernet adapter)

If NetBIOS is being used, then an additional 23 KB will be required. NetBIOS may be required either because the PC/3270 V4.1 workstation is communicating via a PC 3270 Emulation Program Version 3.05 gateway, or a DOS LAN application is also being run on the workstation, such as DOS LAN Requester or PC LAN Program Version 1.34.

In a situation where it is necessary to have as much DOS application space available as possible, users of PC/3270 V4.1 for DOS (Full-Function Mode) might consider the following:

- PC/3270 V4.1 for DOS (Full-Function Mode) is able to use upper memory blocks (UMB) automatically if they are available.
- Expanded memory may be used to increase the amount of memory available for DOS applications.
- PC/3270 V4.1 for DOS (Full-Function Mode) provides task swapper capabilities to swap out most of PC/3270 V4.1 resident memory, while the communications link to the host is maintained by data-link-control memory management programs. The following two types of task swappers are available:
 - **PCSSWAP** swaps most of PC/3270 V4.1 out of active memory, providing a large block of free memory in which you can run another DOS application. Only 12 to 15KB of resident memory will be used by PC/3270 V4.1. To use this function, enter PCSSWAP on the DOS command prompt; when you have finished using the other DOS application, terminate it and enter EXIT at the DOS command prompt.
 - **DOSSWAP** supports the DOS Version 5.0 task-switching functions via the DOS shell menu. PC/3270 V4.1 for DOS (Full-Function Mode) can use this capability and will work as one of the DOS tasks. This allows you to switch to other DOS applications without terminating host sessions.

The following types of connections are supported:

- LAN via 802.2 protocol
- LAN via NetBIOS
- 3174 Peer Communication
- Synchronous Data Link Control (SDLC)
- Asynchronous Data Link Control (ASYNCH)

Note: This task swapper capability *must* be specified during the installation or configuration process.

- In an IEEE 802.2 LAN or PC Network NetBIOS-connected environment, memory relief to permit larger DOS applications to run in the DOS task area can be provided through the use of IBM Workstation Connectivity Memory Management Enhancement Version 1.10 in conjunction with Software Carousel Version 3. The combined use of these programs allows PC/3270 V4.1 for DOS (Full-Function Mode) to be swapped out of resident memory when there are no active host sessions (Carousel function), while the communications link to the host is maintained by Workstation Connectivity Memory Management Enhancement. The functions provided by Carousel and WCMME allow you to free up to approximately 400 to 500KB of memory for application use. The actual available application space is dependent upon the DOS version, DOS extensions and other device drivers installed in the system.
- Remember also that PC/3270 V4.1 for DOS (Full-Function Mode) can be removed from memory by use of the Ctrl+End keys in a host session, or by entering PCSEND at the DOS prompt or through a program. This capability is not available when PC/3270 V4.1 is configured as a gateway or gateway with workstation.

5.5 Estimating Memory Requirements (for DOS (Full-Function Mode))

To estimate the amount of memory required for PC/3270 V4.1 for DOS (Full-Function Mode), use the following three tables, based on the results of our tests. Select the planned host connection(s), the number and type of host sessions(s) emulated, and additional program functions as desired. After totaling the amount of application space needed for your PC/3270 V4.1 configuration, add to this total the memory needed for your DOS configuration, additional device drivers, system extensions, and any other resident memory programs. Then subtract this combined total from available system memory to determine the memory available for DOS applications.

If the host connection is to be made via multiple adapters, the total memory required may be less than the sum of the memory required for each type of connection. The memory requirements shown for the base program include support for extended highlighting and 4 or 7 color mode.

When estimating memory requirements necessary for the operating environment, additional memory should be allocated for the appropriate country keyboard required.

Note: These tables are not applicable if EMS configurations or UMBs are available for PC/3270 V4.1. The memory requirements listed are for conventional memory space (addresses from X'00000' to X'9FFFF').

<i>Table 19. Base Program Memory Requirement</i>	
Base Program:	
- Without Print Options	94 KB
- With Print Options	101 KB

<i>Table 20. Attachment Type and Session Memory Requirements</i>				
Attachment Types:	3270 Model Screen Size(in KB)			
	24 x 80	32 x 80	43 x 80	27 x 132
SNA DFT	50	53	57	61
Additional sessions	19	21	24	28
Non-SNA DFT	35	38	42	46
Additional sessions	9	11	14	18
LAN via IEEE 802.2	61	64	68	62
Additional sessions	13	15	18	22
LAN via NetBIOS	50	53	57	61
Additional sessions	19	21	24	28
3174 Peer Communication	58	61	65	69
Additional sessions	13	15	18	22
SDLC	58	61	65	69
Additional sessions	12	14	17	21
Asynchronous	69	72	76	80
Additional sessions	14	16	29	23
CCITT X.25 Network	260	263	267	271
Additional sessions	17	19	22	26
TCP/IP	111	114	119	122
Additional sessions	21	23	26	30
IPX/SPX	66	69	73	77
Additional sessions	15	17	20	24

Note: The memory requirement in column 27 x 132 is based on a 16-bit VGA or XGA display adapter for full-screen without specified 3270 style fonts (16-bit VGA is standard on PS/2 Models 35, 40, 56 and 57). If you wish to display a complete 3270-M5 (27x132) screen on a normal VGA or 8514/A display, you *must* have selected one of the 3270 style fonts and you *must* specify **Yes** for the Enhance font of screen option during the installation or configuration process. This adds an additional 45 KB to the attachment and 5 KB to the Additional sessions in column 27 x 132. If one or both of the options above are not specified, then only 80 columns will be displayed and you will need to scroll to see the other columns.

<i>Table 21. Additional Memory Requirements for Options</i>	
Facilities and Options	For all Session Types (in KB)
PIU Buffer Space (IEEE 802.2 LAN and 3174 Peer Communication only)	$[(PIU\ Size + 127)*8]/1024$
PIU Buffer Space (SDLC only)	$[(PIU\ Size + 49)*20 + (PIU\ Size * 14)]/1024$
SNA Data Compression	15 KB
Presentation Space Copy	11 KB
Record/Play Function	15 KB
EHLAPI (w/o buffer)	33 KB
PCSPCLK (for GDDM-PCLK)	39 KB
LLAPI	15 KB
Enhanced Connectivity Facility (SRPI)	35 KB
Enhanced Front of Screen	1 KB
3270 Style Fonts	15 KB
Save Graphics Screens (VGA, 8514/A, XGA)	4 KB
Save Graphics Screens (CGA, EGA)	8 KB
Local Copy	16 KB
Host-Directed Print and Local Copy	21 KB
Printer Definition Tables	Allow 1.5 - 3KB for each different PDT used (regardless of number of printers).

How to Use These Tables: To give an example of using the tables, let us assume that we wish to do the following:

- Configure the following three sessions via an IEEE 802.2 token-ring LAN connection:
 - One session with Model 2 (24 x 80) screen size
 - One session with Model 3 (32 x 80) screen size
 - One session with Model 5 (27 x 132) screen size
- Use local copy, but not host-directed printing.
- Use a PIU size of 265 bytes.

The following adds up to our total memory requirement:

- We start with the base memory requirement with print options of 102 KB from Table 19 on page 115.
- We need to add our session requirements from Table 20 on page 116:
 - Our largest session requires 72 KB (27 x 132).
 - The additional sessions require 13 KB (24 x 80) and 15 KB (32 x 80).
- Moving to Table 21, we need to calculate our PIU buffer space for a PIU size of 265 bytes.
- Local copy requires an additional 16 KB.

- Because we want to have a full 132-column display on a VGA or 8514/A we *must* allow for them as follows:
 - 3270 style font
 - Enhanced front of screen
 - Full-screen overhead (total 45 KB).

Note: See the note on Table 20 on page 116.

Our total requirement, therefore, is as shown in Table 22.

<i>Table 22. Example Calculation of Memory Requirement</i>			
Example Calculation of Memory Requirement	PC/3270 V3.1		PC/3270 V2.0
	16-bit VGA XGA(-II)	VGA 8514/A	
Base Program with Print Options	102 KB	102 KB	104 KB
Largest Session (27 x 132)	69 KB	69 KB	70 KB
Additional Sessions (24 x 80)	13 KB	13 KB	13 KB
Additional Sessions (32 x 80)	15 KB	15 KB	15 KB
PIU Buffer Space [(265 + 127)*8]/1024	3 KB	3 KB	3 KB
Local Copy	16 KB	16 KB	17 KB
Full 132-column Screen: - 3270 style font - Enhanced front of screen - Full-screen overhead		15 KB 1 KB 29 KB	5 KB 1 KB 23 KB
Total Memory Requirement	218 KB	263 KB	251 KB

To this figure *must* be added the LAN Support Program (17 KB), and the memory requirement of the DOS configuration, with any additional device drivers, or memory resident applications.

The final figure, when deducted from 640 KB, will give the memory available for DOS applications to run alongside the PC/3270 V4.1 configuration.

Note: The figures given for session memory requirements in Table 20 on page 116 apply to workstations with single host connection types only.

If more than one connection type is being used, then the actual session memory requirement will be *less* than the sum of the figures for each connection type from this table.

Chapter 6. Installation and Customization for Windows

This chapter provides guidance, hints and tips on installing Personal Communications/3270 running in 386 Enhanced mode of Microsoft Windows V3.1, or on Microsoft's Windows for Workgroup 3.11. Personal Communications/3270 has added support to run on a workstation where Windows for Workgroup 3.11 has been installed along with Microsoft's LAN manager; this workstation can then be utilized as a client to Microsoft's SNA Server for Windows-NT using the FMI interface.

For a complete description of the installation procedure, please see the related publication for the desired PC/3270 V4.1 mode of operation.

The following publication is available:

For Windows 3.1/3.11

- *Personal Communications AS/400 and 3270 Version 4.1 Up and Running! for Windows*, SC31-8261

The following sections assume a new installation is being performed, and will show a configuration example.

For each Personal Communications environment of operation, the installation program will use a different directory. For Windows 3.1/3.11 the default directory is PCOMWIN.

If you use the default names, you will have no conflict when you install Personal Communications for more than one environment of operation.

There is an easy migration from PC/3270 4.0 to Personal Communications AS/400 and 3270 Version 4.1. Personal Communications checks the configuration of PC/3270 4.0, generates profiles, and adds icons to the Program Manager automatically.

6.1 Installation Overview

Personal Communications is an easy-to-install application package running in an SNA or non-SNA environment. If Personal Communications is running in conjunction with a 3270 and/or 5250 host system, the following host software is required:

- For a 3270 host system, it needs ACF/VTAM Version 3 (for SNA/SDLC) or ACF/NCP Version 4 Release 2 or later.
- For a 5250 host system, such as an AS/400, it needs one of the following AS/400 software:
 - OS/400 Version 2 Release 1 or later
 - OS/400 Version 3 Release 1 or later
 - IBM PC Support/400 Version 2 Release 2 or later

Personal Communications is subdivided into many different application programs which are all in one package for your target environment. It has many installation options to make it easy to install or migrate on a single workstation or over the network. Partitional installation as well as uninstall is possible.

Personal Communications for Windows 3.1/3.11

It provides connectivity support to the Microsoft Windows 3.1 or Windows for Workgroups V3.11 users for a 3270 and AS/400 environment.

Personal Communications Version 4.1 for Windows the family of products includes two different versions to provide a full-function 3270 and 5250 workstation emulation as follows:

- Personal Communications AS/400 and 3270 Version 4.1 for Windows 3.1/3.11
- Personal Communications AS/400 Version 4.1 for Windows 3.1/3.11

Both versions can be installed as a Windows application, and they support Network Station capabilities in the native Microsoft Windows 3.1 or Windows for Workgroups V3.11 environment. The installation procedure differs with the usage of the workstation. It can be done from diskettes, from a network server or it can be shared from a network server. Personal Communications for Windows lets the user decide how it should be installed as follows:

- Full Installation requires about 11.8 MB disk space.
- Partial Installation requires 9.2 MB to 11.8 MB disk space.
- Minimum Installation requires about 9.2 MB disk space.

PC/3270 V4.1 for Windows 3.1/3.11 provides customization free DFT connection, that is, if you are connected via coaxial cable to an IBM 3174 Establishment Controller (or compatible controller). Double-click on the **Start/Configure Session** icon in the Personal Communications program group to start this connection.

Migrating from Personal Communications Version 4.0 for Windows does not require additional configuration.

For the detailed installation procedure refer to 6.2, "Installation for Windows 3.1/3.11" on page 121.

6.1.1 General Installation Considerations

For some connection types it is necessary to install prerequisite software or device drivers in order to achieve communications in Mobile, Coax, LAN and WAN environments.

This document does not cover customization in Mobile, COAX, LAN and WAN environments. Therefore, two other redbooks will be published for Personal Communications Version 4.1. The following ITSO documents will be available:

- Customization in a mobile environment:
 - *Personal Communications for the Mobile Users*
PCOMM for DOS/Windows, OS/2 4.1 , SG24-4456.
- Customization in a local (Coax, LAN), and WAN environments:
 - *Personal Communications for the Coax, LAN, and WAN Users*
PCOMM for DOS/Windows, OS/2 4.1 , SG24-4688.

6.2 Installation for Windows 3.1/3.11

In this section, we provide guidance on installing Personal Communications AS/400 and 3270 Version 4.1, and Personal Communications AS/400 Version 4.1 for Windows products in Windows 3.1/3.11 environments. The installation and configuration process is identical for both products, so that we do not need to cover each process separately. For simplicity we will refer to it as *Personal Communications for Windows* or *PCOMM for Windows*.

Before you start to install or configure, please note that Personal Communications for Windows has an excellent HELP feature. It provides HELP panels for every field and parameter during the installation and configuration process. These panels contain detailed information, and we strongly recommend that you read each panel as you go through the installation or a configuration part for the first time.

The installation of Personal Communications for Windows can be made from diskettes or executed from a network server. Furthermore, the subsequent customization task can be eliminated if the INSTALL program is passed with the names of preconfigured workstation profiles and workstation batch files.

- If you intend to install from a Network Server, see 6.2.2, “Installing PC/3270 V4.1 for Windows from a Network Server” on page 126.
- If you want to install with pre-configured profiles, refer to 6.2.1, “Installing with Preconfigured Profiles” on page 126 first.
- If you have a previous Personal Communications release and want to keep it, see 6.2.5, “Migration Considerations” on page 130 for necessary precautions.

Now we show you an installation from diskettes, assuming a new Personal Communications AS/400 and 3270 Version 4.1 for Windows installation. To install Personal Communications for Windows, perform the following steps:

- Start Microsoft Windows 3.1.
- Insert diskette #1 into the A: drive.
- Click on the **File** option of Program Manager window and select **Run** to get the Run panel.

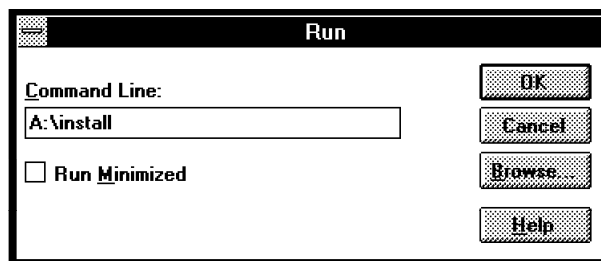


Figure 30. Windows Program Manager Run Panel

Type `A:\install` as shown and click on **OK**

Now it starts to read the diskette, and after a few seconds you will see the IBM logo panel, After a few more seconds you get the Personal Communications Licence panel as shown below.



Figure 31. Personal Communications Licence Panel

Type in your information and click on **OK**.

You will get a confirmation panel that lets you go back to change the entered information by clicking on **Change** or click on **OK** again to confirm. That takes you to the Personal Communications Emulation Selection panel as shown below.

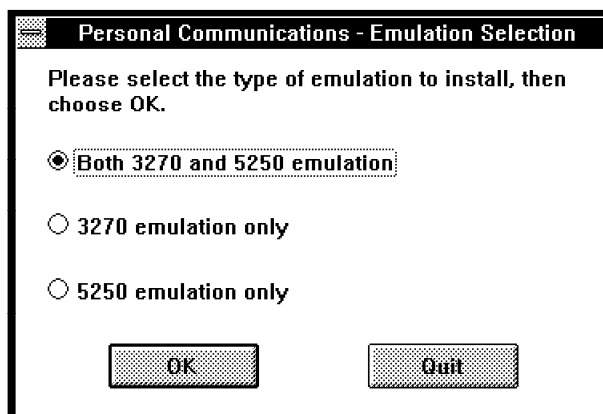


Figure 32. Personal Communications Emulation Selection Panel

If you want Both 3270 and 5250 emulation, select it or make your own choice; then, click on **OK** to proceed checking your system. You will see the message below.

Note: If you are installing from the Personal Communications AS/400 Version 4.1 emulation only package, the emulation selection panel will not appear.

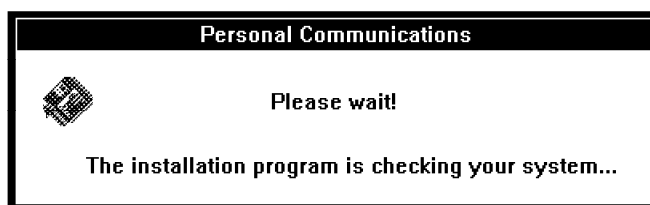


Figure 33. Personal Communications Checking your System Message Panel

After a while, you will get the Personal Communications Drive and Directory panel as follows.

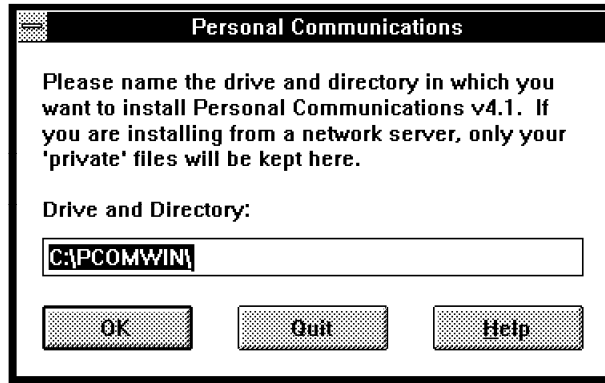


Figure 34. Personal Communications Drive and Directory Panel

Personal Communications allows you to use the default path (C:\PCOMWIN\), or specify a new one. Click on **OK**.

Note: The default path has been changed from the old path (C:\PCSWIN\), used for Personal Communications for Windows Version 4.0. If the PCOM installation program can find a statement in the WIN.INI file about previous versions, it takes that path as the default.

The next panel lets you choose the installation options.

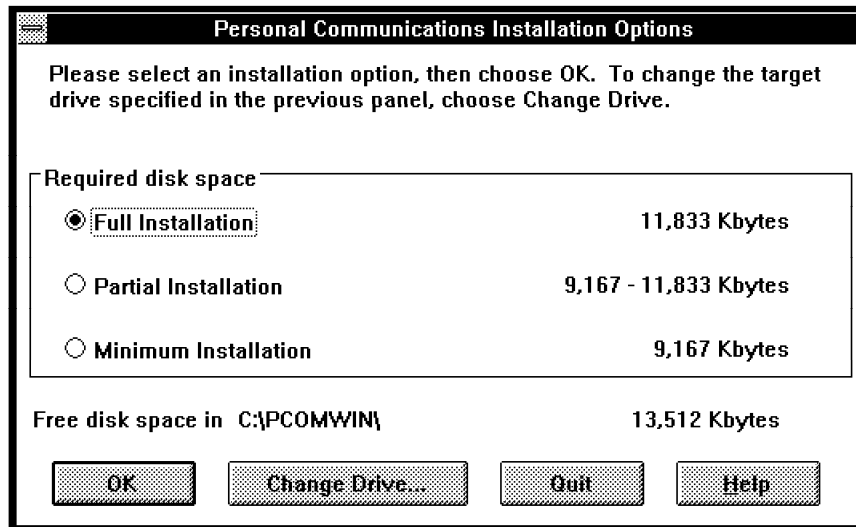


Figure 35. Personal Communications Installation Options Panel

On the Personal Communications Installation Options panel, you can choose from a Full Installation, a Partial Installation or a Minimum Installation, the required hard disk space ranging from 9.2 MB to 11.8 MB.

If you are not going to use Sample Programs for Visual Basic, Printer Definition Files and Tables, Alternate ANSI Font Set, Alternate APL Font Set and Sample Programs to install under OS/2, you can save disk space by specifying a Partial or Minimum Installation.

You also have the ability to go back and change the drive if you do not have enough disk space, or if you want to quit the installation.

If you want Full Installation, select it, and then click on **OK** to proceed.

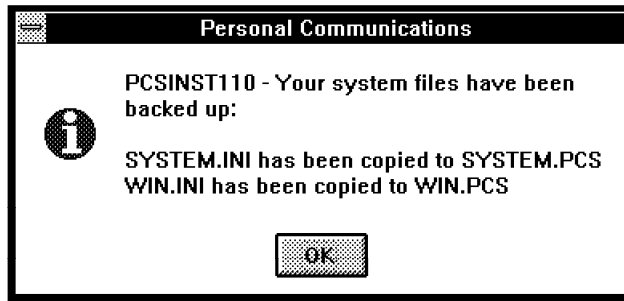


Figure 36. PCSINST110 - Your System Files Have been Backed Up - Message Panel

You will see the message above, saying your SYSTEM.INI has been copied to SYSTEM.PCS and WIN.INI has been copied to WIN.PCS. These are now located in the Personal Communications for Windows directory, which you chose previously (Figure 34 on page 123). You have to confirm this message by clicking on **OK**. Note that diskette £1 still has to be in diskette drive A.

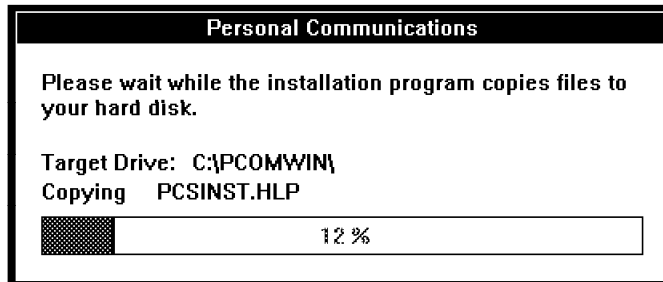


Figure 37. Installation Program Copying Panel

After some time, you will be prompted to insert diskettes £2 and up (Personal Communications for Windows has six diskettes). At each prompt you have the ability to cancel the installation process. Personal Communications Version 4.1 can do a restoration later on, after a previous installation process has stopped.

After all the files are copied, the Add Personal Communications Icons to Program Group panel will be displayed.

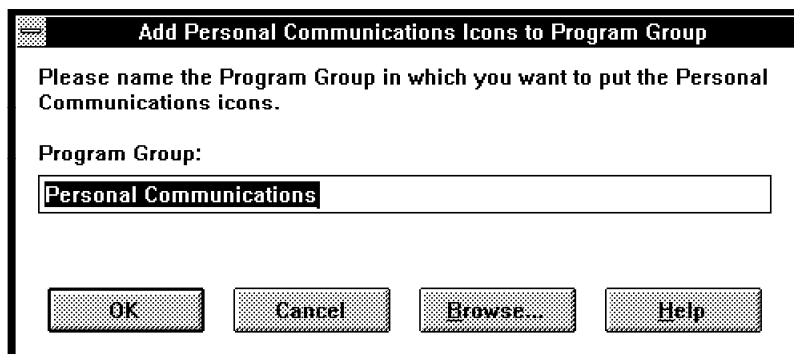


Figure 38. Add Personal Communications Icons to Program Group Panel

Click on **OK** to allow PCOM to add its icons to the new Personal Communications Program Group panel.

Another panel appears confirming where the icons were added. It should be your selected program group. Click on **OK** to continue.

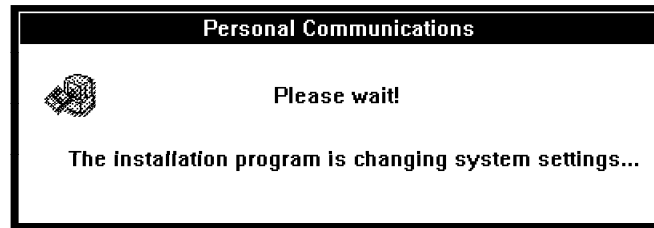


Figure 39. Personal Communications Changing System Settings Message Panel

After your system files have been modified, a completion message tells you that you completed the installation and everything is fine. Click on **OK** to continue.

Depending on your system configuration, you may see a message telling you to restart Microsoft Windows 3.1 to enable the changes.

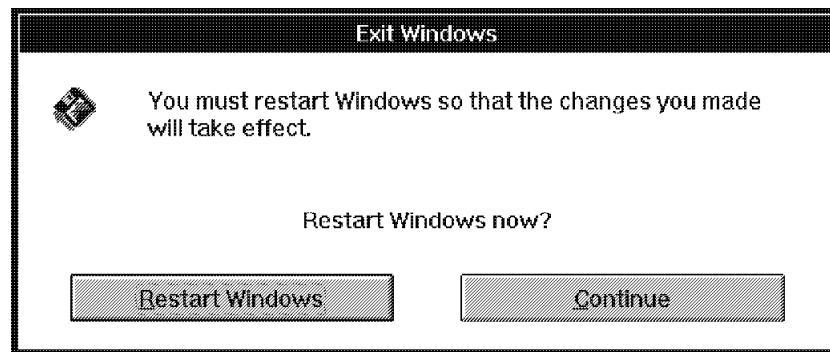


Figure 40. Exit Window Panel

After you restart Windows, the changes will take effect, and you may proceed to customization. As a result of the installation process, the following should be noted:

- The existing Windows WIN.INI and SYSTEM.INI files are saved to the Personal Communications directory with an extension of PCS (Figure 36 on page 124).
- The Windows WIN.INI file is updated by a new [PCSWIN] section, as follows:

```
[PCSWIN]
DIR=C:\PCOMWIN\
```
- The Windows [386Enh] section in the SYSTEM.INI file is altered to contain virtual devices and the parameters for Personal Communications for Windows, depending on the system configuration.
- The PCSWIN.BAT file is created in the directory in which the Personal Communications for Windows was installed.
- The PCSTSR.BAT file is also created depending on the system configuration.

- Some very useful information files are placed in the directory of the Personal Communications for Windows. These files are as follows:

README.TXT	Presents information supplementary to the online help and the publications about newly added functions, hints, tips, restrictions and corrections.
PCOM.TXT	Presents corrective service information for Personal Communications Version 4.1 and contains an APAR list of already installed Corrective Service Diskettes (CSDs).
SAMPCONF.TXT	This file contains sample system configuration files for some popular configurations.

Some of these files are automatically displayed if you double-click on the related icon in the Personal Communications program group.

6.2.1 Installing with Preconfigured Profiles

If your system administrator gives you preconfigured profiles or Batch program files, add their file names to the Install command, as follows:

```
A:\INSTALL.EXE B:\COAX1.WS B:\SLAN1.WS B:\BATCH1.BCH
```

When the installation program has installed the Personal Communications for Windows program files, it will create icons for these WorkStation profiles and batch program files.

6.2.2 Installing PC/3270 V4.1 for Windows from a Network Server

If you want to install the PC/3270 V4.1 Version for Windows from a network server, such as OS/2 LAN server, PCLP server, and NetWare server, you *must* first place the PC/3270 V4.1 for Windows files on the network server. To do that, the PC/3270 V4.1 for Windows INSTALL.EXE program has an administrative installation option /A that you can use to place PC/3270 V4.1 for Windows files on a network server.

- To place PC/3270 V4.1 for Windows files on a network servers start Microsoft Windows 3.1 and click on **File** on the action bar of the Windows program manager. Then choose **Run...** from the pull-down menu.
- Type A:\INSTALL.EXE /A in the Run window and choose **OK**, then follow the instruction.

If you will be sharing the PC/3270 V4.1 for Windows program files with other users from a network server, you *must* keep the following private configuration files on one of your own drives:

- WorkStation profiles (xx.WS)
- Batch program files (xx.BCH)
- Keyboard-definition files (xx.KMP)
- Popup-keypad files (xx.PMP)
- Macro files (xx.MAC)

This can be a drive on your own PS/2 system or your home-directory on the network server.

You can install the PC/3270 V4.1 for Windows from the network server in the same manner as from a diskette. To do that, the PC/3270 V4.1 for Windows INSTALL.EXE program has a network installation option /N that you can use to install PC/3270 V4.1 for Windows from a network server and share the program files on a network server with other users.

The network option does not copy the program files from the network, but creates private files to your personal directory on your hard disk or to your home-directory on the network server.

- To install a shared copy of PC/3270 V4.1 for Windows from a network, connect to the network server, start Microsoft Windows 3.1 and click on **File** on the action bar of the Windows program manager. Then select **Run...** from the pull-down menu.
- Type `N:\PCOMWIN\INSTALL.EXE /N` in the Run window and select the **OK** button. Then follow the instructions.

`N:\PCOMWIN\...` is the `netdrive:\path` (network drive and directory) where PC/3270 V4.1 for Windows is located.

If you do not use the `/N` option, you will be prompted to specify whether you want to share the files on the network server or copy them to your personal directory.

Follow the same instructions as the normal installation. You will not be prompted to insert the remaining IBM Personal Communications V4.1 for Windows diskettes #2 and #3 in drive A:.

6.2.3 Modifications to the Microsoft Windows 3.1 System Files

During an installation or configuration process, Personal Communications asks you to change the current system settings. It is easier to let PCOM do it for you. The following changes appears to the Microsoft Windows 3.1 system files.

Modifications to the WIN.INI File

The WIN.INI file is always modified when you installing the Personal Communications for Windows. During the installation procedure the following changes will be added or modified in the WIN.INI file:

```
[PCSWIN]
DIR=C:\PCOMWIN\
```

`C:\PCOMWIN\` is the `drive:\path` (drive and directory) where PCOM for Windows is located (by default). When you are upgrading from Version 3.1, the default path was `C:\PCSWIN\`.

Note: If you plan to keep a previous version on your system, only [PCSWIN] section can be active at a time. You must change the path statement before starting Microsoft Windows 3.1 and Personal Communications, which you want to use.

Modifications to the SYSTEM.INI File

The following virtual devices and the parameters for them are added to the [386Enh] section of the SYSTEM.INI file depending on the system configuration for a mobile ThinkPad, as follows:

```
[386Enh]
:
EMMExclude=C800-CFFF
VPol1HeapSize=XX
device=C:\PCOMWIN\Vpol1D.386
device=C:\PCOMWIN\Vdosh11D.386
device=C:\PCOMWIN\VpcsrtrD.386
device=C:\PCOMWIN\Vint21hD.386
```

device=C:\PCOMWIN\VvpprtD.386

- VPOLL.D.386 virtual device specification provides the conventional memory for the virtual device or the DOS TSR programs. It is added if Microsoft Windows 3.1 is executing in the enhanced mode and some of the following conditions are satisfied:

- Windows is running in enhanced mode.
- Either VSLAND.386, VSDLCD.386 or VPCSRTRD.386 is added to the [386Enh] section in the SYSTEM.INI file
- Or if either PCSAEA.COM, PCSASYNC.EXE, PCSSDLC.EXE or PCSSLAN.EXE is added to the PCSTSSR.BAT file.
- A SDLC adapter, such as the IBM Multi-protocol adapter is installed in the system.
- A 5250 card, such as the IBM 5250 adapter/A card is installed in the system.

Note: Only a COAX connection for a DFT or CUT terminal emulation does not require the VPOLL.D.386 device in PCOM version 4.1.

- VPollHeapSize specifies the size (in kilobytes) of each buffer that VPOLL.D.386 allocates to the conventional memory. The buffer size will be calculated automatically for the device drivers or DOS TSR programs that are used and the number of sessions that run concurrently. If this value is too small to match all connections and sessions you want, the message PCSDLC010 appears.
- VPCSRTRD.386 virtual device specification provides the virtual device for TSR programs. It is added if Microsoft Windows 3.1 is executing in the enhanced mode.
- VINT21HD.386 virtual device is an interrupt 21 handler.
- The VDOSHLLD.386 is always added. This virtual device allows you to execute DOS HLLAPI program, built for Personal Communications, executing in a Windows DOS box when you are running Microsoft Windows 3.1 in enhanced mode.

Note: If you don't use DOS HLLAPI program in a Windows DOS box, you can remove it to save memory.

- EMMExclude is required to exclude memory used by the PCMCIA device drivers (refer to 8.2.1, "Installing PCMCIA Device Driver for DOS/Windows" on page 174).

Note: If you plan to keep a previous version on your system, only one set of the virtual devices can be active at a time. You must change the path for all devices manually in the SYSTEM.INI file before starting Microsoft Windows 3.1 and Personal Communications, which you want to use.

6.2.4 Modifications to the Personal Communications System Files

During an installation or configuration process, Personal Communications does change its own system settings.

The PCSWIN.INI File

This file exist in the \PRIVATE directory of Personal Communications and contains information about the program group, sessions, such as the last view, the used font and some session related options, a user can modify from the *Apperance* and *Window* pull-down menu.

The PCSWIN.BAT File

If you *must* use Microsoft Windows 3.1 in standard mode or if you have Async3270 (IIN), SNA-overAsync, Home3270 or Hayes AutoSync connection, the PCSWIN.BAT and PCSTR.BAT files may be used instead of WIN.COM depending on the system configuration.

```
@echo off
C:\PCSWIN\PCSLOGO.EXE
call C:\PCSWIN\PCSTR.BAT
C:\WINDOWS\WIN.COM %1 %2 %3 %4 %5 %6 %7 %8 %9
C:\PCSWIN\PCSEND.EXE
@echo on
```

The PCSWIN.BAT file is created in the directory where Personal Communications for Windows is installed. The program loads DOS TSR programs necessary for communication by calling PCSTR.BAT and then starts Windows. After Windows completes, it unloads DOS TSR programs by calling PCSEND.EXE.

Note: This program is not required, since Personal Communications Version 4.1 supports virtual communication drivers (VCD) for asynchronous connectivities.

The PCSTR.BAT File

The PCSTR.BAT file loads the DOS TSR program that is necessary for the communication and is created depending on the system configuration as follows:

- PCSPOLL.EXE was used by PC/3270 V3.1 or V3.0 and is added only when the following conditions are satisfied:
 - Microsoft Windows V3.0/3.1 is running in standard mode.
 - Either PCSAEA.COM, PCSASYNC.EXE, PCSSDLC.EXE, PCSSLAN.EXE or PCSVLAN.EXE is added to the PCSTR.BAT file.

The PCSPOLL.EXE program offers conventional memory for the DOS TSR programs.

- A Async3270 (IIN), SNA-overAsync, Home3270 or Hayes AutoSync communication needs to load as a device in Windows 386 enhanced mode without previously loading PCSPOLL.EXE.

```
@echo off
C:\PCOMWIN\PCSPOLL.EXE /B=XX
C:\PCOMWIN\PCSxxxx.EXE
@echo on
```

The option /B of PCSPOLL.EXE is used to specify the size of buffers in KBs which will be allocated in convention memory. If you encounter the conventional memory allocation error message, you may need to increase this value (>38 KB)

Note: The PCSWIN.BAT and PCSTR.BAT are not required any more, since Personal Communications Version 4.1 supports virtual communication drivers (VCD) for asynchronous connectivities. These are used if Microsoft Windows 3.1 runs in standard mode.

Configuration and User Defined 'Private' Files

All configuration and user defined 'private' files are located in Personal Communications ...\PRIVATE directory. Here is a list of these files with its extensions.

- User profile files AS/400 (*.UPR)
- Modem control information files (*.DAT)
- PCOM initialization file (PCSWIN.INI)
- Keyboard-definition files (*.KMP)
- Popup-keypad files (*.PMP)
- Macro files (*.MAC)
- User profile files AS/400 (*.UPR)
- Vital product data file (PCSVPD.DAT)
- Modem control information files (*.DAT)
- Automatic-dial utility files (*.ADU)

6.2.5 Migration Considerations

The migration process of a previous version, such as PC/3270 V4.0, PC/3270 V3.1, PC/3270 V3.0 or PC400 V4.0 for Windows is almost the same and easy as the installation process. A migration requirement can also be an upgrade from a PC/3270 V4.1 or PC400 V4.1 single package to a PC400 and 3270 V4.1 combined package. Anyway, a new version of Personal Communications Version 4.1 will discover all configuration and user defined 'private' files of a previous installation and can convert it to the new format.

When upgrading a previous installation on a Microsoft Windows 3.1 system, start with the installation process, as written in section 6.2, "Installation for Windows 3.1/3.11" on page 121. Follow them up to Figure 34 on page 123, that ask you for the drive and directory in which you want to install the new version. By the default, it prompts you with the drive and directory in which a previous version of Personal Communications is installed. Take this path statement if want to replace all previous program files.

If you want to keep the previous installation, then you must enter a new path statement for the new product. Then you can follow the installation process.

If you choose the offered path statement, you'll be prompted with some messages to verify, overwriting the previous installation.

When answering those messages by clicking on **Yes**, Personal Communications deletes all the previous program files and you can follow the installation process, as normal.

Before Personal Communications ask you for the name of the program group, where you want to put the program icons, you'll be prompted with message PCSINST018.

Click on **Yes** if you want to migrate all configuration and user defined 'private' files of your previous installation and convert it to the Personal Communications Version 4.1 format. Then follow the installation process, as normal.

Upgrading from PC/3270 V2.0 for Windows

If you have Personal Communications Version 2.0 for Windows already installed and you want to upgrade it to V4.1, this is performed during installation.

Personal Communications AS/400 and 3270 Version 4.1 upgrades the configuration file (xx.CNF) from V2.0. The configuration file will be interpreted and the workstation profiles (xx.WS) and the batch file (xx.BCH) are created in the private subdirectory of PC400 and 3270 V4.1. All configuration files (xx.CNF) in the current private directory get migrated.

In creating the WorkStation profiles, the session information in the initialization file (PCS3270.INI) and all your customized files, listed above, the directory in which PC/3270 V2.0 was installed will need to be modified so they have the format of PC/3270 V4.1 for Windows files.

A workstation profile will be created for each session of every PC/3270 V2.0 configuration file that has been migrated. The workstation profile will include everything that was associated with that session, including macros, keyboard definitions, screen colors and file-transfer options.

A workstation batch program file will be created for each PC/3270 V2.0 configuration file that has been migrated. This will include all the workstation profiles that represent the sessions that were defined in the Version 2.0 configuration file. A Batch Program icon will be added to the program group that you specify. It will be given the name of the PC/3270 V2.0 configuration file.

To install Personal Communications V4.1 for Windows on the system where PC/3270 V2.0 for Windows is installed, follow the normal installation procedure, but read the following notes beforehand.

Notes:

1. If you have started the Microsoft Windows 3.1 by typing PC3270W, exit from it and restart it by typing WIN.
2. The default drive and directory is the directory where PC/3270 V2.0 for Windows is installed (for example, C:\PC3270W).

It is *strongly recommended* that you do not change the drive and directory.

Although you can keep your existing Personal Communications Version 2.0 for Windows by specifying a new directory for PC/3270 V4.1 for Windows, you can not use both Version 2.0 and Version 4.1 in the same Microsoft Windows 3.1 system. Some parts of these versions cause serious conflicts.

If you do not change the drive or directory, you will see the message which asks whether you want to overwrite the PC/3270 2.0 for your confirmation. We strongly advise that you choose **Yes**.

3. The CONFIG.SYS file will be backed up to the directory in which you install the PC/3270 V4.1 as CONFIG.PCS in addition to the Windows WIN.INI and SYSTEM.INI files.

The device drivers for PC/3270 V2.0 are removed from CONFIG.SYS file as follows:

```
:  
DEVICE=C:\LSP\DXMCOMOD.SYS  
DEVICE=C:\PC3270W\PCS802.SYS <-- removed  
DEVICE=C:\LSP\DXMTOMOD.SYS 0=N ES=1 EST=2  
DEVICE=C:\PC3270W\PCSNETB.SYS <-- removed  
:
```

4. Finally, you will be prompted to restart your PS/2 system because the installation changed some of the Windows settings and the CONFIG.SYS file.

6.2.6 Memory Requirements (for Windows)

The amount of memory required to use PC/3270 V4.1 for Windows will vary according to a number of factors, including the following:

- Type and number of host emulated sessions
- Whether Windows is in standard mode or 386 enhanced mode
- Parameters selected for PIU size and file transfer buffers

PC/3270 V4.1 for Windows requires a minimum of 2 MB of system memory (including 640 KB conventional memory) when running in Windows standard mode, and 4 MB when running in 386 enhanced mode.

If multiple connection types are to be used (for example, token-ring 802.2 and DFT), then an additional 1 MB system memory is required. These figures are absolute minimums. You should allow additional memory for the other DOS and larger Windows applications which you are going to be running concurrently with PC/3270 V4.1 for Windows.

It is also recommended to add 1 MB for GDDM graphics WorkStation sessions, and approximately 1 MB memory for Graphics printer support. Memory requirements for the printer depend on the printer device driver.

The DOS virtual machine API requires more than 1MB of memory:

- When only one workstation is used and no other application programs are running with PC/3270 V4.1 for Windows except for DOS and Microsoft Windows V3.0/3.1.
- Approximately 50 KB of additional memory is required for each additional display workstation.
- Approximately 200 KB of additional memory is required for a printer WorkStation.

When estimating the following memory requirements, two types of memory use *must* be examined:

- Below-640KB memory requirement

The first is the memory used by PC/3270 V4.1 code which is loaded in the area below-640KB. This requirement is referred to as the below-640KB memory requirement. When estimating the requirements for this portion of memory, the user *must* ensure that all selected DOS parameters, device drivers, and other resident DOS programs are taken into consideration and added to the below-640KB PC/3270 V4.1 memory requirement.

- Windows-part memory requirement

The second type of memory to be estimated is that used by PC/3270 V4.1 code which can be loaded either above or below the 1 MB boundary. This requirement is referred to as the Windows-part memory requirement. This code is managed primarily by the Windows memory management system. These code requirements, combined with the below-640KB code requirements, contribute to the total system memory requirements.

The following sections can be used to estimate the amount of memory needed for a particular configuration of PC/3270 V4.1 for Windows.

Estimating Below-640KB Memory Requirements: The conventional memory requirement could be reduced up to 80% for PC/3270 V4.1 for Windows. This reduction removes the critical situation of available conventional memory in the Windows DOS box, which we had in previous versions. To estimate the amount of conventional (below-640KB) memory required for PC/3270 V4.1, use Table 23 on page 134 and select the planned host connection(s) to be used. Then add the memory requirement for link specified module and the data-transfer buffer size. After totalling the amount of application space needed for your PC/3270 V4.1 configuration, add to this total the memory needed for your DOS configuration, additional device drivers (including LAN Support Program if appropriate), system extensions, and any other memory resident programs.

The combined total *must* be less than 380 KB when any of the following configurations are used. But this should not be a problem with PC/3270 V4.1 for Windows if you work with Microsoft Windows V3.0/3.1 in standard mode or in enhanced mode.

- Windows in standard mode:
 - LAN via IEEE 802.2 or 3174 Peer
 - LAN via NetBIOS
 - SDLC
 - Any Multiple connections including any of the above
- Windows in 386 enhanced mode:
 - Asynchronous (IIN)
 - Asynchronous (Home3270)

Under these configurations, the below-640KB part of PC/3270 V4.1 for Windows is loaded as a TSR (Terminate-and-Stay-Resident) program before Windows is started. A PCSWIN.BAT file will be created during the customization process; when run, it will load the PC/3270 V4.1 for Windows TSR code and then start Microsoft Windows V3.0/3.1 for you.

Microsoft Windows V3.0/3.1 usually occupies about 150 KB to 200 KB of conventional memory in standard mode or 200 KB to 250 KB in 386 enhanced mode at startup time. Afterwards Windows needs about 50 KB in a Windows DOS box.

When configuring PC/3270 V4.1 for Windows to communicate via a LAN adapter, you *must* reserve the memory required by the IBM LAN Support Program. If communicating via IEEE 802.2, the amount of memory required for the 802.2 interface is estimated as follows:

- Token-ring adapter: 16 KB

- PC Network adapter: 34 KB
- Ethernet adapter: 39 KB plus the size of the NDIS driver (19 KB for the IBM Ethernet adapter)

If the NetBIOS interface is needed (for example, when communicating through an IBM PC 3270 Emulation Program V3.0 gateway or installed with the IBM DOS LAN Requester or PC LAN Program), an additional 23 KB should be allocated. These and any other user-installed system extensions should be accounted for when estimating below-640 KB space availability.

The memory requirements shown in Table 23 are only connection-dependent and of the data-transfer buffer size, which will be automatically calculated at installation or reconfiguration.

<i>Table 23. for Windows Below-640KB Memory Requirements</i>		
Link Connection(s):	Windows Standard Mode	Windows enhanced mode
LAN via IEEE 802.2 or 3174 Peer	0.6 KB	0 KB
+ Data-Transfer Buffer Size	8 KB	8 KB
LAN via NetBIOS	1 KB	0 KB
+ Data-Transfer Buffer Size	8 KB	8 KB
SDLC	13 KB	0 KB
+ Data-Transfer Buffer Size	16 KB	16 KB
Asynchronous (IIN)	22 KB	22 KB
+ Data-Transfer Buffer Size	16 KB	16 KB
Asynchronous (IIN)	8 KB	8 KB
+ Data-Transfer Buffer Size	1 KB	1 KB

Notes:

1. The PC/3270 V4.1 for Windows base program doesn't require conventional (below-640KB) memory.
2. CUT and DFT connections don't require conventional (below-640KB) memory.
3. The data-transfer buffer size (in kilobytes) specifies the following:
 - VPollHeapSize of the buffers that VPOLL.D386 allocates in conventional memory if Windows runs in enhanced mode.
 - /B= parameter of the buffers that PCSPOLL.EXE allocates in conventional memory if Windows runs in standard mode.
4. The data-transfer buffer size can be increased in steps of 4 KB (exactly 4096 bytes).

Estimating Windows-Part Memory Requirements: PC/3270 V4.1 for Windows consists of below-640 KB code and Windows-part code. Windows-part code is loaded by Windows either above or below the 1 MB boundary. Some of the Windows-part code is non-discardable. The rest of the Windows-part code is discardable; this means that Windows may discard it to make room for loading other code. The discarded code is reloaded by Windows automatically when the discarded code is needed again.

All the Microsoft Windows V3.0/3.1 application programs and the Windows program itself consist of discardable code and non-discardable code. The total size of all the non-discardable code, including that of PC/3270 V4.1 for Windows, *must* fit in the memory space remaining after Windows is started. If the total of all the non-discardable and discardable code size exceeds the remaining physical memory space, Windows starts to use virtual memory on a fixed disk in 386 enhanced mode or discards unused code in standard mode. As the amount of excess discardable code increases, the system performance degrades.

The Windows-part memory requirement of PC/3270 V4.1 for Windows to start communications is (roughly estimated):

- Non-discardable: 210-340 KB + 32-48 KB per session
- Discardable: 50 KB

In addition, the non-discardable memory and discardable memory are used while utilities such as Customize Configuration or File-Transfer are running.

The graphic component (PCSGRP.DLL) uses a huge amount of global memory for drawing or printing graphics. If your PC does not have enough memory, you may not get a correct result (for example, an area may not be shaded). It is recommended that you add at least 1 MB of memory. If you use host graphics print, you need to add approximately 1 MB more. You may need, however, to add more memory depending on your host graphics application and printer driver.

Chapter 7. Installation and Customization for OS/2

This chapter provides guidance, hints and tips on installing Personal Communications for OS/2.

For a complete description of the installation procedure, please see the applicable publication for the desired PC/3270 V4.1 mode of operation. The following hardcopy publications are shipped as a part of the product package:

for OS/2

- *Personal Communications AS/400 and 3270 Version 4.1 for OS/2 Up and Running*, SC31-8258
- *Tell Me About OS/2 Access Feature*, SC31-8257

The following sections assume a new installation is being performed, and will show a configuration example.

For each Personal Communications environment of operation, the installation program will use a different directory. PCOMOS2 is the default for OS/2.

If you use the default names, you will have no conflict when you install Personal Communications for more than one environment of operation.

7.1 Installation Overview

Personal Communications is easy to install when the application package is running in SNA or non-SNA environments. When Personal Communications is running in conjunction with a 3270 and/or 5250 host system, the following host software is required:

- For a 3270 host system, it needs ACF/VTAM Version 3 (for SNA/SDLC) or ACF/NCP Version 4 Release 2 or later.
- For a 5250 host system, such as an AS/400, it needs one of the following AS/400 software:
 - OS/400 Version 2 Release 1 or later
 - OS/400 Version 3 Release 1 or later
 - IBM PC Support/400 Version 2 Release 2 or later

Personal Communications for OS/2

It provides connectivity support to the IBM Operating System/2 (OS/2) users for 3270 and AS/400 environments. Two different application programs are available, as follows:

- Personal Communications AS/400 and 3270 Version 4.1 for OS/2
- Personal Communications AS/400 Version 4.1 for OS/2

All versions allow you to choose from many different installation procedures with the usage of the workstation. It can be done from diskettes, from a network server specified directory, or it can be shared from a network server. In addition, Personal Communications for OS/2 is fully CID-enabled.

During an installation, Personal Communications for OS/2 offers three additional alternatives, as follows:

- Full Installation requires about 17.5 MB disk space.
- Partial Installation requires 12.3 MB to 17.5 MB disk space.
- Minimum Installation. requires about 12.3 MB disk space.

The installation process has been improved to handle locked device drivers and can be stopped now at any time. A restoration of a previous version of Personal Communications after an installation has stopped is possible.

To get a new configuration, double-click on the **Start/Configure Session** icon from the Personal Communications folder.

Personal Communications/3270 Version 4.1 for OS/2 provides customization free DFT connection, or it offers the next best configuration depending on the workstation customization.

Migrating from CM/2 or Personal Communications Version 4.0 for OS/2 does not require additional configuration.

For the detailed installation procedure, refer to 7.2, "Installation for OS/2" on page 140.

CID for OS/2 environment

Configuration, installation and distribution (CID) capability is provided to enable a network administrator to configure, install and distribute Personal Communications efficiently for multiple, distributed workstations. CID contains the following new enhancements:

- Support of the ECID keywords Copy, Migrate, Version and Copy/Delete
- Verification of values
- Merging of the target configuration file (.WS)
- Creation of the CID response file from the CM/2 configuration file
- Support for the Personal Communications new configuration file parameters

To use CID, a network administrator must create response files that are appropriate to the required environment. In order to reduce the amount of work involved in this, sample response files have been provided with Personal Communications. They can be used as templates for the files that are needed. The sample files are in the RSP subdirectory on diskette #6. Please note that they will not be installed by the installation program.

7.1.1 General Installation Considerations

For some connection types it is necessary to install prerequisite software or device drivers in order to achieve communications in Mobile, Coax, LAN and WAN environments.

This document does not cover customization in Mobile, COAX, LAN and WAN environments. Therefore, two other redbooks will be published for Personal Communications Version 4.1. The following ITSO redbooks will be available in July 1996:

- Customization in a mobile environment:
 - *Personal Communications for the Mobile Users.*
PCOMM for DOS/Windows, OS/2 4.1 , SG24-4456.
- Customization in a local (Coax, LAN), and WAN environments:
 - *Personal Communications for the Coax, LAN, and WAN Users.*

PCOMM for DOS/Windows, OS/2 4.1 , SG24-4688.

7.2 Installation for OS/2

In this section, we provide guidance on installing the Personal Communications AS/400 and 3270 Version 4.1, and Personal Communications AS/400 Version 4.1 for OS/2 products. The installation and configuration processes are identical for both products, so we don't need to cover each separately. For simplicity we refer to the product as *Personal Communications for OS/2* or *PCOMM for OS/2*.

Before you start to install or configure, please note that Personal Communications for OS/2 has an excellent HELP feature. It provides HELP panels for every field and parameter during the installation and configuration process. These panels contain detailed information, and we strongly recommend that you read each panel as you go through the installation or a configuration part for the first time.

The installation of Personal Communications for OS/2 can be made from diskettes or executed from a network server, and it is CID-enabled. Furthermore, the subsequent customization task can be eliminated if the INSTALL program is passed with the names of preconfigured workstation profiles and workstation batch files. For installation procedures, refer to the following:

- If you intend to install from a Network Server, see 6.2.2, "Installing PC/3270 V4.1 for Windows from a Network Server" on page 126.
- If you want to install using CID, refer to 7.2.3, "CID Implementation for OS/2" on page 146.
- If you want to install with pre-configured profiles, refer to 7.2.1, "Installing with Preconfigured Profiles" on page 145.

We now show you an installation from diskettes, assuming it is a new Personal Communications AS/400 and 3270 Version 4.1 for OS/2 installation. To install PCOMM for OS/2, perform the following steps:

- Open an OS/2 window.
- Insert diskette #1 into the A: drive.
- Type A: at the OS/2 prompt and press Enter.
- Type INSTALL at the OS/2 prompt and press Enter.
- An IBM logo panel will be shown and after a few seconds you will get a message panel that tells you the following: copying temporary installation files to your startup drive.
- You will be prompted to insert diskettes #2 (Personal Communications for OS/2 has eight diskettes). You also have the option to cancel the installation process.

Note: If you have CM/2 installed on your workstation, PCOMM for OS/2 recognizes that and prompts you with a CM/2 Migration message panel (see Figure 50 on page 145). Refer to the related information in 7.2.2, "Migrating Communications Manager/2" on page 145 and return here afterwards.

Now, if you completed the previous panels, you get the Personal Communications Licence panel as shown below.

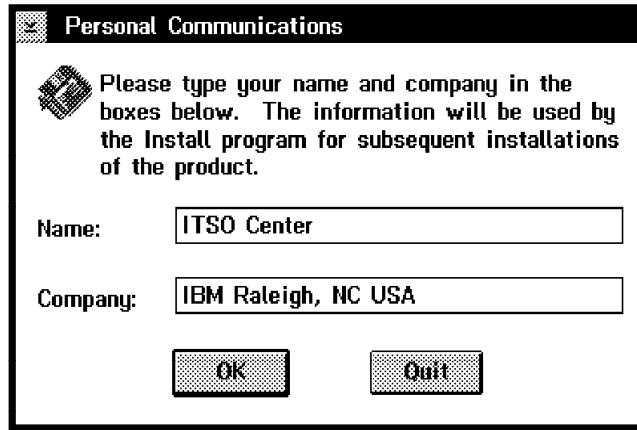


Figure 41. Personal Communications Licence Panel

Type in your information and click on **OK**.

You will get a confirmation panel that lets you go back and change the entered information. If you want to make changes, click on **Change**, or click on **OK** again to confirm it. That takes you to the Personal Communications Emulation Selection panel as shown below.

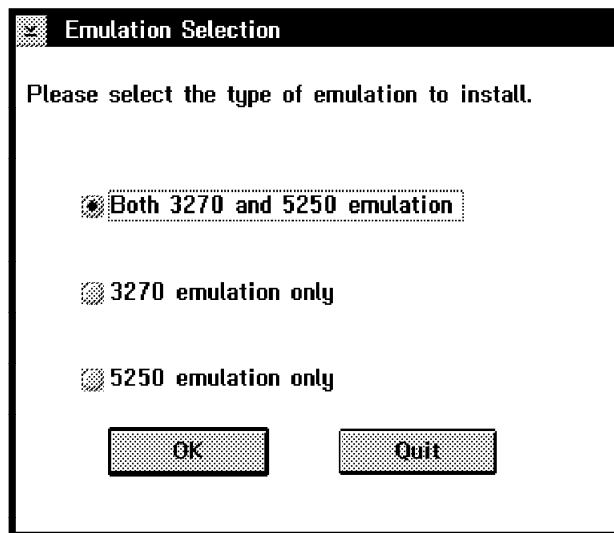


Figure 42. Personal Communications Emulation Selection Panel

If you want Both 3270 and 5250 emulation, select it or make your own choice, and then click on **OK**. This takes you to the Personal Communications Drive and Directory panel.

Note: If you are installing from the Personal Communications AS/400 Version 4.1 emulation only package, the Emulation Selection panel will not appear.

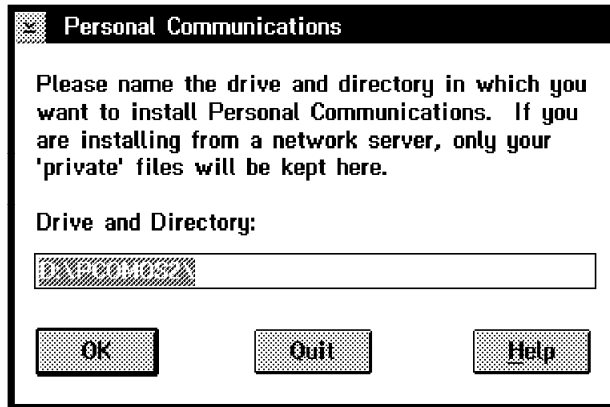


Figure 43. Personal Communications Drive and Directory Panel

Personal Communications will show you the default path (C:\PCOMOS2\). In our environment, we want to install it on drive D:, but we take the default directory name as shown in Figure 43. Make your own specifications, and then click on **OK**.

After PCOM has checked your system, you will get the Personal Communications Installation Options panel, as shown below.

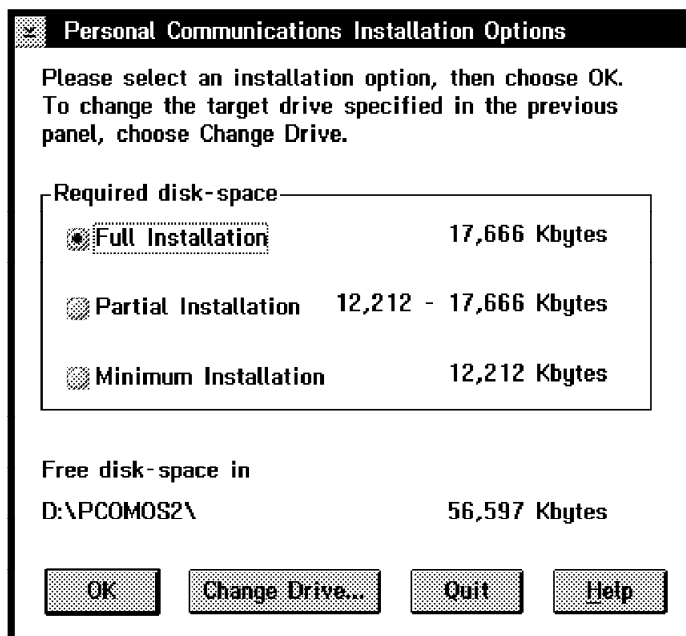


Figure 44. Personal Communications Installation Options Panel

This panel lets you choose the installation options. You can choose from a Full Installation, a Partial Installation or a Minimum Installation, with the required hard disk space ranging from 12.3 MB to 17.5 MB.

If you are not going to use Sample Programs for REXX, Printer Definition Files and Tables, or online documentation, such as the Up and Running, Reference or Programmer's Guide, you can save disk space by specifying a Partial or Minimum Installation.

You also have the option to go back and change the drive if you don't have enough disk space, or if you want to quit the installation.

If you want Full Installation, select it, and then click on **OK** to proceed.

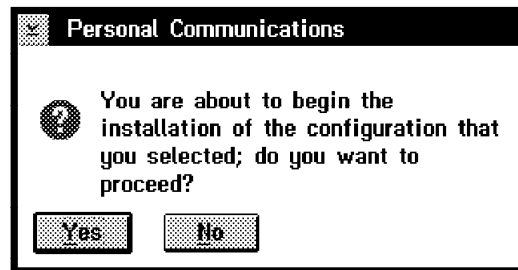


Figure 45. Installation Program Starting - Message Panel

You will get the above message panel. To start the installation, click on **Yes** button. Note that diskette #2 still has to be in diskette drive A.

You will see some message panels, showing what PCOM for OS/2 does at the moment.

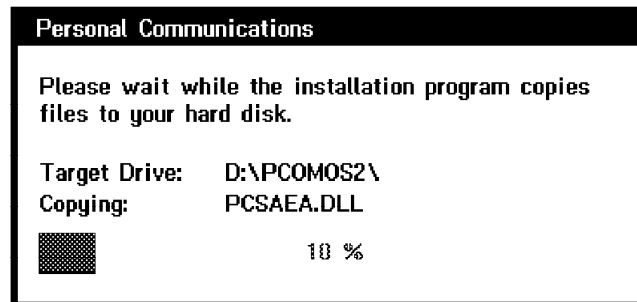


Figure 46. Installation Program Copying Panel

After some time, you'll be prompted to insert diskettes #3 and up (Personal Communications for OS/2 has eight diskettes). You also have the option to cancel the installation process. Personal Communications Version 4.1 can do a restoration later on, after a previous installation process has stopped.

When the files are copied, you get a message that a new Personal Communications folder has been added to your desktop.

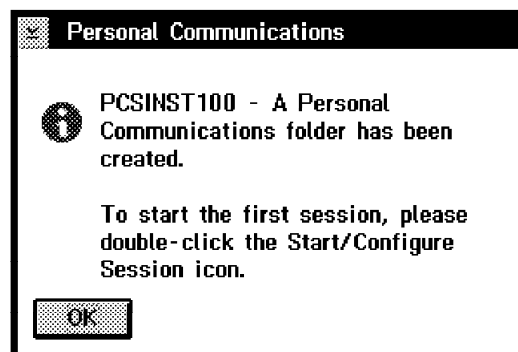


Figure 47. Personal Communications Folder Message Panel

Click on **OK** and you will see the following messages:

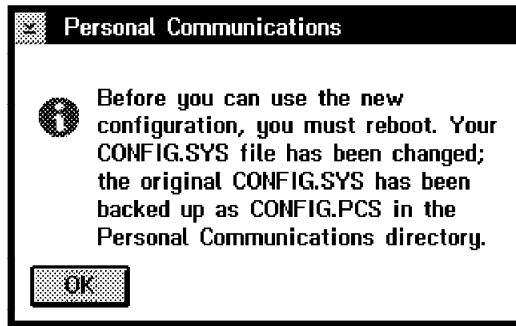


Figure 48. Shutdown and Reboot - Message Panel

If you are not migrating from a previous PCOMM for OS/2, the message above appears. It lets you know that the existing CONFIG.SYS file has been saved and that you need to shut down and reboot your system, before the changes can take effect to use PCOMM for OS/2

Click on **OK** so that you can see that you have successfully completed the installation.

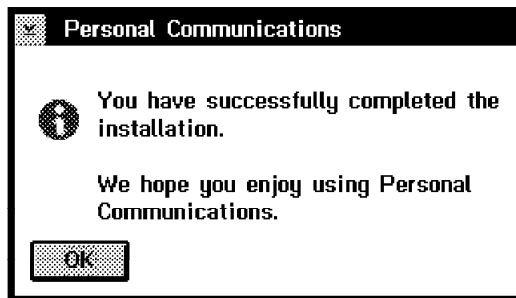


Figure 49. Successfully Installation - Message Panel

Click on **OK** again to end the installation.

After your system has been rebooted, the changes will take effect. As a result of the installation process, the following should be noted:

- The existing CONFIG.SYS file has been saved to the Personal Communications directory.
- The CONFIG.SYS file is updated by the following PATH statements:
`LIBPATH=.;C:\OS2\DLL;D:\PCOMOS2;C:\CMLIB\DLL;C:\MPTN\DLL;...`
`SET PATH=.;C:\OS2;D:\PCOMOS2;C:\CMLIB;C:\MPTN\BIN;C:\TCPIP\BIN;...`
`SET DPATH=.;C:\OS2;D:\PCOMOS2;C:\CMLIB;C:\IBMLAN\NETPROG;C:\IBMCOM;...`

Note: If CM/2 is installed on the same machine, the Personal Communications path entry always comes first. This depends on some file names that are equal, such as SEND/RECEIVE or EHLLAPI functions; they may not work for the second emulation product.

Some very useful information files are placed in the directory in which the Personal Communications for Windows was installed, as follows:

PCOM.INF	Presents information about its function and facilities of Personal Communications Version 4.1.
README.INF	Presents information supplementary to the online help and the publications about newly added functions, hints, tips, restrictions and corrections.
PCSPROD.INF	Presents corrective service information for Personal Communications Version 4.1 and contains an APAR list of already installed Corrective Service Diskettes (CSDs).
CONFIG.INF	This file describes how to configure and start a session.

Some of these files are automatically displayed if you double-click on the related icon in the Personal Communications program group. All files and online documentations can be easily accessed through the *Information Notebook*.

7.2.1 Installing with Preconfigured Profiles

If your system administrator gives you preconfigured profiles or Batch program files, add their file names to the Install command, as follows:

```
A:\INSTALL.EXE B:\COAX1.WS B:\SLAN1.WS B:\BATCH1.BCH
```

When the installation program has installed the Personal Communications for OS/2 program files, it will create icons for these WorkStation profiles and Batch program files.

7.2.2 Migrating Communications Manager/2

To migrate to Personal Communications, follow the installation instructions provided in Installation. If PCOMM for OS/2 can recognize that CM/2 is installed on your system, you'll get the following panel to migrate from CM/2 or not.

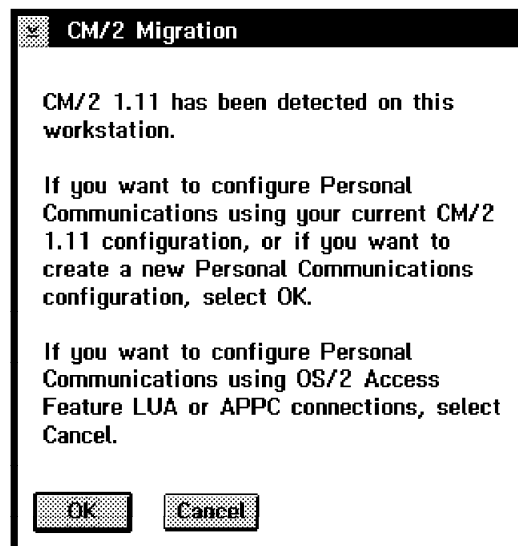


Figure 50. Migrating Communications Manager/2 - Message Panel

Note: Read this panel *carefully*.

- If you migrate from CM/2 and have both 3270 and 5250 sessions configured, you need to migrate to the combined package of Personal Communications Version 4.1 for OS/2.

- You need to migrate each workstation individually; that is, you cannot migrate from your workstation for another workstation.
- After you complete your installation, PCOMM for OS/2 saves the WorkStation profile for each session in the Personal Communications folder.

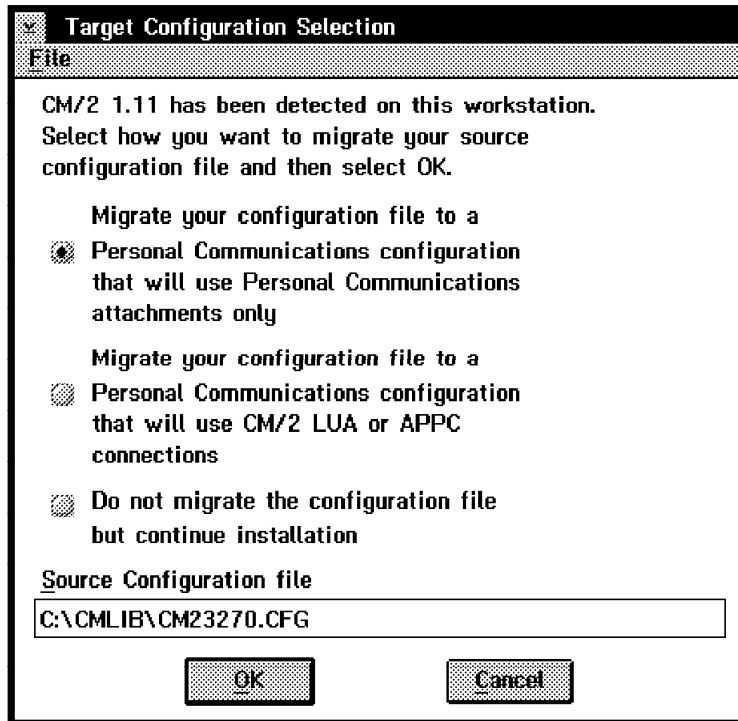


Figure 51. CM/2 Target Configuration Selection Panel

If you are migrating a configuration with ISDN or X.25 connections, or your applications use SNA APIs (such as CPI-C or APPC), select the migration choice that uses CM/2 or OS/2 Access Feature LUA or APPC APIs.

Personal Communications Version 4.1 for OS/2 supports all other connection types that might be defined in a CM/2 configuration.

Note: If you also want to migrate settings, such as keyboard mapping, keypad definitions, fonts, file transfer templates and interchange document profile (IDP) files, use a response file created by your administrator. Refer to the *Personal Communications Reference* for more information about response files.

7.2.3 CID Implementation for OS/2

Configuration, installation, and distribution (CID) is the IBM architecture for automated product installation. Personal Communications for OS/2 adheres to the CID standard and provides a scripting language to allow an installation to be accomplished. One can use CID to fully install or remove Personal Communications for OS/2 and to create one or more emulator session profiles.

CID relies upon an ASCII response file (.RSP) containing keywords that indicate the type of installation to be performed and the sessions. There are hundreds of keywords available although a typical response file will only use a few dozen keywords and rely upon defaults for most of the parameters. All of the Personal Communications CID keywords are documented in the *Personal Communications Version 4.1 Reference for OS/2*.

An example of a CID response file with the minimum keywords can be seen in Figure 52 on page 147. In this example the product is installed with none of the optional features. One 3270 is configured via a token-ring 802.2 connection.

```

*=====*
*   Start of installation function                               *
*=====*
TargetPath=c:\pcomos2 1
SourcePath=f:\dskfiles
SelectFile=!SDK\*. * !RSP\*. * !PDFPDT\*. * !ALTAPL.F20 !ALTANSI.F20 2

*=====*
*   Start of configuration function                             *
*=====*

Communication=( 3
    WSName=cid.ws
    Session=3270
    Link=SLAN
)

3270=( 4
    WSName=cid.ws
    SessionType=Display
    HostCodePage=037-U
)

SLAN=( 5
    WSName=cid.ws
    GatewayAddress=40000C1DA099
    Identifier=05D00076
)

```

Figure 52. Example of CID Response File (.RSP) - for OS/2

Notes:

- 1** The TargetPath= and SourcePath= keywords can be used to specify the path where Personal Communications should be installed and where to find the source files to perform the installation. Alternatively, the /t: and /s: parameters can be used in which case they override the keywords specified in the .RSP file.
- 2** The SelectFile= keyword can be used to indicate files *not to install*. In this case, it is specifying that the Personal Communications optional facilities should not be installed.
- 3** The Communication section must be specified to indicate the name of at least one session profile (.WS) to be created, as well as the session type and the link type to be used. Note that several of each section may be present if there is a need to build multiple .WS files.
- 4** A session section (3270 or 5250) is generally present to indicate the type of emulator session desired (3270 display is the default). This section is necessary if a non-U.S. keyboard is needed.
- 5** The Link section is required to indicate the type of connection being used. In this example, the gateway address is needed with the PU identification.

The following command can be used to execute the above CID installation:

```
[C:]f:dskfilesinstall /r:c:mystuffmycid.rsp /l1:c:mycid
```

The INSTALL.EXE accepts the following standard CID parameters:

- /r:** Precedes the full path and name of the response file (.RSP)
- /g:** Optionally indicates the directory where additional imbedded response files may be found
- /s:** Supersedes the SourceFile= parameter indicating the device and path where the Personal Communications product files can be found
- /t:** Supersedes the TargetFile= parameter indicating the device and path where the Personal Communications product is to be installed
- /l1:** Indicates the full path and file name where CID error messages are to be logged
- /l2:** Indicates the full path and file name where the CID history messages are to be logged

There are fewer keywords and options with Personal Communications CID relative to CM/2. There are also several restrictions with Personal Communications CID to be aware of, as follows:

- CID scripts can be used to perform installation or product removal. Subsequent to the installation, it is also possible to execute a CID response file to create session profiles. In this case, be sure to specify Reinstall=N and ReConfigure=Y as well as the TargetPath= parameter (or /t: parameter).
- In addition to creating an individual session start icon, Personal Communications CID also creates a batch start file (.BCH) and icon for the same session(s).
- There is no possibility of creating any of the auxiliary files that are referenced in the main session profile .WS. One cannot create a keyboard remapping file (.KMP), for example, nor an automatic dialing utility (.ADU) file. There are keywords to build a .WS that *references* these files. They must be created and placed in a directory accessible to the user and Personal Communications CID offers no procedures to accomplish this.
- There are no user exits available for pre-processing or post-processing of the CID execution. Any additional processing must be done by the procedure that invokes INSTALL.
- Personal Communications adheres to strict CID architecture. For all of the INSTALL parameters, *be sure to specify a colon (:) as the separator and a full path with the file name*. This is unlike the Communications Manager/2 CMSETUP command which accepts either a blank or a colon as a separator and does not require full path specifications. As an example, the following command is *not* valid:

```
[C:] f:dskfilesinstall /r:mycid.rsp /l1 mycid.err
```

In the above command, MYCID.RSP must include the full path and the /L1 parameter needs to be followed by a colon and a full path.

7.3 OS/2 Access Feature

OS/2 Access Feature provides additional connectivity and APIs for Personal Communications 4.1 for OS/2 users. Personal Communications V4.0 for OS/2 introduced *LUA3270 via CM/2* and *APPC3270 via CM/2* for users who had Communication Manager/2 installed on their workstations. With the introduction of the OS/2 Access Feature, you can take advantage of the additional connectivities without having to obtain CM/2 separately. OS/2 Access Feature provides APPC, CPI-C, LUA and ACDI API support as well as ISDN and X.25 connectivity.

7.4 OS/2 Access Feature Setup and Installation

We recommend that you install OS/2 Access Feature prior to installing PCOMM Version 4.1, especially if you have been using Communications Manager/2 on the workstation. The reason for this is that OS/2 Access Feature will look for existing CM/2 configuration files and convert them for use by Personal Communications 4.1 for OS/2. In addition, OS/2 Access Feature will be aware of the installed communication adapters and/or their drivers. This will help reduce the instances of conflicts developing between OS/2 Access Feature and Personal Communications 4.1 for OS/2. We ran into a conflict with the adapters or drivers in our workstation since we installed Personal Communications 4.1 for OS/2 first and then OS/2 Access Feature (see Figure 66 on page 157).

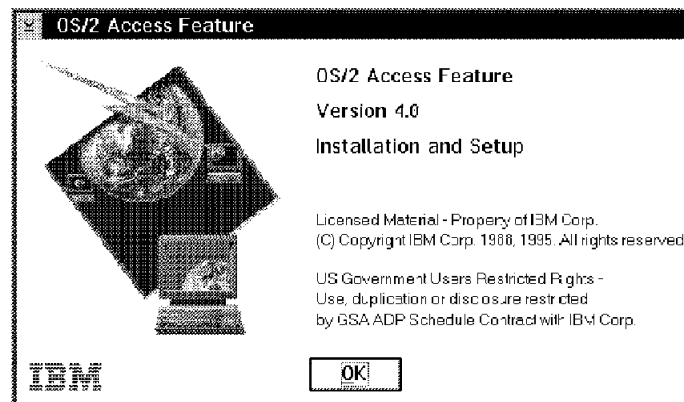


Figure 53. OS/2 Access Feature Installation and Setup - OS/2 Access Feature

For the most part, users familiar with the setup and installation of Communications Manager/2 will be comfortable installing OS/2 Access Feature. We discuss the OS/2 Access Feature setup and installation steps in this section. For your convenience, we include some information from the *Tell Me About OS/2 Access Feature*, which is packaged with Personal Communications 4.1 for OS/2.

OS/2 Access Feature is available on two media, diskette and CD-ROM. OS/2 Access Feature can be installed via panels or response files (CID). We install from diskettes via setup panels.

To install OS/2 Access Feature from diskettes and use the setup panels, insert diskette 1 into the diskette drive. Assuming you are using diskette drive A, open an OS/2 window, type `A:\CMSETUP` and press Enter.

You are greeted by the OS/2 Access Feature Installation and Setup panel (see Figure 53). Click on **OK** to continue.

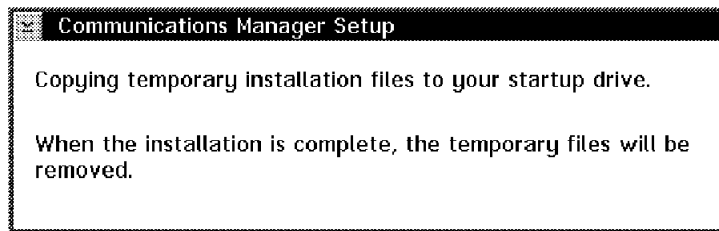


Figure 54. Temporary Subdirectory Notice - OS/2 Access Feature

OS/2 Access Feature creates a temporary subdirectory to expand the files being read from the diskette (see Figure 54). This is only for your information and no action is required on your part.

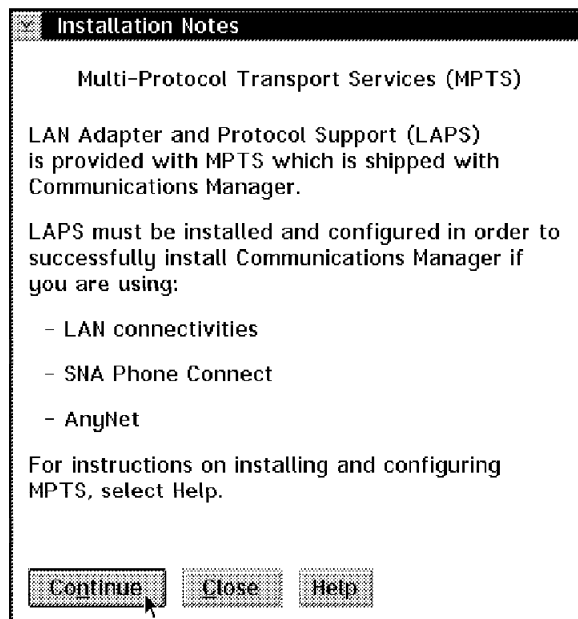


Figure 55. MPTS Notice - OS/2 Access Feature

If you will be using LAN, TCP/IP, SNA Phone Connect, SNA over TCP/IP or Sockets over SNA, then you should make sure that MPTS is installed and configured properly before continuing with the installation of OS/2 Access Feature (see Figure 55). The OS/2 Access Feature configuration program confirms whether MPTS is installed but can not determine if MPTS is configured properly. The options to choose from are defined as follows:

Continue If MPTS is installed and properly configured or if MPTS is not required in your environment, then click on **Continue**.

Close If you want to install and/or configure MPTS now, click on **Close** to exit the OS/2 Access Feature setup and installation process.

Help If you need more information regarding the need to install or configure MPTS, click on **Help**.

Note: The Close and Help buttons will appear on most panels throughout the OS/2 Access Feature Setup and Installation process; however, we will only

reference them if necessary to complete our setup and installation example. Please use them as necessary during your own installation.

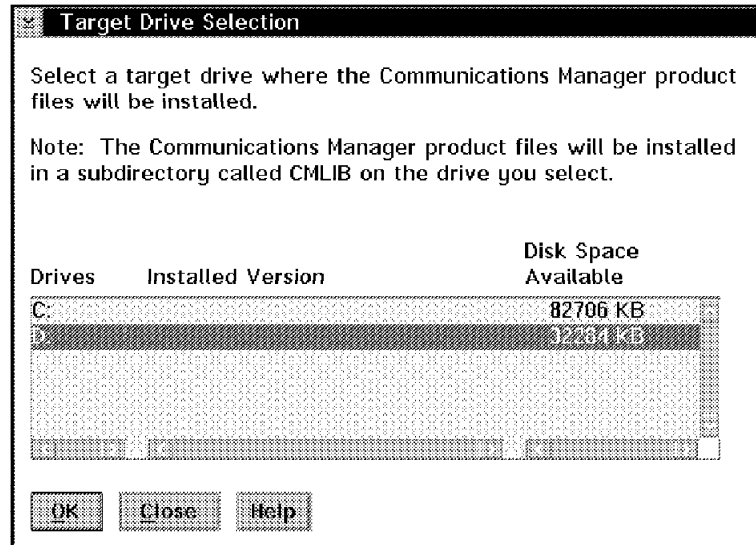


Figure 56. Target Drive Selection - OS/2 Access Feature

From the Target Drive Selection panel (see Figure 56), highlight the drive on which you want OS/2 Access Feature to be installed. In our case, we want OS/2 Access Feature to be installed on drive D; therefore, we highlight the D drive and click on **OK**.

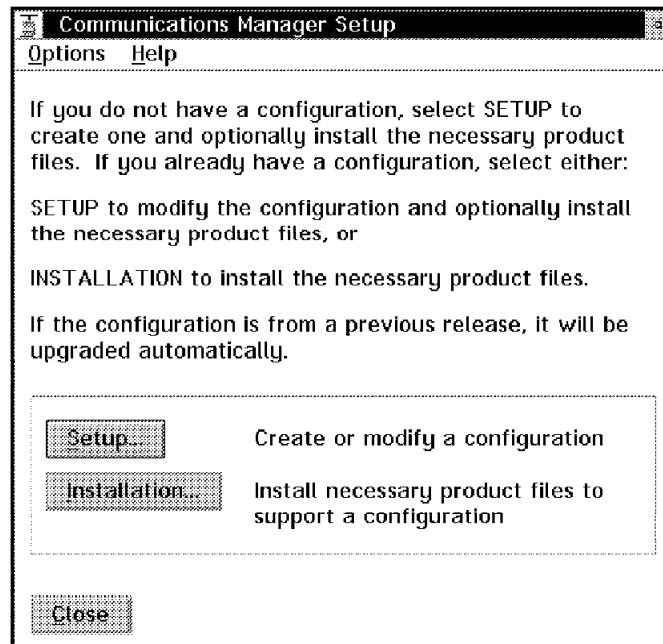


Figure 57. Communication Manager Setup - OS/2 Access Feature

From the Communication Manager Setup panel (see Figure 57), you can select Setup or Installation.

- Setup** If you do *not* have an existing CM/2 configuration that you want to migrate to OS/2 Access Feature, or you do *not* have CM/2 already installed on the machine, then click on **Setup**.
- Installation** If you *do* have an existing CM/2 configuration that you want to migrate to OS/2 Access Feature, or you want to upgrade an existing version of Communications Manager to OS/2 Access Feature, then click on **Installation**.

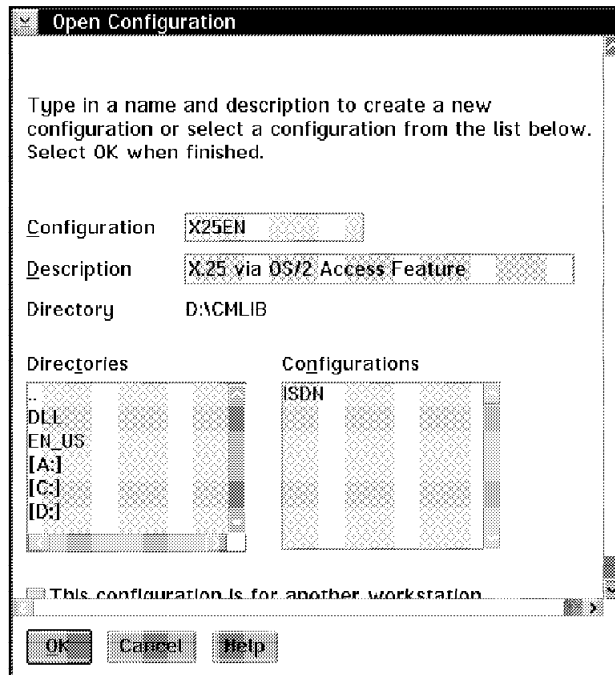


Figure 58. Open Configuration - OS/2 Access Feature

From the Open Configuration panel (see Figure 58), type the name and description of the configuration you wish to use or select one from a drive and directory. The options in the above panel are defined as follows:

- Configuration** You specify the name of the configuration you wish to use either by typing a name in this field or by selecting an existing configuration. If CM/2 had been installed previously, you may want to use an existing configuration. By using the Directories and Configurations windows, you can select an existing directory and configuration.
- Description** You may enter a few words to describe the configuration (optional).
- Directories** If you have been using CM/2 previously, you can use this window to change drives and subdirectories to locate an existing configuration.
- Configurations** If a configuration exists on the drive or subdirectory in the Directories window, the name will appear here.

This configuration is for another workstation and should be checked if you are creating a configuration on one workstation but intend to use the configuration on another workstation. During the configuration of some connectivities, OS/2 Access Feature may attempt to locate or query the communication adapter. If the adapter is not found, OS/2 Access Feature may tell you the adapter is not found and to install the adapter before continuing. If *This configuration is for another workstation* is checked, OS/2 Access Feature will not try to locate or query the adapter.

Enter a configuration name (we use X25EN), type a brief description of the configuration and click on **OK** to continue.

Note: The screens that follow depend on whether you select Setup or Installation (see Figure 57 on page 151). If you select **Setup**, then continue with Figure 59. If you select **Installation**, then go to Figure 61 on page 155.

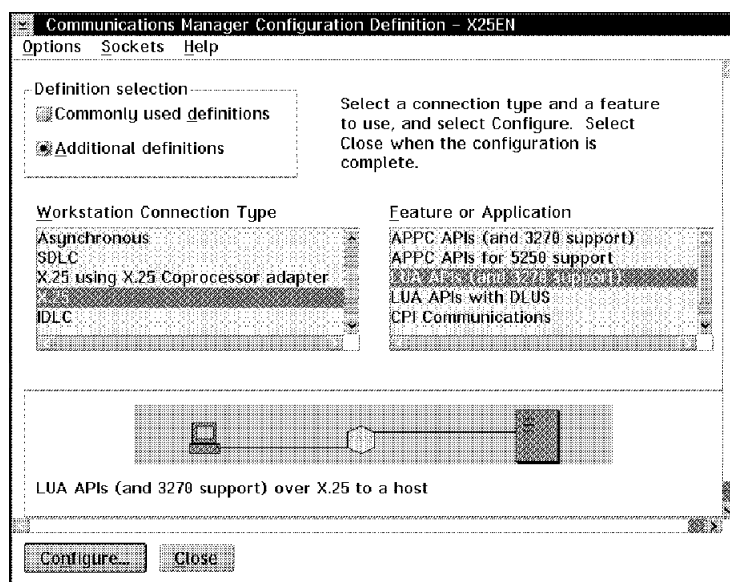


Figure 59. Communication Manager Configuration Definition - X25EN - OS/2 Access Feature

From the Communication Manager Configuration Definition panel (see Figure 59) select the type of configuration you want to use. The Definitions box contains the Commonly used definitions (default) and the Additional definitions buttons.

Commonly used definitions The most frequently used configurations are listed in the Communications Definitions window. If the configuration type you want is not listed here, click on **Additional definitions**.

Additional definitions Clicking on the Additional definitions button replaces the Communications Definitions window with the Workstation Connection type and the Feature or Application window.

The Workstation Connection type window lists additional connectivity types including token-ring, Ethernet, PC Network, Twinaxial, Asynchronous, SDLC, X.25, IDLC, GDLC, Anynet, and DLUS using Anynet.

The Feature or Application window provides LUA API, CPI-C and ACDI redirection support.

The Communication Manager Configuration Definition panel provides two other buttons, Options and Sockets. By clicking on **Options** you can choose additional configuration options, such as verify configuration. Unless you have experience configuring CM/2, we recommend you do not use the advanced options to configure multiple connectivities. The Sockets button is used for configuring sockets for Anynet.

For our example, we want to configure an X.25 connection; therefore, we select **Additional definitions**, highlight **X.25** and **LUA APIs over SDLC (3270 emulation support)** and click on **Configure...**

At this point, the configuration panels will vary depending on the connectivity you have chosen. Once you have filled in the connectivity panels, you will click on **Close** to return to the Communication Manager Configuration Definition panel (see Figure 59 on page 153). If you need additional links or sessions, you would select and configure them now. Once all the required links or sessions are configured, you click on **Close** to continue installing OS/2 Access Feature.

OS/2 Access Feature checks your configuration to determine what files OS/2 Access Feature must install to support the configuration.

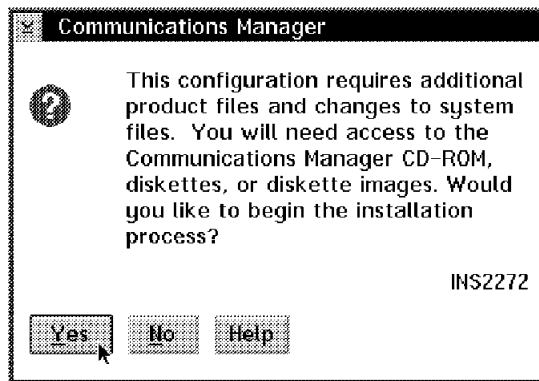


Figure 60. Communications Manager - Additional Files - OS/2 Access Feature

OS/2 Access Feature has determined what files are needed and is asking you to confirm that you are prepared to begin the installation. Click on **Yes**.

Note: Go to Figure 62 on page 155 to continue with the setup and installation process.

Having selected **Installation** from the Communication Manager Setup window (see Figure 57 on page 151), you will see a couple of messages. The first will tell you that Communications Manager is already installed and the second will tell you that it is removing the existing Communication Manager files.

Next, you will see the Upgrade Configuration window (see Figure 61). By checking the **Backup selected configuration** box and entering a Backup name, you can keep a copy of the configuration file in the CM/2 format. We recommend that you back up the configuration file at this time. In this example, we are backing up our X25EN configuration to OLDX25EN.

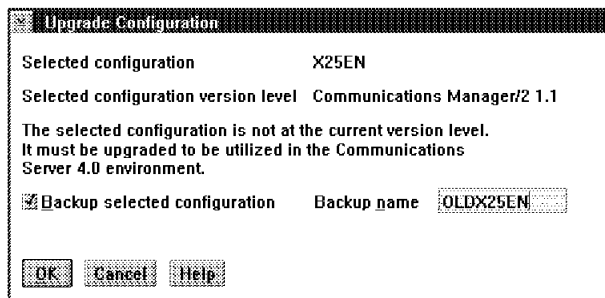


Figure 61. Upgrade Configuration - OS/2 Access Feature

After you click on **OK**, you will see a message that the configuration is being upgraded. You will then get a message stating that the configuration has been upgraded. Click on **OK** to continue.

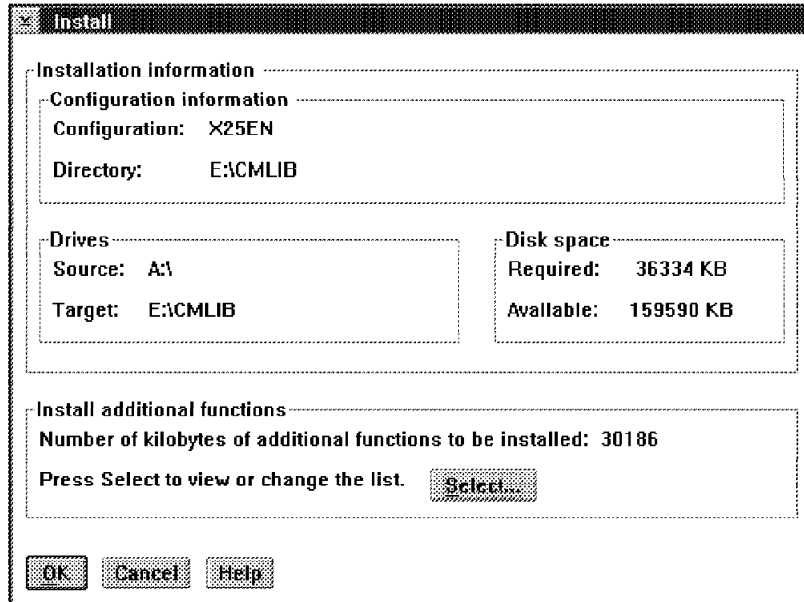


Figure 62. Install - OS/2 Access Feature

By clicking on the **Select** button from the Install window (see Figure 62), you can view the list of additional OS/2 Access Feature functions and online documentation files.

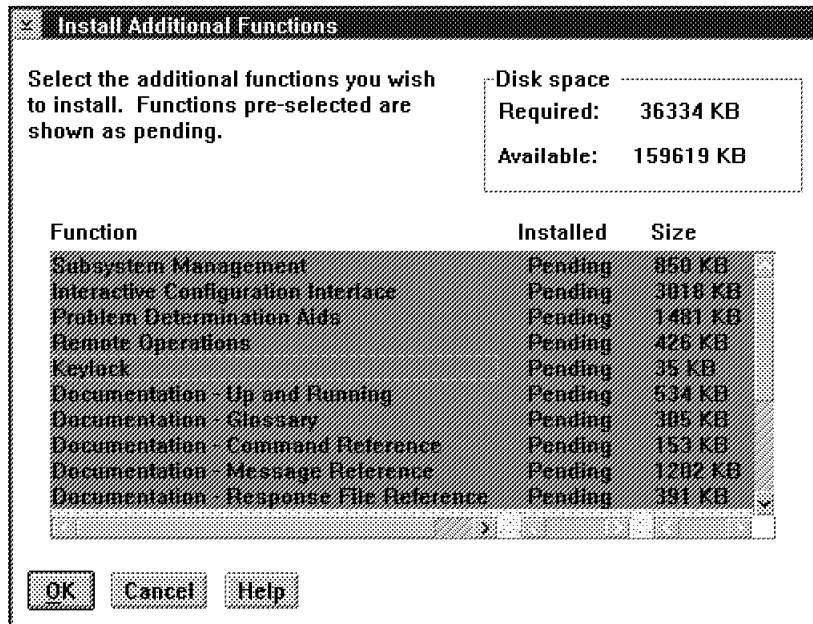


Figure 63. Install Additional Functions - OS/2 Access Feature

From the Install Additional Functions window (see Figure 63), highlight each function or document that you wish to install. An additional 37 MB of disk space is required to install all of the additional functions and online documents. Click on **OK** to return to the Install window.

From the Install window (see Figure 62 on page 155), click on **OK** to continue with the installation.

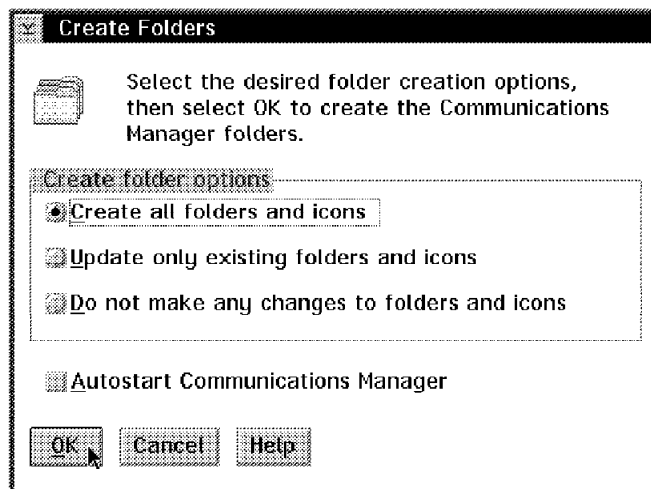


Figure 64. Create Folders - OS/2 Access Feature

You can tell OS/2 Access Feature how to handle the creation or migration of folders using the Create Folders window (see Figure 64 on page 156). The options in this panel are defined as follows:

- Create all folders and icons** If CM/2 was not previously installed, choose this option.
- Update only existing folders and icons** If CM/2 was previously installed and you only want you existing folders and icons to be updated, choose this option.
- Do not make any changes to folders and icons** If you want to preserve your existing folders and icons, choose this option.

You should check the **Autostart Communications Manager** box if you want OS/2 Access Feature to start each time you boot OS/2.

Click on **OK** to continue with the installation.

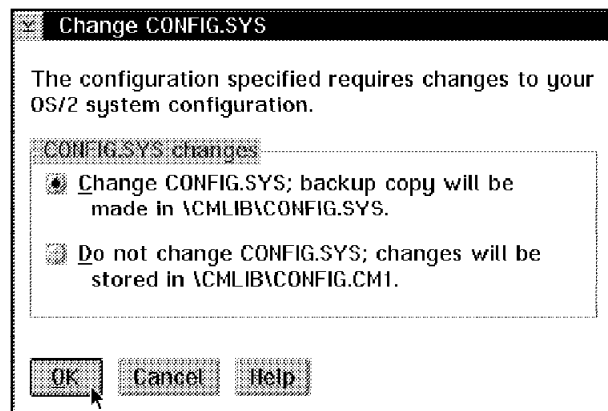


Figure 65. Change CONFIG.SYS - OS/2 Access Feature

You can decide if OS/2 Access Feature should or should not update the CONFIG.SYS file (see Figure 65). After making your decision, click on **OK** to continue.

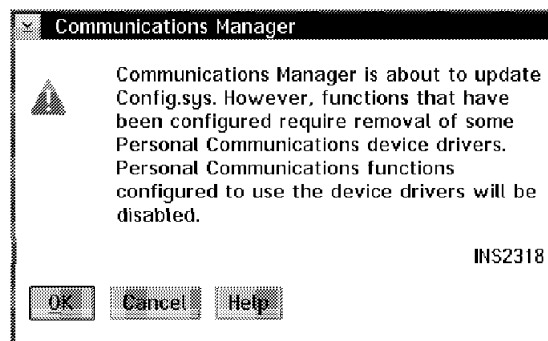


Figure 66. Communications Manager - INS2318 - OS/2 Access Feature

At the beginning of 7.4, "OS/2 Access Feature Setup and Installation" on page 149, we mentioned that it is best to install OS/2 Access Feature before installing Personal Communications 4.1 for OS/2. Since we installed and configured Personal Communications 4.1 for OS/2 for SDLC and LAN IEEE802.2 before we installed OS/2 Access Feature, OS/2 Access Feature displays the INS2318 message (see Figure 66 on page 157). Click on **OK** to continue.



Figure 67. Communications Manager Completion - OS/2 Access Feature

Read and follow the instructions on the Communications Manager Completion window (see Figure 67). Click on **Close** to end the OS/2 Access Feature setup and installation.

If you have not already installed Personal Communications 4.1 for OS/2, you will want to do so after you shut down and reboot the workstation.

Chapter 8. Special Installation Considerations

This chapter provides some special installation considerations about the Personal Communications Version 4.1 Folders or Program Group and the PCMCIA adapter.

8.1 The Personal Communications Program Folder/Group

In this section, we explain the Personal Communications Version 4.1 folders or program group. PCOMM 4.1 has many enhancements and new features as previous releases for all its special environments. It has a highly improved graphical user interface (GUI), that lets you activate every function/operation directly from your active host session. This is much easier and allows you to have your own setup for each session. Each different session can be saved separately in a WorkStation profile and can have its own icon. You can start or close a session independently from other sessions. If you need the same configuration for more than one session, simply start the same session several times. Personal Communications Multiple Sessions program lets you build batch files for your workstations (connections), so that multiple sessions can be started consecutively.

After you have finished the installation and rebooted your system, you normally get a new program group or folder named *Personal Communications* with five or up to nine icons in it. This depends on your installation selections and the product you have. Figure 68 shows you the Personal Communications AS/400 and 3270 Version 4.1 folder for OS/2 (assuming it's a new installation). If you migrated from a previous release, there will be other icons for each configuration and session you had before. See 6.2.5, "Migration Considerations" on page 130, for migration considerations.

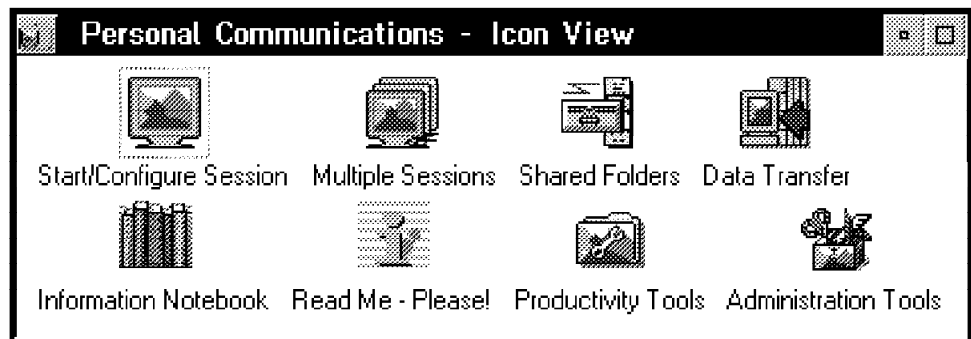


Figure 68. Personal Communications Program Folder/Group

There are some more groups (or folders) in this main folder. Administration Tools is shown in Figure 8 on page 57 and Productivity Tools is shown in Figure 9 on page 58. There are some special PC400 V4.1 utilities for Windows that are shown and described in 2.3, "Utilities in PC400 V4.1 for Windows" on page 36.

There are some very useful information icons containing the new release information, configuring hints and tips. For OS/2 versions, a special Information Notebook icon was added. It's a very helpful and handy tool to find information over all the online documentation available in Personal Communications Version 4.1 (refer to 2.15, "Online Information" on page 62).

The following describes the Personal Communications configuration icons:

Start/Configure Session

This icon is called WorkStation in Personal Communications. It represents the program PCSWS.EXE, which is used to start and create a WorkStation profile (*.WS) for each host session. When Personal Communications is first installed, there are no profiles; you *must* create them by configuring your host connections.

After you have created a profile, you will be asked to name it and a WorkStation icon with that name will be added to the program group you choose. This icon then represents a host session. You can start that session by double-clicking on the icon.

Immediately after installation, you will see the Start/Configure Session icon in the Personal Communications program group. You *must* double-click on that icon in order to start or configure a host connection.

Refer to 8.1.1, "Customizing a Personal Communications WorkStation" for further details.

Multiple Sessions

This icon is called Batch Program in Personal Communications. It represents the program PCSBAT.EXE, which allows you to start several sessions at once. This is accomplished by the creation of a Batch program file (*.BCH) which will contain commands to start sessions according to specific WorkStation profiles (*.WS). Each Batch program file has an icon identical to the WorkStation icon.

However, you can distinguish the WorkStation icon from the Batch program file icon because the latter will have the title in uppercase while the WorkStation icon will have the title in lowercase. When you double-click on the icon, all the workstations (connections) that are included in the Batch file will start.

Refer to 8.1.2, "Starting Multiple Personal Communications WorkStations" on page 169 for further details.

8.1.1 Customizing a Personal Communications WorkStation

If you don't have any pre-configured or migrated profiles, you'll have to customize the sessions.

If you have preconfigured or migrated WorkStation profiles or Batch program files, double-click on the icons to start them. This should match the configuration you had before.

To customize a Personal Communications WorkStation, double-click on the **Start/Configure Session** icon. If you have a coax adapter, you will get a host session; if not, you will get a blank session-window, which will be overlaid by the Customize Communication panel (both are preceded by the IBM logo and a Welcome message).

If you get a host session but want to change any of its definitions, choose **Configure** from the Communication menu at the top of the screen; you will then see the Customize Communication panel shown in Figure 69, which allows you to begin your customization.

The Customize Communication panel shows you the default configuration of the first possible connection, which can be done depending on the communication adapter and device driver already installed. Choose the Interface, the Attachment and the Host you need, then click on **Configure....** This takes you to the Customize Communication - 3270 Host panel as shown in Figure 70 on page 162 or to the Customize Communication - 5250 Host panel as shown in Figure 72 on page 164.

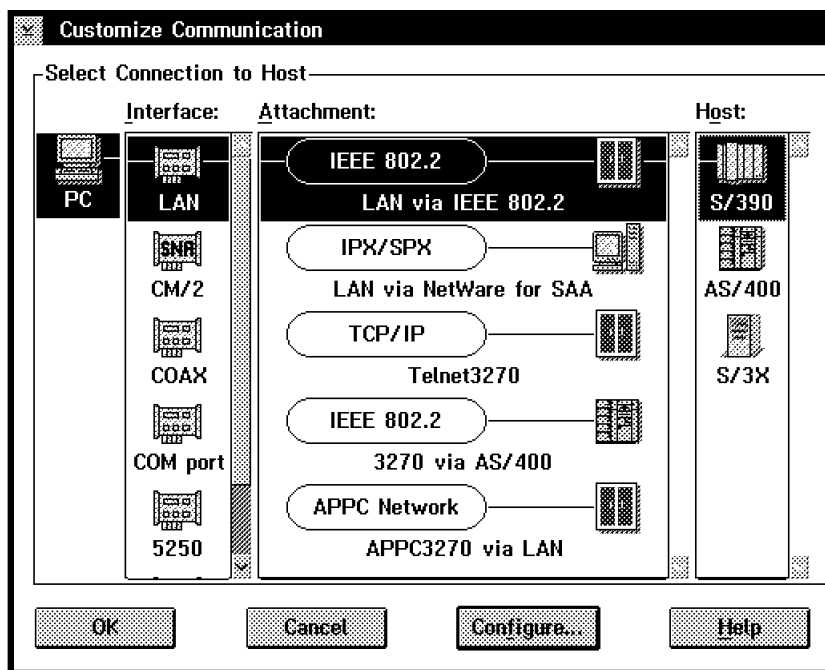


Figure 69. Customize Communication Panel

Note: If you are doing a configuration and you have a good knowledge of Personal Communications, you can directly double-click on the Attachment type or the Host you want to get these customization panels.

Customize Communication - 3270 Host

Customize Communication - 3270 Host

Session Parameters

Screen Size: 24x80

Session Type: Display Printer

Host Code-Page: 037 United States

LU number: Default (Next Available)

SNA Parameters:

Graphics Parameters

Enable Host Graphics: Yes No

Advanced Parameters:

Link Parameters - LAN via IEEE 802.2

Link Parameters:

Figure 70. Customize Communication - 3270 Host Panel

The Customize Communication - 3270 Host panel contains up to four boxes, as follows:

- Session Parameters
- Graphics Parameters
- Link Parameters
- Responstime Time Monitor Parameters

In the Session Parameters box you can specify session characteristics such as Screen Size, Session Type (Display or Printer), Host Code-Page, LT number (or LU address) and SNA Parameters (if you click on Configure SNA...).

The LU address (or LT number) is used to correlate this WorkStation profile to a specific LU definition in the host. This is necessary, for instance, if you have a WorkStation session with singular characteristics (a printer session), or that predefined LU address has unique network access privileges. If the host (VTAM or NCP) definitions are identical for all LUs in the PU, and all LUs have the same network access privileges, you can select Default (Next Available) for the LU address (or LT number).

Notes:

1. LT numbers are used when you have a DFT connection.
2. Be aware that the effective LU address (or LT number) used will depend on the gateway or controller customization (mapping of sessions and/or logical terminals to local addresses).

The SNA Parameters let you enable the SNA Data compression/decompression support. This function is supported for the connection types for which the SNA BIND is handled by the PC/3270 V4.1 (DFT, SDLC, X.25 and SNA LAN). Therefore, SNA data compression/decompression is not supported for the following types of connectivity:

- CUT
- Home3270
- Advantis (Passport)
- IPX/SPX (NetWare for SAA)
- TCP/IP (Telnet 3270)
- APPC3270

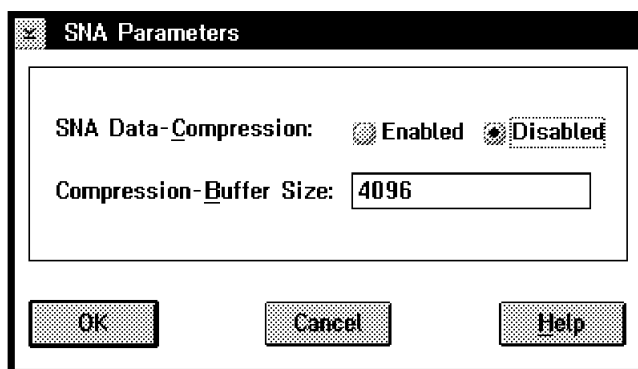


Figure 71. Customize Communication - SNA Parameters Panel

The SNA Parameters panel also lets you specify the Compression-Buffer Size that is to be used when SNA Data-Compression is enabled. The proper buffer size is the larger of the maximum RU size specified for inbound or outbound in the session BIND.

Note: If the specified value is not enough for compression/decompression, this function may not be performed.

Customize Communication - 5250 Host

Customize Communication - 5250 Host

Session Parameters

Screen Size: 24x80

Session Type: Display Printer Router

Host Code-Page: 037 United States

System Location Name: USIBMRA . RALYAS4A

PC Location Name: USIBMRA . MOBILE

Workstation ID:

Router-Status Icon: Show Hide

User Profile:

Link Parameters - LAN via IEEE 802.2

Link Parameters:

Figure 72. Customize Communication - 5250 Host Panel

The Customize Communication - 3270 Host panel contains up to two boxes:

- Session Parameters
- Link Parameters

In the Session Parameters box you can specify session characteristics such as Screen Size, Session Type (Display, Printer or Router), Host Code-Page, System Location Name, PC Location Name, Workstation ID and the User Profile (if you click on Configure User Profile).

The System Location Name and PC Location Name naming depends on the APPC/APPN terminology of the SNA network. These names consist of the Network Identifier and the Location Name or also known together as the Full Qualified Network Name of the resource, such as a Control Point or a Logical Unit. The Network Identifier defines the name of your SNA network, where your AS/400 and workstation is located (connected). The Location Name defines the name of your system, the AS/400 system name or the workstation name. It is also known as the Node name or Control Point (CP) name.

All these names can have one to eight characters, but note the following:

- The first character must be uppercase alphabetic (A-Z) or a special character (@, #, \$).
- The remaining characters can be alphanumeric (A-Z, 0-9) or special characters (@, #, \$).

The Workstation ID field identifies the session to the AS/400 host system. Type one to ten characters in the workstation ID field, using the same rules as previously described. If you leave this field blank, the AS/400 will create a workstation ID for you. The AS/400 creates this name using the logical unit (LU) name and the short session ID.

The SNA Parameters option lets you enable the User Profile support. It allows you to do the Logon process automatically with the user ID and password that are set in the user profile specified.

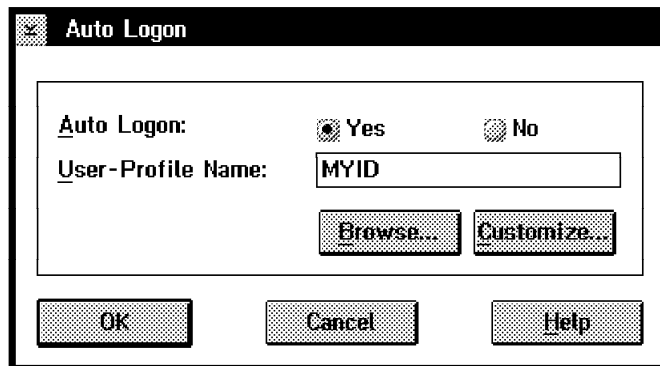


Figure 73. Customize User Profile - Auto Logon Panel

Select **Yes**, enter a User-Profile Name and then click on **Customize...** to set your user ID and password twice. By saving your user ID and password in a user profile, you will not have to enter them each time you start a session. You will be logged on automatically.

The Link Parameters

On the Customize Communication panels (see Figure 70 on page 162 or Figure 72 on page 164) you will see the Link Parameters box, which allows you to customize the relevant link parameters for your selected attachment type. Details for configuring relevant link parameters for the different attachment types are given in the following ITSO documents:

- For a mobile environment:
 - *Personal Communications for the Mobile Users.*
PCOMM for DOS/Windows, OS/2 4.1, SG24-4456.
- For local (Coax, LAN) and WAN environments:
 - *Personal Communications for the Coax, LAN, and WAN Users.*
PCOMM for DOS/Windows, OS/2 4.1, SG24-4688.

The LAN via IEEE 802.2 attachment, for example, can be a token-ring, PC network, Ethernet or an FDDI connection, depending on the adapter you have installed and how you have configured the LAN Support Program or the Microsoft Data Link Control (MSDL) in a Windows environment or the LAN Adapter Protocol Services (LAPS) or Multiprotocol Transport Services (MPTS) in an OS/2 environment previously. The IEEE 802.2 connection is transparent to Personal Communications; therefore, we will use this connection in succeeding chapters in correlation with other IBM products for mobile computing.

Finally Save the WorkStation Profile

If you make all your changes to the Customize Communication panels, click on the **OK** button until you return to the host session window. Before your configuration is finally closed, you may receive the PCSDL010 message window, which requires changes to the system settings and the system needs to be restarted.

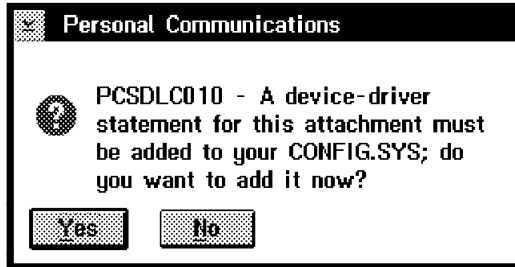


Figure 74. Personal Communications System Setting Message

If you made changes on an existing WorkStation profile or there are no changes that have to do with the system settings, the PCSCC041 message panel appears, as shown below.

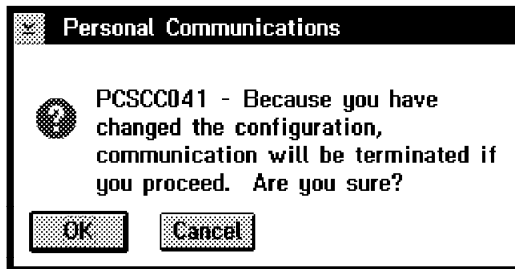


Figure 75. Personal Communications Termination Message

Click on the **OK** button to terminate your old communication and bring up the new setup active right now. If you click on the **Cancel** button, this takes you back to the Customize Communication panel shown in Figure 69 on page 161.

If you have configured a connection that requires changes to the system settings, the PCSDL010 message panel (Figure 74) asks you whether to change them now. Choose **Yes**, and the settings will be changed. You will be asked to restart Windows as shown in Figure 77 on page 167 or receive a message that you need to shut down your system and reboot it in a OS/2 environment, before you can communicate.

If you choose **No**, you will receive a Stop message panel (PCSDL011), which tells you to run the Configuration and Program Options Administration Tool to add the required communication driver.

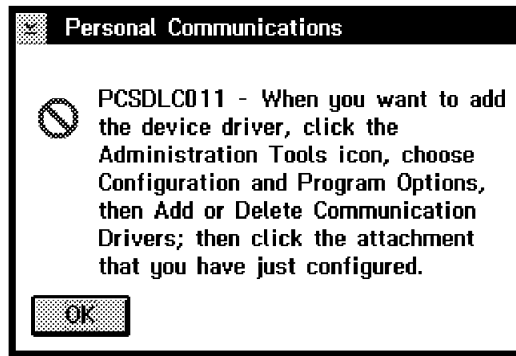


Figure 76. Personal Communications Stop System Setting Message

It's easier to let the administration program do it for you.

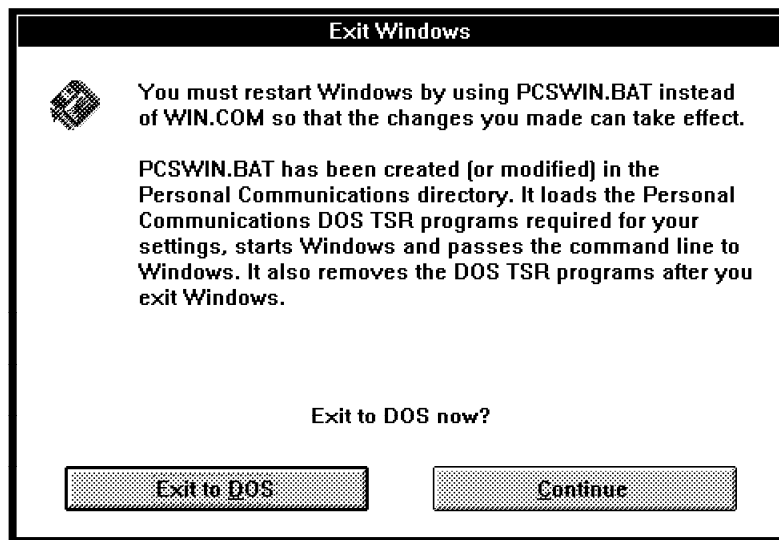


Figure 77. TSR Exit Windows Panel

Important

Do *not* choose the Exit to DOS button or you will be prompted to restart Windows at this time. You have to save your configured WorkStation profile first. Click on the **Continue** button.

Depending on the type of host connection, you are told, as in the preceding figure, to restart Windows using PCSWIN.BAT instead of WIN.COM; thus, the required DOS TSR programs can be loaded ahead of Windows.

If you customize the first configuration from the Start/Configure Session icon, the configuration program lets you save the WorkStation profile. If not, choose **File** on the session menu bar of your host session window and click on **Save as...** from the pull-down menu. That lets you also save the new configuration to a WorkStation profile.

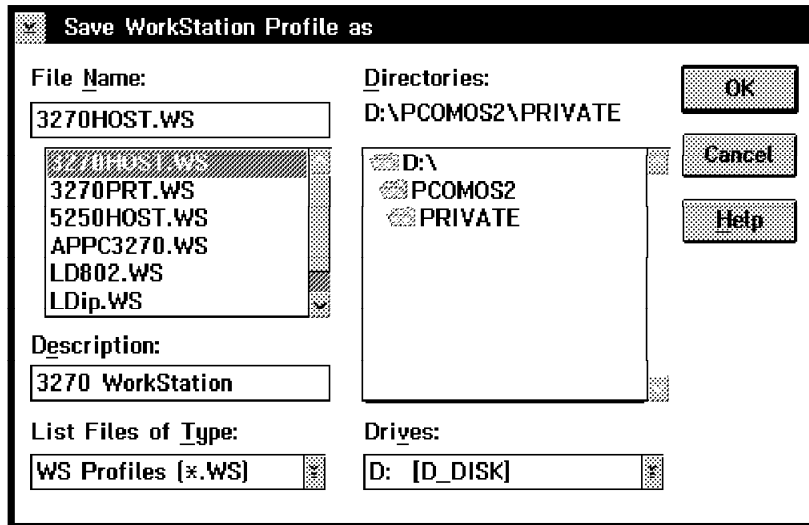


Figure 78. Save WorkStation Profile Panel

Type the name and description of your WorkStation profile, then click on the **OK** button. The following message panel asks whether you want to add the new WorkStation icon to the OS/2 Desktop or to the Windows Program Manager.

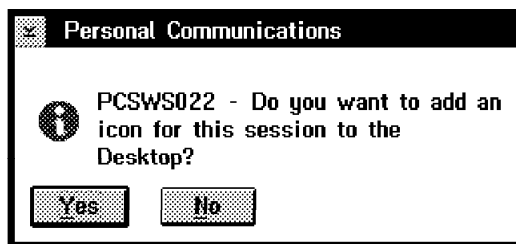


Figure 79. Add WorkStation (Session) Icon to OS/2 Desktop Message

Choose **Yes** and it will be added on the OS/2 Desktop, from where it can be moved to the location you want. You'll receive an information message, where the WorkStation profile icon will be.

Personal Communications for Windows lets you select a program group for this WorkStation profile icon.

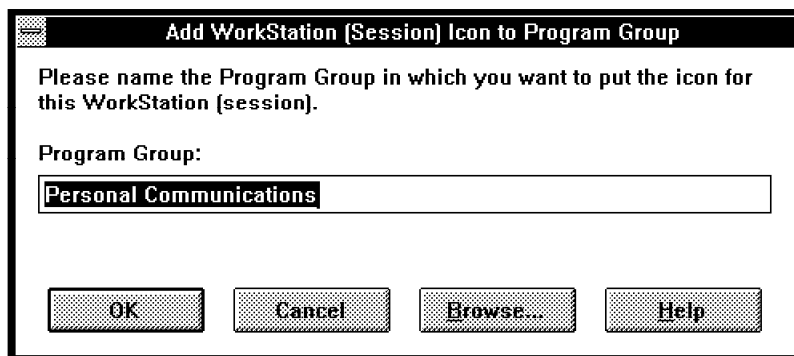


Figure 80. Add WorkStation (Session) Icon to Program Group Panel

Choose the default program group, or type in a new name or select an existing one by clicking on the **Browse** button. After clicking on the **OK** button, an information message appears, which tells you the program group name where the icon for your WorkStation profile will be.

Repeat the steps of this section for each WorkStation (session) that you want to configure and that has any difference to the previous WorkStation profile.

However, if you want to create another WorkStation, which is exactly the same as the others, start that original WorkStation, select **Save As...** from the File pull-down menu and save the profile with a new name. If you use them on the same system, start that WorkStation more times.

Important

Only a WorkStation that does *not* have a specified LU address/LT number or Workstation ID can be started more times. This means that the LU/LT parameter for 3270 sessions on Figure 70 on page 162 must be at its Default (Next Available) or the Workstation ID field for 5250 sessions on Figure 72 on page 164 must be blank.

8.1.2 Starting Multiple Personal Communications WorkStations

There are many different ways to start multiple Personal Communications WorkStation sessions, as follows:

- Double-click on your customized **WorkStation** icon to start the first session. Double-click on this icon again to start the second WorkStation session and so on. All started sessions are identical. If you have different sessions, they need a WorkStation profile and icon for each session that is different from the other. Double-click on your icons to start the relevant WorkStation sessions.
- If one WorkStation is already active, select **File** on the session menu bar and click on **Run the same** or **Run others...** from the pull-down menu to start more WorkStation sessions.
- If you always need more than one WorkStation session, you can customize a batch file with the Multiple Sessions icon in the Personal Communications folder or program group. That lets you start several host sessions at one time. Double-click on your customized **Batch file** icon to start all desired host sessions simultaneously.

8.1.3 Customize a WorkStation Batch File

A WorkStation batch file starts several host sessions at once. It is a convenient way to start 3270 and/or 5250 WorkStation sessions under the following circumstances:

- You need more than one session to be started automatically at once
- You use more than one WorkStation profile
- The order in which the sessions are started is important because you have at least one profile that uses a specific LU address/LT number

To customize a batch file, double-click on the **Multiple Sessions** icon. The batch program starts and displays the Create/Modify Batch File panel as shown below.

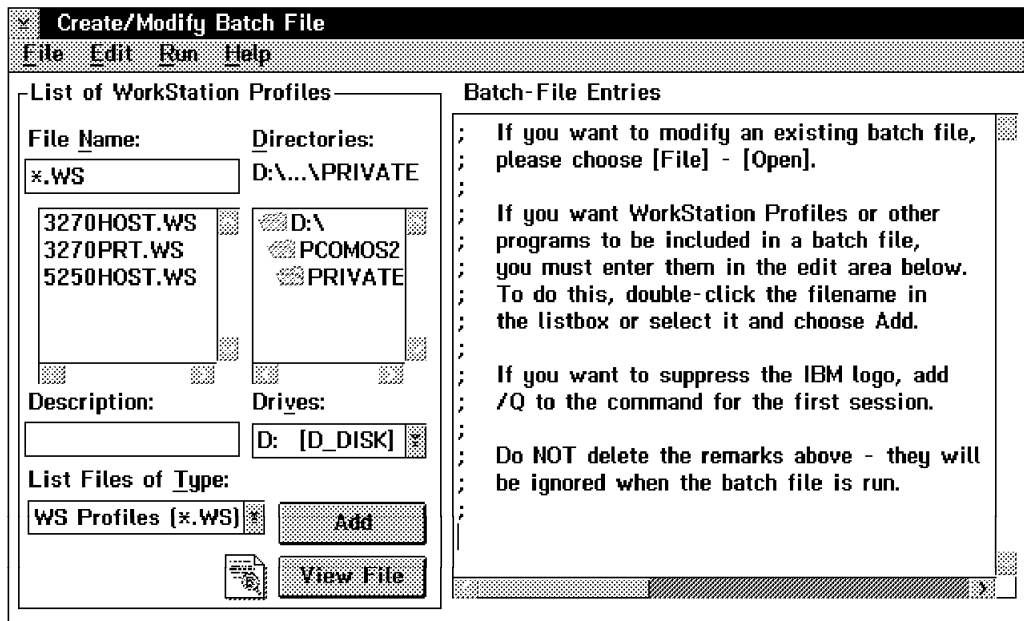


Figure 81. Creat/Modify Batch File Panel

The Creat/Modify Batch File program (PCSBAT.EXE) provides an improved interface for creating the batch files to allow you to start multiple sessions and applications from a single icon.

In our example, we have three WorkStation profiles called 3270HOST.WS, 5250HOST.WS and 3270PRT.WS (WS is the default extension for all WorkStation profiles). The 3270PRT.WS WorkStation profile *must be* LU address/LT number-dependent for the LU address 03. It has to be the second WorkStation that we start.

First we select the 3270HOST.WS WorkStation profile, which will be a display session for LU number 02. Click on the **Add** button. A configuration line has been added on the right side in the Batch-File Entries box. Now we use the 3270PRT.WS profile for LU number 03. Click on the **Add** button again. For the next three sessions, we use the 3270HOST.WS profile; these will have the LU numbers 04, 05 and 06. For the last two sessions, we want to connect to an AS/400; therefore, we use the 5250HOST.WS profile.

The following are four methods of including profiles or programs in a batch file; you can use whichever is convenient.

- Drag and Drop the file name into the edit area (for OS/2 only).
- Double-click on the file name.
- Click on the file name and select the **Add** button.
- Type the complete command in the edit area.

Notes:

1. LU/LT number-dependent WorkStation profiles can only be used one at a time.
2. The Workstation-ID field must be blank in the 5250HOST.WS profile, so that we can start it twice. If not, it can be used only one at a time, as a dependent WorkStation session.

If you want to view (or edit) a WorkStation profile before you add it, choose the profile and click on **View File** or the icon below the list (it has a blue magnifying glass in it).

If you want to include other programs in the batch file, change the file type and source, then add the programs to the Batch-File Entries box. For example, look for the ZIPPRINT.EXE file in your Personal Communications directory.

Some other useful tips to control a Personal Communications WorkStation are as follows:

- The Personal Communications logo is controlled by adding the parameter /Q to the first *.WS line in the Batch-File Entries box, as follows:
D:\PCOMOS2\PCSW.S.EXE D:\PCOMOS2\PRIVATE\3270HOST.WS /Q
- If you want a WorkStation session to start as an icon, not as a session window, add the parameter /I to the command that starts it, as follows:
D:\PCOMOS2\PCSW.S.EXE D:\PCOMOS2\PRIVATE\3270PRT.WS /I
- To start a session with a specific short session ID, insert the parameter /S=a (where a is the short session ID) after PCSWS.EXE in the batch file, as follows:
D:\PCOMOS2\PCSW.S.EXE /S=a D:\PCOMOS2\PRIVATE\3270HOST.WS
- If you have added ZipPrint without a parameter, it will be enabled for the first 3270 WorkStation session by default. Add the parameter /abc (where a,b, and c are the short session IDs) after ZIPPRINT.EXE to enable it for specific short session IDs a, b and c, as follows:
D:\PCOMOS2\ZIPPRINT.EXE /abc

The batch files may be shown sequentially in your Batch-File Entries box (see Figure 82) to run four 3270 WorkStation profiles for display sessions, one WorkStation profile for a 3270 printer session and two 5250 WorkStation profiles for display sessions from an AS/400.

```
D:\PCOMOS2\ZIPPRINT.EXE /abc
D:\PCOMOS2\PCSW.S.EXE D:\PCOMOS2\PRIVATE\3270HOST.WS /Q
D:\PCOMOS2\PCSW.S.EXE /S=p D:\PCOMOS2\PRIVATE\3270PRT.WS /I
D:\PCOMOS2\PCSW.S.EXE D:\PCOMOS2\PRIVATE\3270HOST.WS
D:\PCOMOS2\PCSW.S.EXE D:\PCOMOS2\PRIVATE\3270HOST.WS /I
D:\PCOMOS2\PCSW.S.EXE D:\PCOMOS2\PRIVATE\3270HOST.WS /I
D:\PCOMOS2\PCSW.S.EXE /S=e D:\PCOMOS2\PRIVATE\5250HOST.WS
D:\PCOMOS2\PCSW.S.EXE /S=f D:\PCOMOS2\PRIVATE\5250HOST.WS /I
```

Figure 82. Creat/Modify Batch File Sample

The following will happen when you start that example:

- ZipPrint is enabled for 3270 session a, b and c (not for d and p).
- You get four 3270 WorkStation sessions, two of which will be started as icons.
- The 3270 printer session will be assigned to short session ID p.
- You get two 5250 WorkStation sessions that always have the short session IDs e and f. Session f will be started as an icon.

Important

To have a logical link to an S/390 and to an AS/400 host system, it is required to set the Link Station Count parameter to a minimum of two, as follows:

1. Select **Configure Link** from the Customize Communication panel:
 - See Customize Communication - 3270 panel in Figure 70 on page 162
 - See Customize Communication - 5250 panel in Figure 72 on page 164
2. Click on **Advanced...** in the IEEE 802.2 Link Parameter panel.
3. Set the Link station Count parameter greater than 1.

Now let us save this WorkStation batch file; select **File** on the menu bar and choose **Save as...** from the pull-down menu.

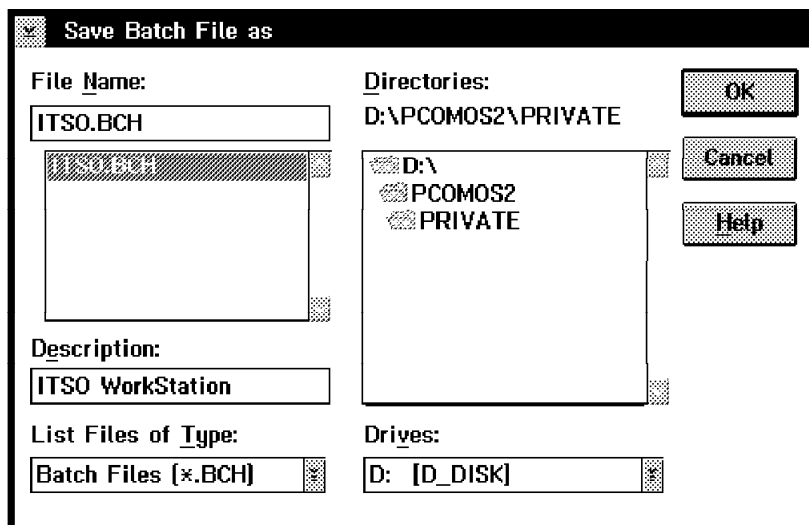


Figure 83. Save WorkStation Batch File Panel

The Save Batch File as panel opens and lets you save this WorkStation batch file by typing the name and description in these fields and clicking on the **OK** button. This is equal to saving a WorkStation profile (see Figure 78 on page 168). The name extension for a WorkStation batch file will be .BCH.

If you click on the **OK** button, a message panel asks whether you want to add the new Batch file icon to the OS/2 Desktop or Windows Program Manager.



Figure 84. Add WorkStation Batch File Icon to OS/2 Desktop Message

Choose **Yes** and it will be added on the OS/2 Desktop, from where it can be moved to the location you want. You'll receive an information message, where the WorkStation Batch file icon will be.

Personal Communications for Windows lets you select a program group for this WorkStation Batch file icon.

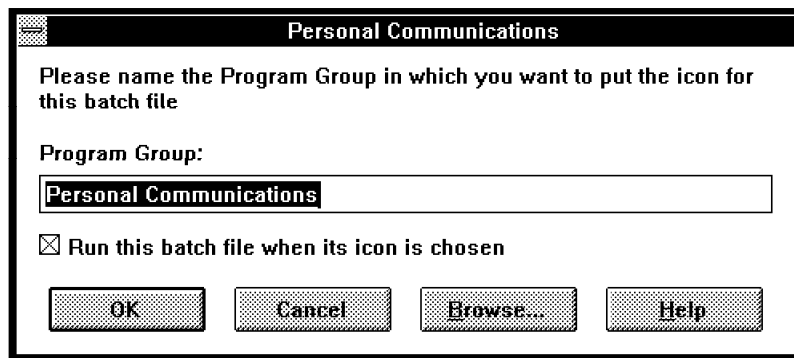


Figure 85. Program Group for the WorkStation Batch File Icon Panel

Choose the default program group, or type in a new name or select an existing one by clicking on the **Browse** button. After clicking on the **OK** button an information message appears which tells you where the icon for your WorkStation batch program will be located.

The X in the Run this batch file when its icon is chosen check box starts sessions specified in the PCSBAT.EXE file. If you remove this X, the PCSBAT batch file opens its own panel as shown in Figure 81 on page 170.

You can create as many batch files as you like. You can edit them and mix WorkStation profiles, matching your needs; you can also include other applications, in the Batch program file, which need to communicate with the WorkStation (via DDE or HLLAPI).

8.1.4 How to Start Personal Communications WorkStations Automatically

To start a Personal Communications for OS/2 WorkStation automatically when OS/2 starts, use the following steps:

1. Open the Startup folder of OS/2.
2. Either move or copy the WorkStation profile icon or Batch file icon to the Startup folder. Pressing the Ctrl and Shift keys, when moving the icon, creates a *shadow* of the original icon in the Startup folder.

To start a Personal Communications for Windows WorkStation automatically when Microsoft Windows 3.1 starts, use the following steps:

1. Double-click on the **AutoStart program group** icon.
2. Either move or copy the icon for the Workstation profile or batch file into the AutoStart program group.

Notes:

- If you have migrated from PC/3270 V2.0 or from Microsoft Windows Version 3.0 and had entered a LOAD or RUN command in WIN.INI to start Personal Communications automatically, you *must* remove this command.
- Microsoft Windows Version 3.0 is not supported for Personal Communications Version 4.1.

8.2 Special Considerations for PCMCIA

Most mobile computers, such as an IBM ThinkPad or other Laptop/Notebook computers, use the Personal Computer Memory Card International Association (PCMCIA) standard for the credit-card-sized adapters. To communicate with such an adapter, you need to install all the required device drivers for it.

8.2.1 Installing PCMCIA Device Driver for DOS/Windows

This section provides you with the information you need to install the PCMCIA Device Driver in a DOS and Windows environment on IBM Thinkpad 755C.

To install EasyPlaying PCMCIA Support for DOS, which is included in the ThinkPad Utility, perform the following steps:

- Insert the ThinkPad utility diskette #2 into the A: drive.
- Type A: at the command prompt and press Enter.
- Type INSTALL at the command prompt and press Enter.
- Follow the instructions on the screen.
- Restart the system.

To install EasyPlaying PCMCIA Support for Windows, which is included in the ThinkPad Utility, perform the following steps:

- Start Microsoft Windows 3.1.
- Insert the ThinkPad utility diskette #2 into the A: drive.
- Click on the **File** option of the Program Manager window and select **Run** to get the Run panel.

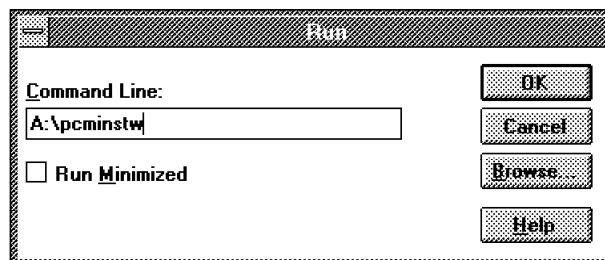


Figure 86. Windows Program Manager Run Panel

Type A:\pcminstw as shown and click on **OK**. At the IBM EasyPlaying logo panel, click on **Continue**; this takes you to the IBM EasyPlaying Installation Program panel, as shown below.

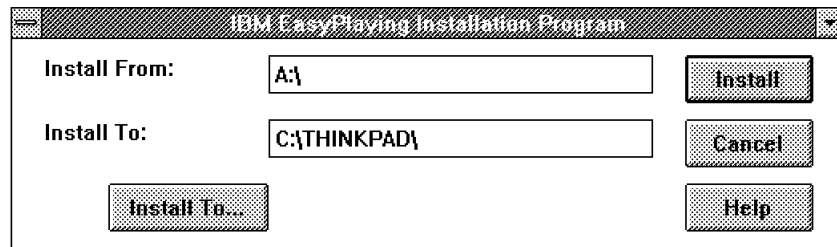


Figure 87. IBM EasyPlaying Installation Program Panel

Follow the instructions on the panel and make your selections; then click on the **Install** button.

After all the files are copied, a question panel will be presented, which asks you to modify the CONFIG.SYS and SYSTEM.INI files.

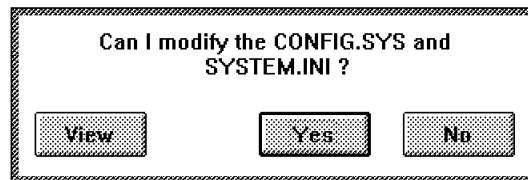


Figure 88. IBM EasyPlaying Installation Program Modify Panel

Let the installation program do the changes for you, and then click on **Yes**.

Finally, the installation of EasyPlaying has been successfully completed; exit Windows and restart your system, so that the changes can take effect.

Considerations to the Related Configuration Files

As a result of the installation process, the following should be noted:

SYSTEM.INI file

The following line has been added to the [386Enh] section in the Windows SYSTEM.INI file:

```
EMMExclude=C800-CFFF
```

CONFIG.SYS file

Figure 89 on page 176 shows the CONFIG.SYS file, used on an IBM ThinkPad 755C. Some of the statements are optional or depend on your home country National Language Support (NLS) See DOS 7.0 Environment.

The PCMCIA device drivers have been added as a result of the above installation. We slightly modified these statements by adding the /S0=2 parameter, as highlighted. Refer to the READ.ME file in the \THINKPAD directory.

Be careful with the EMM386 parameters. They are critical and relate to your hardware. Use RAMSETUP of DOS 7.0 to do the inclusion and exclusion. The part /MA=C800-CFFF must be excluded, as highlighted (x=b800-cfff reserves all C frame for special use). This must be done manually after RAMSETUP.

The statement STACKS=9,256 should be the first line in your CONFIG.SYS file.

```
STACKS=9,256                <-- have it as the first line

REM ***** DOS 7.0 Memory Management *****
DEVICE=C:\DOS7\HIMEM.SYS
DEVICE=C:\DOS7\EMM386.EXE NOEMS RAM x=a000-b1ff i=b200-b7ff x=b800-cfff i=d000-efff
                                                x=f000-f7ff h=64 a=7 d=64

DEVICE=C:\DOS7\SMARTDRV.EXE /DOUBLE_BUFFER
DEVICE=C:\DOS7\RAMBOOST.EXE LOAD                <-- DOS 7.0 Memory Manager
DOS=HIGH

REM ***** PCMCIA Device Drivers *****
DEVICE=C:\THINKPAD\IBMDSS01.SYS /D /S0=2        <-- Socket Services
DEVICE=C:\THINKPAD\IBMDOSCS.SYS                <-- Card Services
DEVICE=C:\THINKPAD\DICRMU01.SYS /MA=C800-CFFF  <-- Resource Map Utility
DEVICE=C:\THINKPAD\ICPMDOS.SYS                <-- PCMCIA Power Management Support
DEVICE=C:\THINKPAD\AUTODRV.SYS C:\THINKPAD\AUTODRV.INI <-- Auto Configurator
DEVICE=C:\THINKPAD\DISKDRV.SYS                <-- Super Storage Driver

REM ***** DOS 7.0 Environment *****
DEVICE=C:\DOS7\DISPLAY.SYS CON=(,1)           <-- used for NLS Support
DEVICE=C:\DOS7\ANSI.SYS
DEVICE=C:\DOS7\SETVER.EXE
DEVICE=C:\DOS7\POWER.EXE                      <-- ThinkPad Power Management
COUNTRY=001,437,C:\DOS\COUNTRY.SYS          <-- used for NLS Support
SHELL=C:\DOS\COMMAND.COM C:\DOS /P /E:1024
FCBS=16,8
FILES=64
BUFFERS=10
LASTDRIVE=Z
```

Figure 89. The CONFIG.SYS File for DOS 7.0 Including PCMCIA Support

Warning: Resource Manager

Sometimes the Resource Manager (part of Card and Socket Services support) returns an IRQ as valid, even if it is already used by the system. For example, the loud speaker on Thinkpad 755C uses IRQ 10 by default, while the Pen interface on Thinkpad 750P uses IRQ 5.

Use your Thinkpad Utilities (PS2 on DOS) or specific PCMCIA System configuration in OS/2 to check what is really used by your machine, and change the IRQ used by the system or by the Wireless application.

Once the potential conflict is identified, a switch could also be added to the Resource Manager Device statement in the CONFIG.SYS file to specify the interrupt request levels that cannot be used by the PC card.

The following is an example for 755C with loud speaker using IRQ 10:

```
DEVICE=C:\THINKPAD\DICRMU01.SYS /IX=10
```

In this case, IRQ 10 cannot be used by the PC Card and will be reserved to the loud speaker.

8.2.2 Installing PCMCIA Device Driver for OS/2

This section provides you with the information you need to install the PCMCIA Device Driver in an OS/2 environment.

Determine whether the Card Services device driver statement is present in your CONFIG.SYS file.

The statement in the CONFIG.SYS file should look as follows:

```
DEVICE=C:\OS2\PCMCIA.SYS          or          BASEDEV=PCMCIA.SYS /P
                                     OS/2 V2.1          OS/2 WARP V3.0
```

If this statement is not present, do a selective installation of the OS/2 Card Services by clicking on the **Selective Install** icon in the System Setup folder.

Card Services also requires that Socket Services be installed. OS/2 Socket Services is normally shipped with your PCMCIA adapter, or with your computer if it has a built-in PCMCIA socket. OS/2 Warp V3.0, for example, has PCMCIA support built in to the operating system.

In our mobile communication scenarios, an IBM ThinkPad 750C will be used with OS/2 Warp V3.0 and its PCMCIA Plug-and-Play support. The following statements shows the device drivers installed by the operating system, to use the PCMCIA Card and Socket Services, the Plug-and-Play utility program and the IBM Auto Configurator for various IBM and non-IBM PCMCIA Data/Fax Modems:

```
BASEDEV=PCMCIA.SYS /P
BASEDEV=IBM2SS01.SYS /s0=2
BASEDEV=PCM2ATA.ADD /S:2
DEVICE=C:\OS2\BOOT\COM.SYS
DEVICE=C:\OS2\BOOT\AUTODRV2.SYS C:\OS2\AUTODRV2.INI
DEVICE=C:\OS2\MDOS\VPCMCIA.SYS
```

The following list describes all the device drivers (in their correct order) that may need to be installed in your CONFIG.SYS file:

PCMCIA.SYS

This is the PCMCIA card services device driver. It is shipped as part of OS/2 2.1 or above. Remove the /P parameter if you are using a PCMCIA enabler software other than Plug-and-Play built in to OS/2 Warp Version 3.0.

IBM2SS01.SYS

This is the socket services device driver. Set the socket service environment for your system. Many socket service device drivers are included in OS/2 Warp Version 3.0. See the online *OS/2 Command Reference* to find the specific driver for your system.

PCM2ATA.ADD

This is the Advanced Technology Attach ATA device driver. It provides PCMCIA support for disk drives.

COM.SYS

This is the COM port device driver for serial ports COM1 through COM4. It is shipped as part of OS/2 as well.

AUTODRV2.SYS

This is the IBM Auto Configurator, which is a super-client modem device driver that supports many various IBM and non-IBM PCMCIA Data/Fax Modems.

VPCMCIA.SYS

This is an optional PCMCIA card device driver for virtual DOS. It is shipped as part of OS/2 2.1 or above and is used only for DOS applications under OS/2; however, it does not do any harm to have it in CONFIG.SYS even if it is not needed.

Plug-and-Play for PCMCIA

Plug-and-Play for PCMCIA is an OS/2 utility that gives you access to the PCMCIA socket status and card information. It is part of OS/2 Warp Version 3.0 and is located in the System Setup folder.

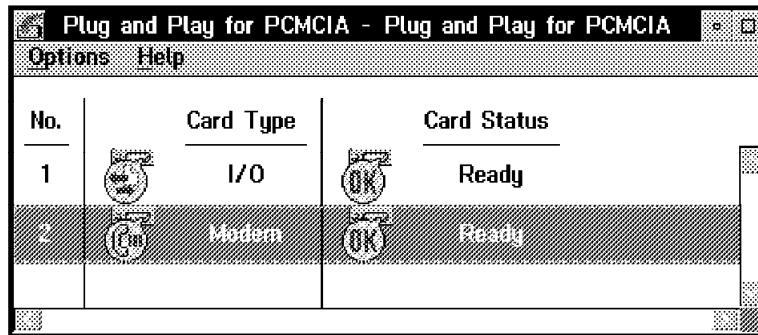


Figure 90. Plug-and-Play for PCMCIA - OS/2 Warp

The figure above shows that there are two PCMCIA cards inserted. One of them is the IBM PCMCIA 14.4/14.4 Data/Fax Modem currently in slot 2 and ready to use.

Plug-and-Play for PCMCIA lets you plug and unplug the PCMCIA cards as long as Personal Communications is not started and using it. Do not try to plug and unplug the card while PCOM is up as this can cause problems.

Together with IBM's Auto Configurator, Plug-and-Play can automatically configure card information such as the port name, interrupt level and I/O addresses. Double-click on the modem to see that information.

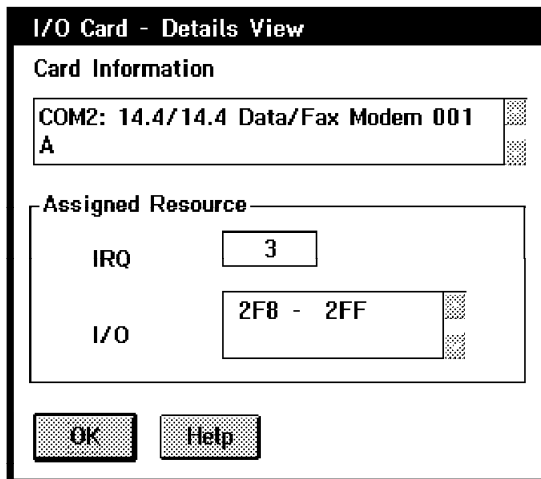


Figure 91. Plug-and-Play for PCMCIA Details - OS/2 Warp

The card information shows you the COM port, which has been customized for this modem card. Then, when you configure the COM port in PCOM, you use the same port name as configured by Plug-and-Play (that is, COM2:).

Chapter 9. SNA Data Compression/Decompression

When you have limiting factors such as low speed and/or high cost communication lines in your network, you should consider data compression as an option. There is not a single best way of achieving data compression, as the communication profiles assume different characteristics for each particular application, and there are distinct ways of implementing data compression. For instance, you could have a hardware box installed on your communication line(s) that would compress all data traffic (including, perhaps, a certain amount not well-suited for compression). You could also have the data files compressed before they are sent through the network.

The type of data compression we are interested in is a facility of VTAM V3R4.1 or later for MVS/ESA, which provides four different levels of compression for LU-LU sessions.

In the following sections, we briefly explain the VTAM support for data compression, and how to set up the environment, so Personal Communications Version 3.0 or higher can establish sessions using SNA data compression.

9.1 Introduction

Data Compression² is an application program facility of VTAM that allows the data for messages on selected LU-LU sessions to be compressed. This is transparent to application programs³.

You can implement data compression for logical units in either an extended BIND (PU types 2.1, 4 or 5) or non-extended BIND environment (PU types 1 or 2). PC/3270 supports the non-extended BIND environment only.

The use of data compression can be negotiated for each session through the BIND and BIND (RSP) request units (RUs). The session partners can negotiate whether to use data compression and what type of compression. VTAM supports two different compression algorithms, as follows:

RLE Run-length encoding compression

This method encodes duplicate characters using a control byte (SCB: string control byte) comprised of a count field and type field.

LZ Lempel-Ziv compression

This algorithm devised by Jacob Ziv and Abraham Lempel uses tables that adapt dynamically to match the data being sent or received. LZ compression replaces the original data with a set of compression codes. Each set represents one or more bytes.

² Sometimes this data compression is referred to as LCC (Length-checked Compression). In fact, when an RU is compressed, its RH (request header) contains the LCCI (length-checked compression indicator) bit turned on.

³ As Personal Communications is a boundary node (PU T2.0), the compression/decompression can not be handled by VTAM for the PC/3270 V4.1 side. Personal Communications has to provide the data compression/decompression support in this case.

There are three levels of LZ compression, as follows:

- LZ small table
This type uses 9-bit compression codes.
- LZ medium table
This type uses 10-bit compression codes.
- LZ large table
This type uses 11-bit compression codes.

With LZ compression, each partner begins a session with an identical set of tables. Senders of the RU update their send tables as data is compressed. Receivers of the RU make identical updates to their receive tables as data is decompressed. This method keeps both ends of the session identical without exchanging table data between nodes.

According to the previous paragraphs, VTAM provides the following levels of compression:

- | | |
|----------|-----------------|
| 0 | No compression |
| 1 | RLE |
| 2 | LZ small table |
| 3 | LZ medium table |
| 4 | LZ large table |

The higher level numbers will generally give better compression, but at a higher cost in CPU cycles and storage usage.

9.2 Prerequisites

You need to have the following three things ready before data compression with Personal Communications may be achieved:

- VTAM
VTAM *must* be at Version V4R3.1 or later for MVS, and compression *must* be enabled. See 9.2.1, “VTAM Setup” on page 181 for details.
- Application
Data compression/decompression is transparent to the application, but its definition in VTAM should be coded to allow the facility. See 9.2.1, “VTAM Setup” on page 181 for details.
- PC/3270
Its VTAM definition (logmode) should not prohibit compression/decompression; the type of attachment allows compression/decompression and the function should be enabled in PC/3270. See 9.2.2, “PC/3270 V4.1 Setup” on page 182 for details.

9.2.1 VTAM Setup

There is a VTAM startup option that sets the maximum global level of compression (0, 1, 2, 3 or 4). The keyword is called CMPVTAM and may be coded in the startup member ATCSTRnn, nn being installation dependent. For instance, for 10-bit Lempel-Ziv maximum global level of compression, CMPVTAM=3 should be coded in the ATCSTRnn member. The maximum global level of compression can be changed at any time with the MODIFY (F) COMPRESS command as shown in Figure 92.

F NET, COMPRESS, CMPVTAM=4

```
IST097I  MODIFY   ACCEPTED
IST223I  MODIFY COMPRESS COMMAND COMPLETED
```

Figure 92. Changing VTAM Maximum Compression Level

To display the current VTAM maximum level of compression, use the DISPLAY (D) VTAMOPTS command as shown in Figure 93.

D NET, VTAMOPTS

```
IST097I  DISPLAY ACCEPTED
IST1188I  ACF/VTAM V3R4.2 STARTED AT 04:33:21 ON 11/22/95
IST1189I  ALSREQ   = NO                      ASYDE    = TERM
IST1189I  BSCMDRS  = (STATS,INOPS)          CDRSCTI   = 480
IST1189I  CMPVTAM = 4                      COLD      = YES
.
.
.
IST314I  END
```

Figure 93. Displaying VTAM Maximum Compression Level

The CMPVTAM keyword in the startup member ATCSTRnn or in the MODIFY (F) COMPRESS command establishes the maximum global level of compression for applications residing on this VTAM. As an additional requirement, the application(s) should be enabled for compression as well. When compression is negotiated during session setup, a compression level is set for each flow direction (PLU-SLU and SLU-PLU). The PLU-SLU compression level is referred to as the output (or outbound) compression level. The SLU-PLU compression level is referred to as the input (or inbound) compression level. For sessions using a non-extended BIND (PC/3270 for instance), there are limited negotiation capabilities. Bits 6 and 7 in byte 25 of the BIND are used for compression negotiation, and the highest possible compression levels in the PLU-SLU direction and SLU-PLU direction are 2 and 1 respectively.

Use the DISPLAY (D) ID command as shown in Figure 94 on page 182 to display the maximum compression levels (input and output) for an application.

D NET, ID=RAIAT06

```
IST097I DISPLAY ACCEPTED
IST075I NAME = RAIAT06           , TYPE = APPL
IST486I STATUS= CONCT          , DESIRED STATE= CONCT
IST977I MDLTAB=***NA*** ASLTAB=***NA***
IST861I MODETAB=***NA*** USSTAB=***NA*** LOGTAB=***NA***
IST934I DLOGMOD=***NA*** USS LANGTAB=***NA***
IST597I CAPABILITY-PLU INHIBITED,SLU INHIBITED,SESSION LIMIT NONE
IST231I APPL MAJOR NODE = RAIBTSO
IST212I ACBNAME = TS00006
IST654I I/O TRACE = OFF, BUFFER TRACE = OFF
IST271I JOBNAME = ***NA***, STEPNAME = ***NA***, DSPNAME = ***NA***
IST1050I MAXIMUM COMPRESSION LEVEL - INPUT = 4 , OUTPUT = 4
IST171I ACTIVE SESSIONS = 0000000000, SESSION REQUESTS = 0000000000
IST314I END
```

Figure 94. Displaying Compression Levels for an Application

In Figure 94, message IST1050I shows input and output compression levels of 4 for the application RAIAT06.

To set an application's compression levels, you can code the keywords CMPAPPLI=m and CMPAPPLO=n in the VTAM application major node, or you can use the MODIFY (F) COMPRESS command as shown in Figure 95.

F NET, COMPRESS, ID=RAIAT06, CMPAPPLI=4, CMPAPPLO=4

```
IST097I MODIFY ACCEPTED
IST223I MODIFY COMPRESS COMMAND COMPLETED
```

Figure 95. Changing Compressions Levels for an Application

Notice in Figure 95, the command is similar to the one used to change VTAM's global compression level. This time you don't specify the keyword CMPVTAM, and you have to specify the input compression level (CMPAPPLI), the output compression level (CMPAPPLO) and the application (ID).

9.2.2 PC/3270 V4.1 Setup

PC/3270 V4.1 is the 3270 terminal emulation capability for the Personal Communications AS/400 and 3270 Version 4.1 for PCs running DOS (3270 only), Windows 3.x, OS/2, OS/2 Warp, and Windows 95.

You need to perform the following three checks to achieve SNA data compression in PC/3270 V4.1:

- Verify that the type of attachment supports compression/decompression.

The SNA data compression/decompression is supported for the connection types in which the SNA BIND is handled by PC/3270 V4.1 (DFT, SDLC, X.25 and SNA LAN). Therefore, SNA data compression/decompression is not supported for the following types of connectivity:

- CUT
- Home3270

- Async3270
- IPX/SPX (NetWare for SAA)
- TCP/IP (Telnet 3270)
- Verify that the logmode entry has compression enabled.

A new parameter (COMPRES) was added to the logmode to indicate whether compression is prohibited (COMPRES=PROHIB), required (COMPRES=REQD) or optional (COMPRES=SYSTEM). If you don't code the parameter, COMPRES=SYSTEM is assumed. The default (COMPRES=SYSTEM) is sufficient to achieve compression, but you can also use COMPRES=REQD.

- Verify that PC/3270 V4.1 has been customized for compression/decompression.

Let's now see how we enable compression for PC/3270 V4.1.

For DOS (Full-Function Mode), perform the following steps:

1. Execute the CONFIG program⁴.
2. When you get to the End of Link Options panel shown in Figure 96, choose **Yes** for the field Do you wish to add or change ADVANCED CONFIGURATION OPTIONS?. Press F8 to get the Advanced Configuration Options panel shown in Figure 97 on page 184.
3. In the Advanced Configuration Options panel shown in Figure 97 on page 184, choose **Yes** for Facilities. Press F8 to get the Facilities, part I panel.
4. On the Facilities, part I panel, press F8 to get the Facilities, part II panel, shown in Figure 98 on page 184.
5. On the Facilities, part II panel shown in Figure 98 on page 184, choose **Yes** for SNA Data Compression, and press F8.
6. Proceed until the CONFIG or INSTALL program ends the configuration or the installation.

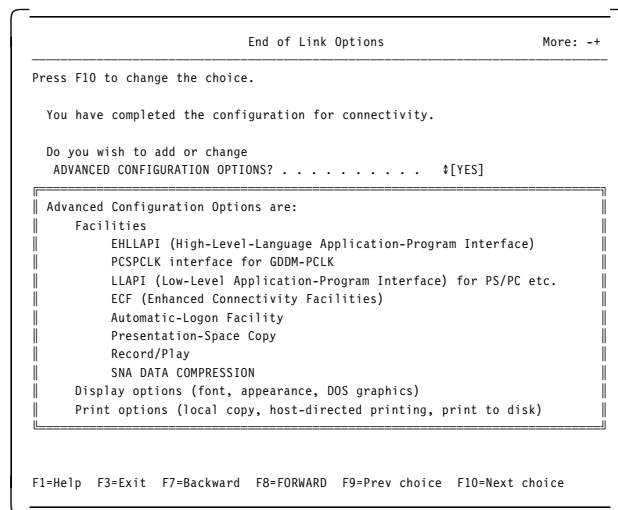


Figure 96. Enabling Compression - End of Link Options - for DOS (Full-Function Mode)

⁴ You can also enable SNA data compression when you are installing PC/3270 V4.1 for DOS (Full-Function Mode), as the same procedure applies.

```

Advanced Configuration Options                                     More: -+
-----
Press F10 if you want to change the options in any group.

Facilities . . . . . [Yes]
Display options . . . . . [No ]
Print options . . . . . [No ]

F1=Help F3=Exit F7=Backward F8=Forward F9=Prev choice F10=Next choice

```

Figure 97. Enabling Compression - Advanced Configuration Options - for DOS (Full-Function Mode)

```

Facilities, part II                                             More: -+
-----
Press F10 to select Yes or No.

Automatic Logon Facility . . . . . [No ]
  Name of file to store Automatic
  Logon Facility parameters . . . . . [PCSLGON.PCS]
Presentation-Space Copy . . . . . [No ]
  Copy characters with their attributes . . . . [No ]
Record/Play . . . . . [No ]
SNA Data Compression . . . . . [Yes]
Leave mouse enabled
while a host session is being displayed . . [No ]
Allow DOS background execution . . . . . [No ]
(Resume-mode)

F1=Help F3=Exit F7=Backward F8=Forward F9=Prev choice F10=Next choice

```

Figure 98. Enabling Compression - Facilities, part II - for DOS (Full-Function Mode)

Perform the following steps to enable compression under Windows or OS/2 modes:

1. Click on the **Communication** option of the host session menu bar, and then click on **Configure...** in the displayed pull-down menu to get the Customize Communication window.
2. On the Customize Communication window, click on **Configure...** to get the Customize Communication-3270 Host window shown in Figure 99 on page 185.
3. On the Customize Communication-3270 Host window, click on **Configure SNA...** in the Session Parameters box to get the SNA Parameters window shown in Figure 100 on page 185.
4. In the SNA Parameters window shown in Figure 100 on page 185, choose **Enabled** for SNA Data Compression, and alter the Compression-Buffer Size value if necessary. Its value *must* not be less than the larger RU flowing in the session.
5. Click on **OK** until you finish the configuration.

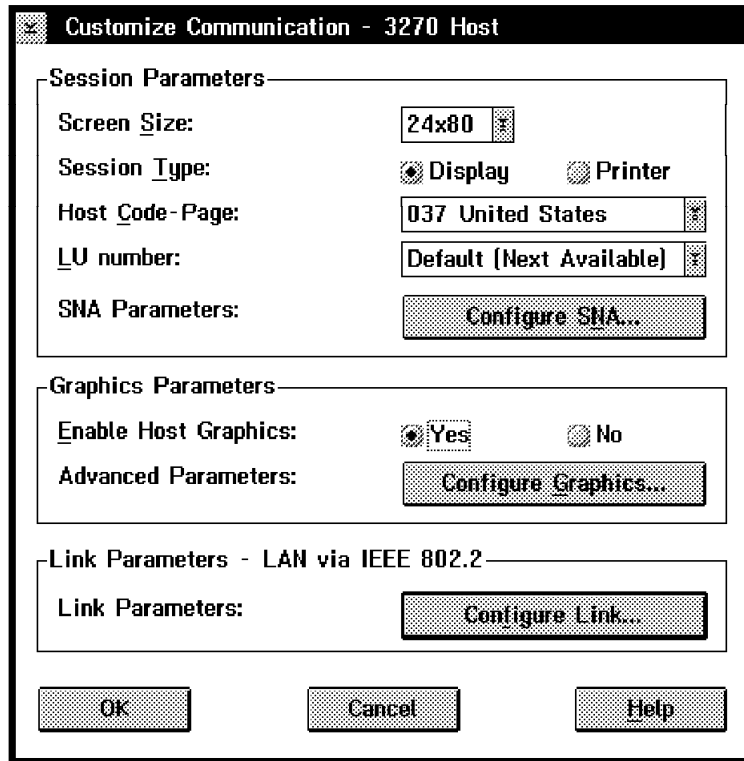


Figure 99. Customize Communication - 3270 Host Panel

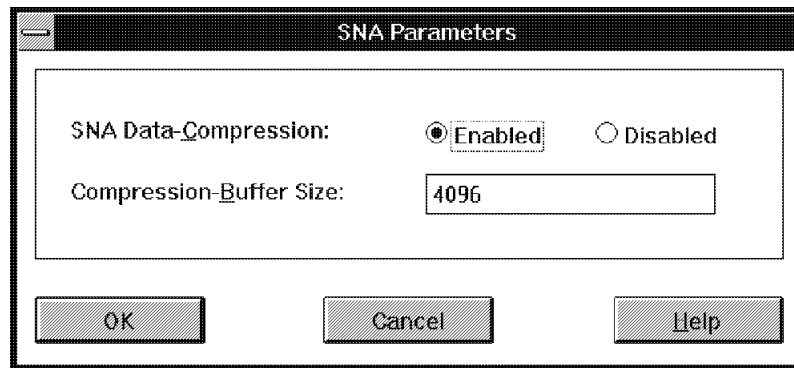


Figure 100. Enabling Compression - SNA Parameters - Windows or OS/2 modes

9.3 BIND Processing

Although the data compression negotiation is supported by VTAM for extended BIND and non-extended BIND, PC/3270 V4.1 supports only non-extended BIND. Under non-extended BIND the highest level of compression is 2 (9-bit Lempel-Ziv - LZ small table) for outbound flow (PLU to SLU) and 1 (run-length encoding) for inbound flow (SLU to PLU).

With non-extended BIND, bits 6 and 7 in byte 25 in BIND request are used as follows to indicate the compression requirements:

- 00** No compression required. PC/3270 V4.1 sends back short BIND response.
- 01** Compression available. PC/3270 V4.1 will accept the compression (if it has been enabled in the workstation) by sending "10" in return. Otherwise it returns the short BIND response to reject the offer.
- 10** Reserved. PC/3270 V4.1 interprets this as 00 (no compression).
- 11** Mandatory compression. PC/3270 V4.1 will return "10" to accept the compression (if it has been enabled in the workstation); otherwise, it will return the short BIND response to reject the compression.

See Figure 101 for a PCSMON formatted trace of the BIND request and the BIND response for a PC/3270 V4.1 session with SNA data compression.

```
17:03:23.595 OUTB: [LH:] l=43 LSid=0101
                  [TH:] OIS 1->2 EFI SNF=0360
                  [RH:] REQ SC FI OIC DR1I
                  [RU:] BIND
                        .....g8.....RAIAN.
                        000b938008f800800000000000dcccc0
                        133100000780020000000003305919150

17:03:23.632 INB: [LH:] l=43 LSid=0101
                  [TH:] OIS 1<-2 EFI SNF=0360
                  [RH:] +RSP SC FI OIC DR1I
                  [RU:] BIND
                        .....g8.....&.&....RAIAN.
                        000b938008f8008000015250000dcccc0
                        133100000780020000080003205919150
```

Figure 101. BIND Processing Trace

Regarding the data compression, you only have to check bits 6 and 7 of byte 25 (last two bits of the second hexadecimal digit) of the BIND request shown in Figure 101. In this case, byte 25 is X'03', and the last two bits (6 and 7) are "11" (compression mandated: COMPRES=REQD coded for the logmode), but they could well be "01" (compression offered: COMPRES=SYSTEM or defaulted). The BIND response byte 25 is X'02', and bits 6 and 7 are "10" (compression accepted). If PC/3270 V4.1 had SNA data compression not enabled, it would send the short (one byte) BIND response to reject the compression.

9.4 Length-Checked Compression Indicator (LCCI)

For outbound data stream, PC/3270 V4.1 examines the bit 1 of RH byte 1 for LCCI. If LCCI is on, PC/3270 V4.1 assumes that a 3-byte compression header follows the RH. It is possible to have compressed and normal (not compressed) RUs in the same chain.

For inbound data stream, PC/3270 V4.1 sets LCCI and appends a 3-byte compression header immediately after the RH when the RU content is compressed under the RLE algorithm.

9.5 Compression Header

For outbound data stream, PC/3270 V4.1 accepts a 3-byte length compression header with a compression type value of X'21' (LZ compression). Other values will be rejected with the sense data 20130000.

For inbound data stream, PC/3270 V4.1 attaches the compression header with a compression type value of X'11' (RLE compression) only.

9.5.1 LZ Control Sequence

PC/3270 V4.1 accepts the following LZ commands in LZ control sequences, but never generates them:

X'1' (reset)	PC/3270 V4.1 resets its decompression tables to their initial state before decompressing the data.
X'2' (freeze)	PC/3270 V4.1 discontinues updates to the decompression tables. PC/3270 V4.1 ignores this command if the tables are already frozen.
X'3' (unfreeze)	PC/3270 V4.1 resumes updates to the decompression tables. PC/3270 V4.1 ignores this command if the tables are normal (unfrozen).

9.5.2 Sense Data

PC/3270 V4.1 provides the following sense data in support of compression:

2013 0000	No specific code applies.
2013 0001	The decompressor received a compressed RU without an expected Reset decompression control sequence. The compressor and decompressor are not synchronized.
2013 0002	The compressor received a compressed RU containing an invalid decompression control sequence. The compressor and the decompressor are not synchronized.
2013 0003	The length of the decompressed RU did not match the length given in the compression header.

9.6 Managing Compression Effectiveness

After your PC/3270 V4.1 session is established, you can monitor it to learn whether compression was set for the session, and the amount of reduction achieved.

Because the compression in the SLU side (PC/3270 V4.1) is not handled by VTAM, you can not know, issuing commands to the VTAM that owns the SLU, whether there is compression or not (unless the PLU and the SLU reside on the same VTAM domain).

Issue the following commands to the VTAM that owns the PLU (the application you are accessing from PC/3270 V4.1 (the SLU)):

1. D NET,SESSIONS,LU1=RAST2T,LIST=ALL

In the command above, replace RAST2T with the LU name assigned to the PC/3270 V4.1 workstation. You will receive the messages shown in Figure 102 from VTAM.

Figure 102 shows that one session is active between RAST2T (PC/3270 V4.1 SLU) and RAIAT04 (application PLU). Take note of the SID (session identifier) field (F86FE1647AABF49D); you will need it for the next command.

```
IST350I DISPLAY TYPE = SESSIONS
IST873I      PLU              SLU              SID              STATUS
IST874I USIBMRA.RAIAT04    USIBMRA.RAST2T    F86FE1647AABF49D  ACTIV
IST878I NUMBER OF PENDING SESSIONS =          0
IST878I NUMBER OF ACTIVE  SESSIONS =          1
IST878I NUMBER OF QUEUED  SESSIONS =          0
IST878I NUMBER OF TOTAL  SESSIONS =          1
IST314I END
```

Figure 102. Displaying Compression Status - Part 1

2. D NET,SESSIONS,SID=F86FE1647AABF49D

You will get the messages shown in Figure 103 from VTAM. See the description that follows the figure.

```
IST350I DISPLAY TYPE = SESSIONS
IST879I PLU/OLU REAL = USIBMRA.RAIAT04  ALIAS = USIBMRA.RAIAT04
IST879I SLU/DLU REAL = USIBMRA.RAST2T  ALIAS = USIBMRA.RAST2T
IST880I SETUP STATUS = ACTIV
IST875I ADJSSCP TOWARDS SLU = RAK
IST933I LOGMODE=D4C3COMP, COS=*BLANK*
IST1048I COMPRESSION LEVEL - INPUT = 1 , OUTPUT = 2
IST1049I PERCENT REDUCTION - INPUT = 0, OUTPUT = 64
IST314I END
```

Figure 103. Displaying Compression Status - Part 2

In Figure 103, message IST1048I is telling us that the compression level for input and output is 1 and 2 respectively. Message IST1049I shows a 0 percent reduction for inbound flow (PC/3270 V4.1 to application) and a 64 percent reduction in the outbound flow (application to PC/3270 V4.1).

Chapter 10. Dynamic Definition of Dependent Logical Units

The traditional SNA VTAM environment is often thought of as a very static environment. This is because, in the earlier days of VTAM, in order to add resources you had to disrupt the service to one or more users. For this reason, careful planning had to be done or extra resources had to be defined.

As people started using devices with multiple-LU capability, the most requested resource was additional LUs. This meant that the PU that owned the resources would have service disrupted in order to add new LUs. The newer versions of VTAM are more dynamic. One of the capabilities that lends to dynamic VTAM definitions is the Dynamic Definition of Dependent LUs (DDDLU) or Self-Defining Dependent LU (SDDL U). Now, the device can request LUs on an as-needed basis.

Support for SDDL U is available to Personal Communications V3.0 and later as a workstation or gateway, except for Entry Level DOS mode.

10.1 Introduction

The dynamic definition of dependent LUs is a VTAM facility that allows the logical units to be known by VTAM when they connect to VTAM, rather than during the major node activation of the related PU. With this support, VTAM builds LU definitions from reusable model LU definitions instead of using predefined LUs. The LU definitions are replaced or changed each time the device containing the LU(s) powers on (or notifies that it is enabled and startable).

The dynamic definition of dependent LUs provides the ability to add new or additional dependent LUs to the network without interruptions to other users on the network. SDDL U allows end users to replace, upgrade, or move old dependent LUs on the network without interruption to any other user on the network; it accomplishes these changes without intervention of the system programming or operations staff.

This capability gives you the structure to predefine characteristics of your workstations to installation standards down at the control unit or workstation level, if necessary, while maintaining the ability to tailor particular workstations to individual needs.

The SDDL U capability requires some minor changes in VTAM (see 10.2, "VTAM Setup" on page 190) and depends on the activation of the physical unit (PU) being done by a format-1 ACTPU. This format-1 ACTPU can carry the PU Capabilities Control Vector, and should be sent only to devices that send an XID3 with byte 10, bit 3 set to '1' (this PU supports format-1 ACTPU). The PU Capabilities Control Vector will tell whether the sending node supports unsolicited NMVTs (network management vector transport) for Reply Reply Product Set ID (PSID). If unsolicited NMVTs for Reply PSID are supported, SDDL U can be achieved.

The Reply PSID NMVT contains the local address of each LU, a power on/off indicator, the machine type and model number of the device, and optionally other device-dependent information needed to define the logical units. VTAM uses this information to choose an appropriate model LU definition statement to build an LU definition.

10.2 VTAM Setup

The support for dynamic definition of dependent LUs is provided by VTAM V3R4.1 for MVS/ESA or V3R4 for VM and VSE.

Note: VTAM V3R4.2 for MVS/ESA or V3R4 for VM and VSE is required for PCOM (Combo) V4.1 for OS/2.

The information supplied by the Reply PSID NMVT is used by the SDDL U exit to provide a dynamic definition of the LU which originated the NMVT. A default SDDL U exit routine comes with VTAM. The module name is ISTE XCSD. This default SDDL U exit routine will be used unless you supply your own exit routine. The exit is automatically activated during VTAM initialization, and you can see the following message then:

```
IST984I  USER EXIT ISTE XCSD IS ACTIVE
```

Three command strings that affect the SDDL U exit routine operation are shown in Figure 104. They are used to do the following:

- Replace the SDDL U exit **1**
- Deactivate the SDDL U exit **2**
- Activate the SDDL U exit **3**

```
1      F NET,EXIT,ID=ISTE XCSD,OPTION=REPL
IST097I  MODIFY  ACCEPTED
IST984I  USER EXIT ISTE XCSD IS REPLACED

2      F NET,EXIT,ID=ISTE XCSD,OPTION=INACT
IST097I  MODIFY  ACCEPTED
IST984I  USER EXIT ISTE XCSD IS INACTIVE

3      F NET,EXIT,ID=ISTE XCSD,OPTION=ACT
IST097I  MODIFY  ACCEPTED
IST984I  USER EXIT ISTE XCSD IS ACTIVE
```

Figure 104. SDDL U Exit Commands

You now have the required VTAM level and the default IBM-supplied SDDL U exit routine running. To complete the VTAM setup, you need to code the required definitions for SDDL U by altering the existing PU definition and creating an LUGROUP major node.

10.2.1 Adding SDDL U Support to the PU Definition

The only thing you need to do in the major node that contains the PU for the PC/3270 V4.1 workstation is add the LUGROUP and the LUSEED keywords in the PU statement and remove the LU's instances that are going to be defined dynamically, as shown in Figure 105 on page 191.

```

          VBUILD MAXGRP=1,MAXNO=1,TYPE=SWNET
WTSTST  PU   ADDR=13,                                X
          IDBLK=061,                                  X
          IDNUM=32209,                                 X
          LUGROUP=TSTGRP,                             X
          LUSEED=RAKLT###,                             X
          DISCNT=NO,                                   X
          ISTATUS=ACTIVE,                             X
          MAXDATA=1033,                               X
          MAXPATH=4,                                  X
          PACING=0,                                    X
          PUTYPE=2,                                    X
          DLOGMOD=D4C32XX3,                           X
          MODETAB=ISTINCLM,                           X
          USSTAB=US327X,                              X
          VPACING=0

```

Figure 105. PU Definition with SDDL U Support

The LUGROUP keyword instructs VTAM to search a model LU definition in the TSTGRP LUGROUP (coded in a LUGROUP major node as shown in Figure 106). The LUSEED keyword provides a mask to build the LU name. The default SDDL U VTAM exit routine will replace the ### by the local address supplied in the Reply PSID NMVT. For instance, for a local address of 2, the LU name would be RAKLT002, using the LUSEED=RAKLT### definition. The SDDL U exit requires that you code at least two (##) or three (###) contiguous characters for the LUSEED value not being in the first position. If you use two characters (##), the SDDL U exit will use the hexadecimal representation of the local address. Otherwise, it will use the decimal representation.

10.2.2 Defining a LUGROUP Major Node

In Figure 106, you have a sample LUGROUP major node coding.

```

          VBUILD TYPE=LUGROUP
GROUP1  LUGROUP
          .
          .
          .

TSTGRP  LUGROUP
3270004 LU  DLOGMOD=D4A32784,USSTAB=US327X
3270@   LU  MODETAB=AMODETAB,DLOGMOD=D4C3COMP,USSTAB=US327X
@      LU  DLOGMOD=D4C32XX3,USSTAB=US327X
GROUPN  LUGROUP
          .
          .
          .

```

Figure 106. LUGROUP Major Node Coding

You can code one or more LUGROUPs within an LUGROUP major node, and of course, you can have more than one LUGROUP major node. After VTAM receives a Reply PSID NMVT containing a local address, for which an LU was not coded in the PU definition, it takes the LUGROUP value (TSTGRP in Figure 105) coded and tries to find an LUGROUP that has the same name.

After it finds the intended LU group, the default SDDL U exit routine uses the seven-character machine type and model number⁵ provided by the Reply PSID NMVT as the model LU name. VTAM serially checks the LU group for a model LU statement that matches the model name supplied by the SDDL U exit routine. If you choose, for instance, 24 x 80 as the screen size, PC/3270 V4.1 will insert 3270002 as the machine type and model in the Reply PSID NMVT; in this case, 3270@⁶ will be used as the LU model.

After you alter the PU definition and create the LUGROUP major node, you have to recycle (deactivate and activate) the major node that contains the PU definitions, and you have to activate the newly created LUGROUP major node.

10.3 PC/3270 V4.1 Setup

The SDDL U support in PC/3270 V4.1 as a workstation is automatically available. To activate the SDDL U support for PC/3270 V4.1 working as a gateway, choose **Yes** for Use SDDL U feature on the Gateway Information panel of the configuration process, as shown in Figure 107.

Note: PC/3270 V4.1 is the 3270 terminal emulation capability for the Personal Communications AS/400 and 3270 Version 4.1 for PCs running DOS (3270 only), Windows 3.x, OS/2, OS/2 Warp, and Windows 95.

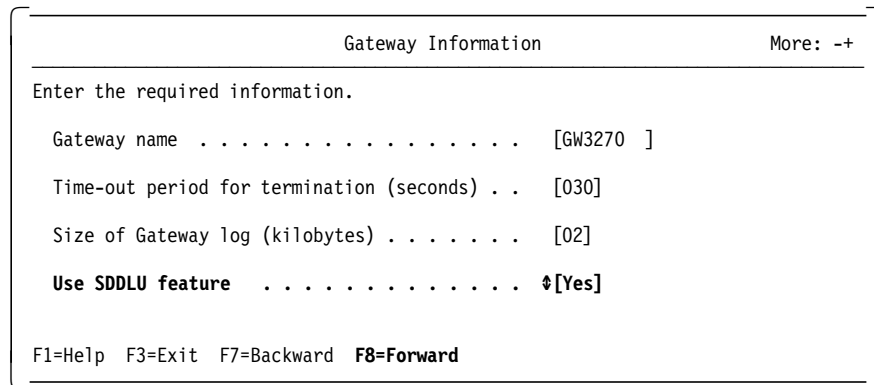


Figure 107. Activating SDDL U - for DOS (Full-Function Mode) Gateway Attachment

Note: If you enable the SDDL U support for PC/3270 V4.1 as a gateway, all downstream workstations should support SDDL U, or you will have to use pre-allocated LUs for the workstations that do not support SDDL U and use static LU definitions in VTAM for those workstations.

⁵ PC/3270 V4.1 uses 327000n as the machine type and model, where n can be 2, 3, 4 or 5, according to the screen size selected for the session.

⁶ The character @ in the LU model name has the following special meanings:

- In the middle of a name, @ represents a single unknown character.
- As the last character of a name, @ represents any number of unknown characters.
- As the only character of a name, @ it will match any LU acronym.

10.4 Activation Flow Summary

The use of the SDDLU facility requires that the PC/3270 V4.1 SSCP-PU session be activated by a format-1 ACTPU. The format-1 ACTPU (PCSMON trace) is shown in Figure 108, and its interpretation is shown in Table 24. After the ACTPU is received, PC/3270 V4.1 sends a Reply PSID NMVT for each session defined. In network station for DOS (Full-Function Mode), all NMVTs are sent at once. In gateway for DOS (Full-Function Mode), all NMVTs for local sessions are sent at once, and additional NMVTs are sent as the downstream workstations connect to the gateway. Under Windows and OS/2, an NMVT is sent as each session is opened. The trace of the Reply PSID NMVT that PC/3270 V4.1 sends in the SSCP-PU session is shown in Figure 109 on page 194, and its interpretation is shown in Table 25 on page 194.

```

12:25:50.711 OUTB: [LH:] l=21 LSid=0101
                  [TH:] OIS 0->0 EFI SNF=027e
                  [RH:] REQ SC FI OIC DR1I
                  [RU:] ACTPU
                        .....
                        10000001808
                        21500004010

12:25:50.720 INB:  [LH:] l=29 LSid=0101
                  [TH:] OIS 0<-0 EFI SNF=027e
                  [RH:] +RSP SC FI OIC DR1I
                  [RU:] ACTPU
                        . . . . .
                        1444444440000000000
                        2000000000071000000

```

Figure 108. Format-1 ACTPU PCSMON Trace - SDDLU

The first byte of the ACTPU request is X'11', and is not shown in the trace in Figure 108. The trace shows bytes 1 to 11 of the ACTPU request.

Byte	Bit	Value	Description
0		X'11'	ACTPU request code (not shown in trace)
1	0-3	X'1'	Format 1
1	4-7	X'2'	ERP type activation
2	0-3	X'0'	FM profile 0
2	4-7	X'1'	TS profile 1
3-8		X'050000000014'	SSCP node type (5) and ID (X'14')
9-10		X'8001'	PU Capabilities (X'80') Control Vector
11	0	B'1'	Unsolicited NMVTs for PSID supported

Figure 109 on page 194 shows the PCSMON trace of a Reply PSID NMVT sent by a PC/3270 V4.1 workstation.

```

12:25:50.722 INB: [LH:] l=69 LSid=0101
                  [TH:] OIS 0<-0 SNF=0000
                  [RH:] REQ FMD FI OIC DR1I
                  [RU:] NMVT
                        .....b..000.....3270002
                        000010309000000000000801fff020030110110101ffffff
                        000000400a410000002d2500003013019006113023270002

12:25:50.985 OUTB: [LH:] l=12 LSid=0101
                   [TH:] OIS 0->0 SNF=0000
                   [RH:] +RSP FMD FI OIC DR1I
                   [RU:] NMVT

```

Figure 109. Reply PSID NMVT PCSMON Trace - SDDL U

The first three bytes that identify the NMVT (X'41038D') are not shown in the trace in Figure 109. The trace shows the remaining bytes of the complete NMVT, except for the last 9 bytes (plant of manufacture and sequence number) that were truncated by PCSMON. The most important pieces of the NMVT are highlighted, as follows:

- The LU local address (X'02')
- The machine model and type (3270002)

VTAM will use the LUSEED operand of the PU definition and the local address to build the LU name. The machine model and type will be used to find a model LU within the group pointed by the LUGROUP keyword of the PU definition.

Table 25 (Page 1 of 2). Reply PSID NMVT Interpretation - SDDL U

Byte	Bit	Value	Description
0-2		X'41038D'	FMD NS Header for NMVT (not shown in trace)
3-4		X'0000'	Retired
5-6	0-1	B'00'	Reserved
5-6	2-3	B'00'	Retired
5-6	4-15	X'000'	Procedure related identifier (PRID). It should be X'000' for unsolicited replies.
7	0	B'0'	Unsolicited NMVT
7	1-2	B'00'	Only NMVT for this PRID
7	3	B'1'	This NMVT contains an SNA Address List subvector
7	4-7	X'0'	Reserved
8-11		X'00340090'	Reply Product Set ID (PSID) (X'0090') MS Major Vector of length X'0034'
12-13		X'0A04'	SNA Address List (X'04') MS Common Subvector of length X'0A'
14		X'01'	Address count
15		X'00'	Address type (single local address)
16-21		X'000000000002'	Local address of X'02' (first 5 bytes reserved)
22-23		X'0D82'	Port-Attached Device Configuration Description (X'82') Reply PSID MS Subvector of length X'0D'

Table 25 (Page 2 of 2). Reply PSID NMVT Interpretation - SDDL U			
Byte	Bit	Value	Description
24-25		X'0510'	Port Number (X'10) Port-Attached Device Config. Des. Subfield of length X'05'
26-28		X'F0F0F0' (000)	Port number the device is attached to
29-30		X'0320'	Power-on Status (X'20') Port-Attached Device Config. Des. Subfield of length X'03'
31		X'01'	Device is currently powered on
32-33		X'0330'	Power-on Since Last Solicitation (X'30') Port-Attached Device Config. Des. Subfield of length X'03'
34		X'01'	Device was powered on (from a power-off position) at least once
35-36		X'1910'	Product Set ID (X'10') MS Common Subvector of length X'19'
37		X'00'	Retired
38-39		X'1611'	Product Identifier (X'11') MS Common Subvector of length X'16'
40	0-3	X'0'	Reserved
40	4-7	X'1'	Product classification: IBM hardware
41-42		X'1300'	Hardware Product Identifier (X'00') Product ID Subfield of length X'13'
43		X'12'	Format type
44-50		3270002	Machine type and model
51-52		X'0000'	Plant of manufacture (not shown in trace)
53-59		X'0000000000000000'	Sequence number (not shown in trace)

10.5 SDDL U VTAM Related Displays

```

DISPLAY NET, ID=WTSCTST, SCOPE=ALL

IST097I DISPLAY ACCEPTED
IST075I NAME = WTSCTST          , TYPE = PU_T2
IST486I STATUS= CONCT          , DESIRED STATE= CONCT
IST1058I MODEL LU GROUP = TSTGRP , LUSEED = RAKLT###
IST1043I CP NAME = ***NA***, CP NETID = USIBMRA , DYNAMIC LU = YES
IST136I SWITCHED SNA MAJOR NODE = SWDDL U
IST654I I/O TRACE = OFF, BUFFER TRACE = OFF
IST172I NO LOGICAL UNITS EXIST
IST314I END

```

Figure 110. PU Display without Dynamic LU(s) - SDDL U

Figure 110 shows a display for a PU that is enabled for SDDL U with no dynamic LU yet. You can see the PU is enabled for SDDL U by the IST1058I message that shows the model LU GROUP TSTGRP and the LUSEED RAKLT### to be used. Message IST172I says there is no logical unit currently defined for this PU. Although no LU is shown in this case, you could have some if you have coded them as static LUs.

```

DISPLAY NET,ID=WTSCTST,SCOPE=ALL

IST097I DISPLAY ACCEPTED
IST075I NAME = WTSCTST           , TYPE = PU_T2
IST486I STATUS= ACTIV           , DESIRED STATE= ACTIV
IST1058I MODEL LU GROUP = TSTGRP , LUSEED = RAKLT###
IST1043I CP NAME = ***NA***, CP NETID = USIBMRA , DYNAMIC LU = YES
IST136I SWITCHED SNA MAJOR NODE = SWDDL
IST081I LINE NAME = J000T019, LINE GROUP = EG29L00 , MAJNOD = RA03745
IST654I I/O TRACE = OFF, BUFFER TRACE = OFF
IST355I LOGICAL UNITS:
IST080I RAKLT004 ACTIV---X- RAKLT003 ACTIV---X- RAKLT002 ACTIV---X-
IST314I END

```

Figure 111. PU Display with Dynamic LU(s) - SDDL

Figure 111 shows a display for a PU that is enabled for SDDL with dynamic LUs defined. You know the LUs were dynamically defined by the X modifier of the ACTIV---X- status.

```

D NET,LUGROUPS,ID=TSTGRP,SCOPE=ALL

IST097I DISPLAY ACCEPTED
IST075I NAME = TSTGRP           , TYPE = MODEL LU GROUP
IST355I LOGICAL UNITS:
IST080I 3270004                3270@          @
IST314I END

```

Figure 112. LUGROUP Display - SDDL

Figure 112 shows a display for an LUGROUP. With this code, PCOMM AS/400 & 3270 V4.1 with a 43 x 80 screen would use the 3270004 LU model, and 3270@ LU model for the other screen sizes.

```

IST075I NAME = USIBMRA.RAKLT002 , TYPE = LOGICAL UNIT
IST486I STATUS= ACTIV---X-, DESIRED STATE= ACTIV
IST977I MDLTAB=***NA*** ASLTAB=***NA***
IST861I MODETAB=AMODETAB USSTAB=US327X LOGTAB=***NA***
IST934I DLOGMOD=D4C3COMP USS LANGTAB=***NA***
IST1059I MODEL NAME = 3270@
IST597I CAPABILITY-PLU INHIBITED,SLU ENABLED ,SESSION LIMIT 00000001
IST136I SWITCHED SNA MAJOR NODE = SWDDL
IST081I LINE NAME = J000T019, LINE GROUP = EG29L00 , MAJNOD = RA03745
IST135I PHYSICAL UNIT = WTSCTST
IST082I DEVTYPE =           LU
IST654I I/O TRACE = OFF, BUFFER TRACE = OFF
IST171I ACTIVE SESSIONS = 0000000000, SESSION REQUESTS = 0000000000
IST172I NO SESSIONS      EXIST
IST314I END

```

Figure 113. Dynamically Defined LU Display - SDDL

Figure 113 shows a display for a dynamically defined LU. You can see the X modifier of the ACTIV---X- status, and the LU model used: 3270@.

Chapter 11. Printing Considerations

PC/3270 V4.1 printer support allows a printer attached to a PC/3270 V4.1 workstation to emulate a host-attached printer, such as the 3287 Model 1 or 2. Local copy, both user-initiated or host-initiated, as well as host-directed printing is available. For host-directed printing, PC/3270 V4.1 supports the 3270 printer data stream and the SNA Character String (SCS) data stream.

The SCS data stream support for PC/3270 V4.1 has been expanded to include Page Presentation Media (PPM) support for page printers.

Note: PC/3270 V4.1 is the 3270 terminal emulation capability for the Personal Communications AS/400 and 3270 Version 4.1 for PCs running DOS (3270 only), Windows 3.x, OS/2, OS/2 Warp, and Windows 95.

11.1 Printer Definition Tables

For PC/3270 V4.1 for DOS (Full-Function Mode), printer definition tables (PDTs) are included with the program for a large number of IBM printers. Additional printers may be defined by the user by using the Printer Table Compiler (PCSPTC.EXE) shipped with the program. The Printer Table Compiler may also be used to modify the provided printer definition tables.

For PC/3270 V4.1 for Windows or OS/2, printer definition tables (PDTs) are provided to support a large number of IBM printers. As with PC/3270 V4.1 for DOS (Full-Function Mode), the PC/3270 V4.1 for Windows or OS/2 allows you to control the attached printer by the PDT files or directly by the host application. If you select the PDT mode, the Microsoft Windows printer driver or the OS/2 printer driver will no longer be used for printing from Personal Communications. Instead, the PC/3270 V4.1 for Windows or OS/2 printer driver will directly control the attached printer per the specified PDT file with no intervention from the Microsoft Windows printer driver or the OS/2 printer driver. You will receive the same printout as you are receiving on the PC/3270 V4.1 for DOS (Full-Function Mode).

The PC/3270 V4.1 for DOS (Entry-Level Mode) provides the local copy function to print the contents of a 3270 emulation screen on a control unit-attached printer or allow you a full-screen print to the PC printer. It does not support printer definition tables (PDTs).

For a full list of printers supported by PC/3270 V4.1, refer to 3.1.4, "Printer" on page 66.

11.2 Page Presentation Media (PPM)

SNA Character String (SCS) Page Presentation Media (PPM) control code support for PC/3270 V4.1 provides the user with a means to control the following from within the host-directed print job:

- The drawer selection of a sheet feeder
- Print quality

from within the host-directed print job. The function is most valuable to the user that has page printers such as the IBM 4019, 4029, 5202 and 5204. This support

is not limited to only the listed printers. To support non-IBM printers, the user is required to modify a PDF/PDT to support the printer controls available on the particular printer.

The format of the SCS PPM control code is as follows:

2BD2	count	48	SC	EC	FC	SD	DO	DDO	Q	DX	EM	MF
------	-------	----	----	----	----	----	----	-----	---	----	----	----

Figure 114. Page Presentation Media (PPM) Format

2BD2	SCS class header for medium manipulation controls
count	Number of bytes contained in the PPM string including the count byte
48	Indicates the beginning of Page Presentation Media string
SC	Ignored by Personal Communications
EC	Ignored by Personal Communications
FC	Forms Control (Ignored by Personal Communications)
SD	Specifies the source drawer of the target sheet feeder
DO	Digital Output (Ignored by Personal Communications)
DDO	Discrete Digital Output (Ignored by Personal Communications)
Q	Specifies the print quality
DX	Duplex (Ignored by Personal Communications)
EM	End of Medium (Ignored by Personal Communications)
EF	End of Form (Ignored by Personal Communications)

11.3 Printer Utility

For PC/3270 V4.1 for DOS (Full-Function Mode), a menu-driven, interactive Printer Utility provides the following functions:

- View the current mapping of sessions to printers
- View the current mapping of sessions to printer tables/host code pages
- View the current status of the physical printers
- Remap sessions to printers and printer tables

These changes are only temporary and are lost when the PC/3270 V4.1 is terminated.

- Change printer settings, such as characters per inch, lines per inch, form length and margins

The effect of these changes for an LU3 print session or for local copy from a display session are temporary until PC/3270 V4.1 is terminated.

- Emulate PA1 and PA2 switches and cancel print jobs

The effect of the PA1 and PA2 keys depends on host application program logic on an LU1 print session.

Using this utility, the DOS (Full-Function Mode) user can dynamically remap a printer session to another printer, to another printer definition table or change the default printer settings, if unique print requirements arise.

For the Windows 3.x, OS/2, OS/2 Warp, and Windows 95 users, a printer utility is also provided for each WorkStation. The Print Screen..., the Printer Setup... and the Printer Control... windows can be opened from the File pull-down menu on the WorkStation window action bar. These utilities let you change the default printer and the parameter settings, the PDT mode and the printer definition tables (PDTs). A special pop-up keypad provides the PA1, PA2 and Reset functions for a printer WorkStation.

Figure 115 shows you the Printer Control parameter window. Click on the **Help** button to see the detailed description for the available parameters.

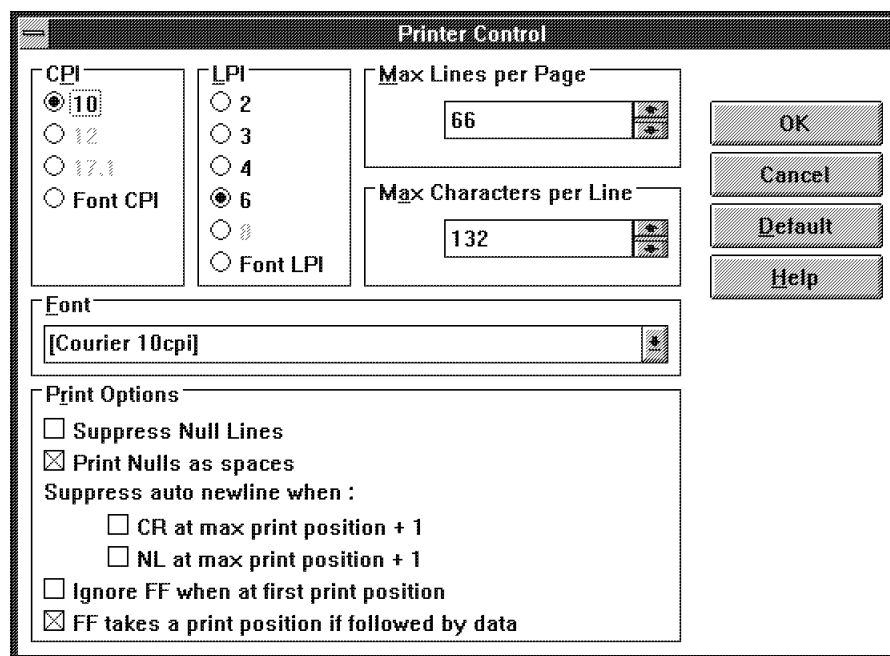


Figure 115. Printer Control Parameter Window - Windows and OS/2 Modes

11.4 Printer Management

Printer management is provided to allow multiple host and/or DOS print sessions to share a printer without collisions. Each defined print session can have its own printer character and control string translation table (PDT) so that a user may define which printer supports which print session.

In PC/3270 V4.1 for Windows or OS/2, printer management and print job control is provided by the Microsoft Windows V3.0/3.1 print manager or by PC/3270 V4.1 for Windows or OS/2 itself, if the PDT mode is selected (use PDT files on the Printer Setup window).

In PDT mode, the printer selected in the Printer Setup window will simply be used to designate the used printer port, such as LPT1:, LPT2: or File:. The Microsoft Windows V3.0/3.1 printer driver will no longer be used for printing. Thus, the PC/3270 V4.1 for Windows or OS/2 printer driver will recognize the attached printer from the specified PDT file, not from the printer selected in the Printer Setup window.

You can enable the PDT mode and specify the used PDT file as follows: choose Printer Setup... from the File pull-down menu on the WorkStation window action bar. The Printer Setup window will appear.

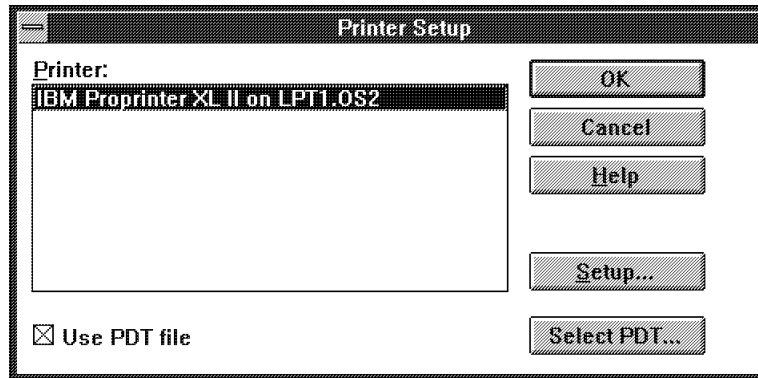


Figure 116. Printer Setup Window - Windows and OS/2 modes

Select the Use PDT file check box to enable PDT mode. Choose the printer including the printer port (LPT1:, LPT2: or File:) you want to use. The selected printer does not mean the Microsoft Windows V3.0/3.1 printer driver you want to use. It simply means which printer port will be used in the PDT mode. Click on the Select PDT... button to show you the Select PDT file window.

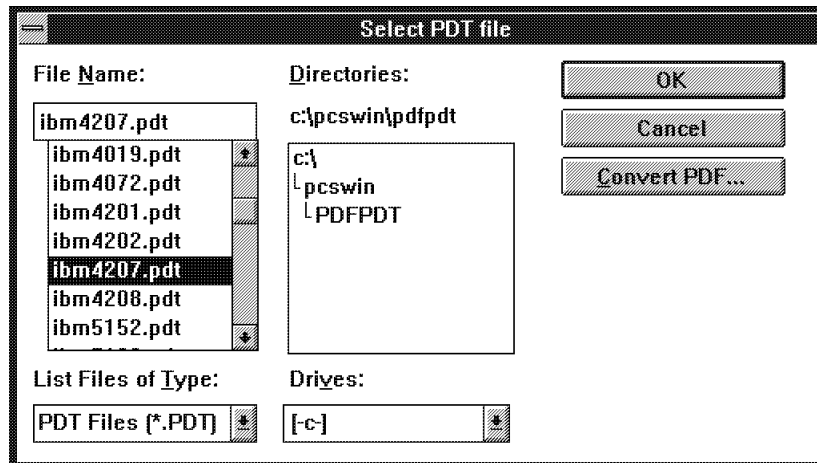


Figure 117. Printer Setup - Select PDT File Window - Windows and OS/2 modes

Select the target PDT file in the File Name list box and the selected PDT file name will appear in the top entry of the File Name list box. Then click on the **OK** button to go back to the Printer Setup window. You will complete the setup to use the PDT mode if you click on the **OK** button again in the Printer Setup window.

11.5 Redirecting Print

When we speak of printing for Personal Communications, by default it is assumed that information is being sent to a physical printer attached to the PS/2 running Personal Communications. This is not always the case. PC/3270 V4.1 supports redirection of print data to the following:

- Printer server
- Disk

For each mode, this function is handled differently. We provide details on how to use both capabilities in the subsections to follow.

11.5.1 Printing to a Server

Utilizing a LAN server/requester product in conjunction with Personal Communications, we can redirect our output to a print server somewhere on the LAN.

11.5.2 Print to Disk

Prior to PC/3270 V4.1, print to disk was formally available for Windows or OS/2. To accomplish printing to disk with earlier versions required a separate TSR the hooked INT17. PC/3270 V4.1 added this natively for DOS (Full-Function Mode).

11.6 Local Copy

3270 Local Copy is the printing of the contents of a 3270 terminal display on a control unit-attached printer. PC/3270 V4.1 printer support emulates this function on the PC printer without the participation of the control unit.

- For DOS (Entry-Level Mode), the local copy is a function that provides for the printing of the full 3270 emulation screen to a control unit-attached printer or to the PC printer. By pressing the PrintScreen key, the printout goes to the workstation-attached printer on LPT1. If the Shift+PrintScreen key combination is pressed, the printout goes to the authorized printer with ID nn attached to the same 3174 or 3274 control unit.

Note: Only a CUT-connected PC/3270 V4.1 for DOS (Entry-Level Mode) workstation can print to a 3174 or 3274 control unit-attached printer. All other attachment types can only print to a PC printer, which is attached to the workstation, or controlled by a print server.

- For DOS (Full-Function Mode), the local copy is a function which provides for the printing of all, or part, of the 3270 display presentation space. The printout may be printed in color and will reproduce all graphics that your printer is capable of supporting. No Operator Information Area (OIA) information or PC-specific information is printed.

By pressing the PrintScreen key, a full 3270 emulation screen print goes to the workstation-attached printer on LPT1. If the Shift+PrintScreen key combination is pressed in DOS, this initializes the local copy for the 3270 display presentation space, which will give you the choice of a full or a trim print to the specified printer for this session. If a trim print is selected, the corners of the screen area to be printed are first defined by using the cursor keys and set box.

If the printer is not available for some reason, an OIA indicator will be displayed showing why the job is not being printed. When the printer does become available, the printing will begin. If the workstation has not been configured for local copy, pressing the local copy key will have no effect.

A Device Cancel key (Alt+Left Ctrl) is operational only during a user-initiated local copy. The use of this key will cancel the current local copy request, together with any queued requests, and return the terminal session to its state before the local copy key was pressed.

- For Windows or OS/2, the local copy is normally initiated by selecting **Print Screen...** from the File pull-down menu on the WorkStation action bar. If only a portion of the screen is to be printed, this area is first defined by drawing a box with the mouse.

The host may issue a request for a local copy on any active terminal except for non-SNA-attached sessions, for which no host-initiated copy is supported. This is done by sending a write command with the start print flag in the write control character (WCC) set on.

11.7 Host-Directed Printing

PC/3270 V4.1 for DOS (Full-Function Mode) and for Windows or OS/2 host-directed printer emulation provides the user with emulation of host-attached LU1, LU3 and non-SNA 3270 data stream printers. The two different types of host-directed print data streams supported are as follows:

- The 3270 printer data stream

The 3270 printer data stream is a presentation space-oriented printer data stream, which is quite similar to the 3270 display data stream supported for LU2 terminal sessions. The host system sends commands that format the presentation space (buffer). These commands may change the presentation space in any location at any time. Once the host has completed its formatting of the presentation space, it issues a START PRINT command and the presentation space is printed as accurately as the printer hardware will allow. The 3270 printer data stream can be sent to a PC/3270 V4.1 workstation over an SNA LU type 3 session or a non-SNA DFT session. The PC/3270 V4.1 printer support is responsible for interpreting each 3270 attribute and printer control.

- The SNA Character String (SCS) printer data stream

The SCS printer data stream is a sequential data stream normally used with line printers. It flows across SNA LU type 1 sessions on all SNA links. The characters are translated according to the host system code page and printed according to the attributes and formatting specified by control commands. The way in which SCS characters are printed depends only on the control codes that precede them, so there is no requirement for buffering the characters before they are printed.

These data streams are interpreted in the workstation and are translated into data streams oriented for PC printers attached to the workstation. The level of support of the various functions, such as color and highlighting, which are available in the SCS and 3270 printer data streams, is directly dependent on the features supported by the attached PC printer.

PC/3270 V4.1 host-directed printer emulation provides the most accurate representation of the intent of the host data stream which is possible on the attached PC printer. Unlike terminal sessions, printer sessions don't have a screen associated with them. Activation and deactivation of printer sessions is the responsibility of the host and, in general, requires no intervention on the part of the workstation user.

11.7.1 Customizing for Host-Directed Printing and Local Copy (for DOS (Full-Function Mode))

For any host connection type, customizing for printer support in PC/3270 V4.1 for DOS (Full-Function Mode) begins when you have completed the customization for connectivity. You *must* select **Yes** for Advanced Configuration Options on the End of Link Options panel.

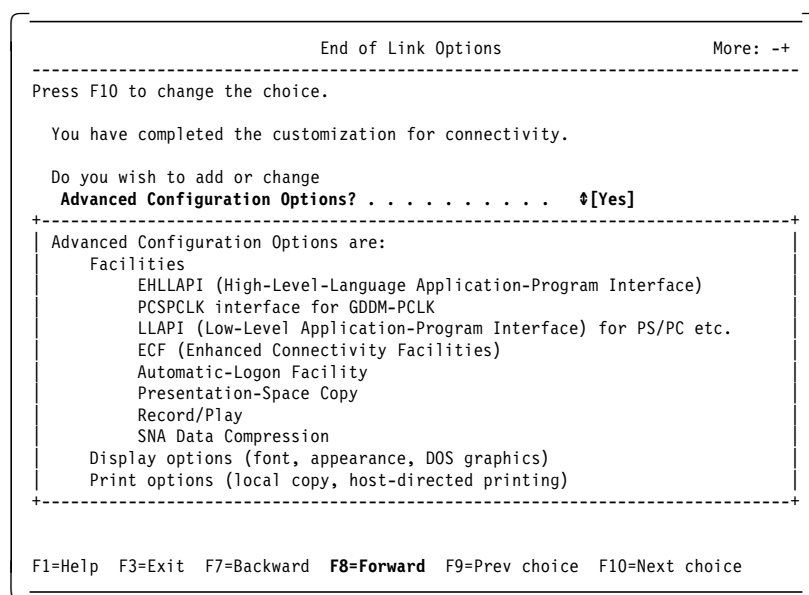


Figure 118. Printer Support - End of Link Options Panel - for DOS (Full-Function Mode)

Pressing F8 will take us to the Advanced Configuration Options panel.

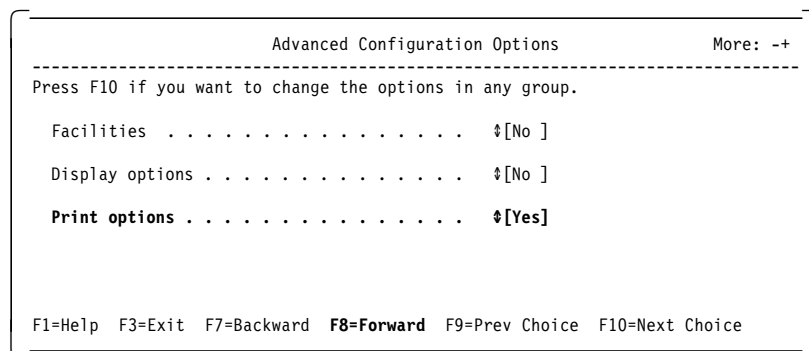


Figure 119. Printer Support - Advanced Configuration Options Panel - for DOS (Full-Function Mode)

On the Advanced Configuration Options panel, select **Yes** for Print options and then press F8 to take us to the Print Options panel.

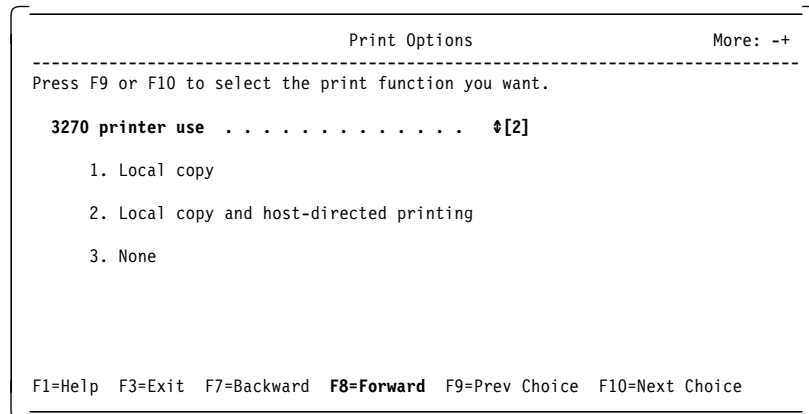


Figure 120. Printer Support - Print Options Panel - for DOS (Full-Function Mode)

Select the choice you want by pressing F10=Next Choice to use any 3270 print functions. The choices are as follows:

1. Local copy - you will be able to print the whole or part of the presentation space to a printer attached to your PC or to a print server (*not* to a 3174 or 3274 control unit-attached printer).
2. Local copy and host-directed printing - you will also be able to print host-system files to a PC printer or to a print server.
3. You will not use any 3270 print functions.

We select 2 for Local copy and host-directed printing. Pressing F8 will now take us to the Printer Communications panel.

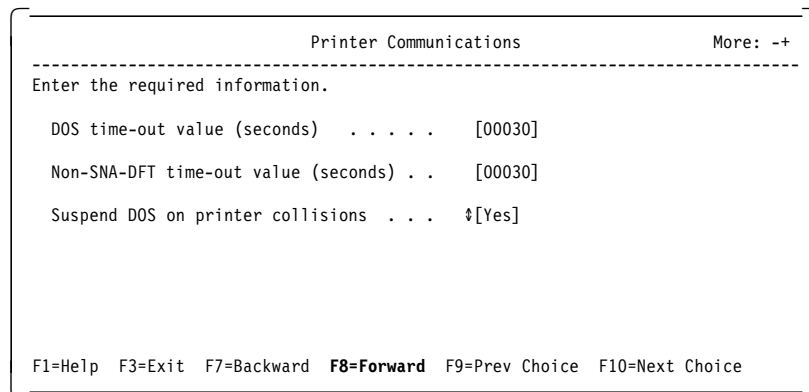


Figure 121. Printer Support - Printer Communications Panel - for DOS (Full-Function Mode)

The first two options on this panel are used to help PC/3270 V4.1 for DOS (Full-Function Mode) delimit print jobs. In this example, the default value of 30 seconds has been left for each option. This means that once a DOS or a non-SNA print job has started, if a period of 30 seconds elapses with no data being sent to the printer, PC/3270 V4.1 assumes that the job is completed, and that it is safe to start a print job from another session. SNA data stream print jobs do not need similar timeout values, since job delimiters are included in the data stream itself.

Under PC/3270 V4.1 for DOS (Full-Function Mode), the emulator sessions always have priority access to the printer over DOS applications. With the Suspend DOS on printer collisions option, you have the choice of how the emulator will react if DOS tries to send a job to the printer when the printer is already busy with a host print job, as follows:

- If **Yes** is selected, DOS is suspended until the host session print job(s) is completed. In this case, if a DOS application sends data to a printer while it is being used by an emulator session, the application will be suspended until the printer is available.
- If **No** is selected, a negative return code is sent to the DOS application, which means that the application can recover and do something else while waiting for the printer.

Note: If PC/3270 V4.1 for DOS (Full-Function Mode) is configured for host-directed printing and is loaded on an IBM PC LAN Program server, Suspend DOS on printer collisions should be set to **Yes**.

Pressing F8 takes us to the Session Types panel.

Session Types						More: -+
Press F9 or F10 to change the session type or code page.						
Session ID	Link type	Adapter number	LU address/ LT number	Session type	Host code page	
a	lan1	0	LU 02	⌘[Display]	⌘[037]	
b	lan1	0	LU 04	⌘[Display]	⌘[037]	
c	lan1	0	LU 05	⌘[Display]	⌘[037]	
d	lan1	0	LU 06	⌘[Display]	⌘[037]	
e	lan1	0	LU 03	⌘[Printer]	⌘[037]	
				⌘[]	⌘[]	
				⌘[]	⌘[]	
				⌘[]	⌘[]	

F1=Help F3=Exit F7=Backward **F8=Forward** F9=Prev Choice F10=Next Choice

Figure 122. Printer Support - Session Types Panel - for DOS (Full-Function Mode)

On the Session Types panel you define which of your configured LT/LUs are display sessions and which are printer sessions. Care *must* be taken to ensure that printer sessions map to those sessions on the host which have been set up as LU types 1 or 3. For example, on the Advanced Options for Network Stations panel (see Figure 21 on page 107) we specified the printer session with the LU address 03 to session ID e. Now on this panel, we select the session type Printer to match the host session definition to be a printer session.

The value entered for Host code page is valid for printer sessions only. Any value entered for a display session type will be ignored; a display session uses the default host code page defined in the Keyboard and Code Pages panel (Refer to Figure 23 on page 108).

Note: If you select 1 for local copy as print options without host-directed printing, this panel will not appear.

Pressing F8 now takes us to the Map Sessions to Printers panel.

Map Sessions to Printers More: -+

Enter the LPT number and the printer-table name for each session.

Session ID	Link type	Adapter number	Session type	LU address/ LT number	LPT number	Name of Printer table for session
a	lan1	0	Display	LU 02	[LPT001]	[IBM4202.PDT]
b	lan1	0	Display	LU 04	[LPT001]	[IBM4202.PDT]
c	lan1	0	Display	LU 05	[LPT001]	[IBM4202.PDT]
d	lan1	0	Display	LU 06	[LPT001]	[IBM4202.PDT]
e	lan1	0	Printer	LU 03	[LPT001]	[IBM4202.PDT]
					[]	[]
					[]	[]
					[]	[]

F1=Help F3=Exit F7=Backward **F8=Forward**

Figure 123. Printer Support - Map Sessions to Printers Panel - for DOS (Full-Function Mode)

On the Map Sessions to Printers panel you define the physical printer (the LPT number) and the printer definition table to be used by each session. For a display session, the printer defined is the one which will be used for the local copy function. Note that you can define a local or a server printer; if you define a server printer, the workstation *must* be running the PC LAN Program, the DOS LAN Requester or the NetWare client software.

This completes customization for host printing in PC/3270 for DOS (Full-Function Mode). Pressing F8 takes you to the Installation Options or to the End of Customization panel (see Figure 29 on page 113).

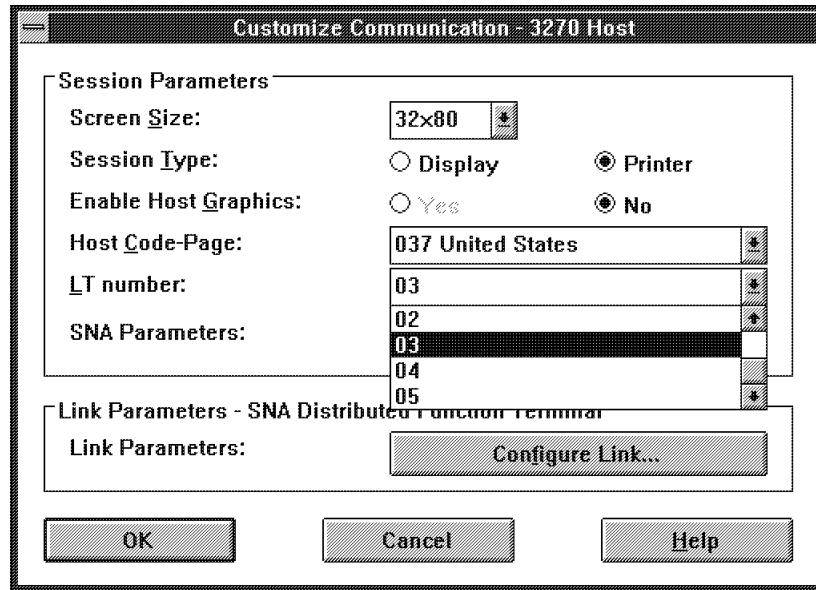
11.7.2 Customizing for Host-Directed Printing and Local Copy (for Windows or OS/2)

There is no customization required, on the part of PC/3270 V4.1 for Windows or OS/2, to support emulated local copy. You are only required to customize a display session, as we did in scenario in 8.1.1, "Customizing a Personal Communications WorkStation" on page 160. If a printer has been installed on a Microsoft Windows V3.0/3.1 system, then once you have completed your host attachment customization and started the display session, local copy is available.

To set up host-directed printing, start your own customized WorkStation profile. You should receive the main screen of your host session.

Select **Configure...** from the Communication pull-down menu in the action bar of your WorkStation window. This will open the Customize Communication window and show you the configuration for your active display session.

Click on the **Configure...** button. This brings us to the Customize Communication - 3270 Host window (see Figure 124 on page 207).



Window

Figure 124. Host-Directed Printing - Customize Communication - 3270 Host

Click on the **Printer** radio button, which sets this WorkStation to be a host-directed printer session. Ensure that the LU address number maps to the LU at the host, which has been set up as an LU type 1 or type 3 (in our example, the LU number 03).

To complete the customization for host printing in PC/3270 for Windows or OS/2, click on the **OK** button until you return to the WorkStation window. Click on the **OK** button to agree with the PCSCC041 message window. This terminates the active communication and activates the new host-directed printer WorkStation profile. Save this new WorkStation profile as a separate printer.WS profile.

11.8 Host Definitions for Host-Directed Printing

The sections that follow show the definitions at the host which *must* be specified before a PC/3270 V4.1 host-directed printer will work. The definitions are meant as examples only and are not intended as guidance for host systems programmers.

Two host scenarios are described. A PC/3270 V4.1 workstation with an attached printer is connected to the following:

- VM/VTAM host with RSCS
- MVS/ESA host with JES2 and JES/328X

11.8.1 VM/VTAM and RSCS Definitions for Host-Directed Printing

In a Network Station LAN attachment to a 9370 scenario, the PC/3270 V4.1 workstation with its attached printer is connected to a 9370 (the 9370 acts as a combined 37xx gateway and an S/390 host) via a token-ring connection. The PC/3270 V4.1 workstation is treated by the 9370 as a PU type 2, with two LUs, attached on a switched line.

To get host-directed printing to work, we *must* do the following:

- Define the PC/3270 V4.1 workstation and its attached printer in VTAM.

In this example, we will define the PC/3270 V4.1 workstation with its attached printer in a switched major node because of the way it is attached to the host.

Other attachment types and their VTAM definitions have been described in the ITSO publications: *Personal Communicactions for the Mobile Users*, SG24-4456 and *Personal Communications for the COAX, LAN, and WAN Users*, SG24-4688. For example:

- If the connection were non-switched, the PU and LU definitions would be in an NCP definition.
- If the connection were to a locally attached 3174 gateway, the PU and LU definitions would be in a local major node definition.

In each case, the definition of the PU and LUs would be similar. You should refer to the appropriate chapters on the previous ITSO publications for your attachment type.

- Define the 9370 token-ring attachment in a LAN major node.
- Define the RSCS application in VTAM.
- Define the RSCS application link to the printer.
- Define appropriate logmode table entries for the PC/3270 V4.1 workstation display and printer sessions, and for the RSCS application.

VTAM Definition for PC/3270 V4.1 Workstation and Printer

Figure 125 shows the VTAM switched major node used to define the PC/3270 V4.1 workstation with its attached printer.

```

          VBUILD TYPE=SWNET
*****
* PC/3270 Workstation with Host Printer *
*****
PU4001  PU  IDBLK=061,          FOR PC/3270          X
          IDNUM=04001,        PHYSICAL UNIT ID   X
          MACADDR=00004001,    LAA                 X
          SAPADDR=04,          PC/3270 SAP MUST BE 04 X
          USSTAB=AUSSTAB,      X
          MODETAB=AMODETAB,    X
          DLOGMOD=M2SDLCQ
LU400102 LU  LOCADDR=2          DISPLAY SESSION
LU400103 LU  LOCADDR=3,        PRINTER SESSION   X
          DLOGMOD=M3287DSC,      X
          LOGAPPL=LSAVMSC5

```

Figure 125. VTAM Switched Major Node with Printer LU Definition

The first LU, LU400102, has no specific operands specified. Therefore, it takes the default logmode (DLOGMOD=M2SDLCQ) from the default logmode table (MODETAB=AMODETAB) specified for the PU. If we refer to Figure 128 on page 210, we can see that the logmode M2SDLCQ is for a 24x80 display session.

The second LU, LU400103, has a default logon mode (DLOGMOD=M3287DSC) specified. If we refer to Figure 128 on page 210, we can see that the logmode M3287DSC is for a 3287 DSC printer (LU type 3).

The LOCADDR=2 for LU400102 and the LOCADDR=3 for LU400103 relate to the LU addresses specified in the PC/3270 V4.1 configuration (see Figure 122 on page 205).

The LOGAPPL operand specifies an application LU that the printer LU, LU400103, will automatically connect to when it becomes active. In this example, the application named LSAVMSC5 is the RSCS application (see Figure 127).

VTAM Definition for 9370 Token-Ring Attachment

Figure 126 shows the LAN major node definition for the physical token-ring connection on the 9370. This definition is not directly relevant to host-directed printing but is included for completeness.

```

NSC5LAN  VBUILD TYPE=LAN
PORT300  PORT  CUADDR=300,                CHANNEL ADDR 300      X
          MACADDR=400093700001,          LAN ADDRESS          X
          LANCON=(6,5),                  TIMER AND RETRY COUNTS**X
          MAXDATA=2000,                  X
          SAPADDR=4
G0101002 GROUP DIAL=YES,LNCTL=SDLC
L0101002 LINE ISTATUS=ACTIVE,CALL=INOUT
E0101002 PU   MAXLU=10
L0101003 LINE ISTATUS=ACTIVE,CALL=INOUT
E0101003 PU   MAXLU=10
L0101004 LINE ISTATUS=ACTIVE,CALL=INOUT
E0101004 PU   MAXLU=10
L0101005 LINE ISTATUS=ACTIVE,CALL=INOUT
E0101005 PU   MAXLU=10
L0101006 LINE ISTATUS=ACTIVE,CALL=INOUT
E0101006 PU   MAXLU=10

```

Figure 126. 9370 Token-Ring Major Node Definition

VTAM Definition for RSCS Application

Figure 127 shows the definition for our RSCS application. The node name to RSCS is LSAVMSC5 and *must* match the LOCAL statement in the RSCS configuration file (see Figure 130 on page 211).

```

RSCSAPPL VBUILD TYPE=APPL
LSAVMSC5 APPL ACBNAME=LSAVMSC5,          X
          MODETAB=RSCSTAB,                X
          DLOGMOD=RSCSNJEO,              X
          AUTHEXIT=YES,                    X
          AUTH=(ACQ),                       X
          VPACING=3

```

Figure 127. RSCS Application

Logmode Entries for PC/3270 V4.1 Display and Printer Sessions

Figure 128 shows a part of the logmode table that is used by the VM/VTAM host. Only the entries used by the LUs in Figure 125 on page 208 are shown.

```
AMODETAB TITLE 'LOGON MODE TABLE FOR TERMINAL DEVICES'
AMODETAB MODETAB
*****
* LOGMODE TABLE ENTRY FOR 24 X 80 SCREEN, 3270 PC - QUERYABLE *
*****
M2SDLCQ MODEEENT LOGMODE=M2SDLCQ, FMPROF=X'03', TSPROF=X'03', X
          PRIPROT=X' B1', SECPROT=X'90', COMPROT=X'3080', X
          RUSIZES=X'8587', PSERVIC=X' 028000000000185000007E00'
*****
:
: (other entries not shown)
:
*****
* LOGMODE TABLE ENTRY FOR 3287 DSC PRINTER *
*****
M3287DSC MODEEENT LOGMODE=M3287DSC, FMPROF=X'03', TSPROF=X'03', X
          PRIPROT=X' B1', SECPROT=X'90', COMPROT=X'3080', X
          RUSIZES=X'87C7', PSERVIC=X' 030000000000185018507F00'
          MODEEEND
          END
```

Figure 128. Logmode Table Entries for PC/3270 V4.1 Display and Printer Sessions

Note the following:

- The two logmode names used for the PC/3270 V4.1 workstation display and printer sessions are highlighted.
- The first two digits of the PSERVIC operand define the LU type for each logmode.

Logmode Entry for RSCS Application

Figure 129 shows the logmode table entry used for the RSCS application.

```
RSCSTAB CSECT
RSCSTAB MODETAB
RSCSNJEO MODEEENT LOGMODE=RSCSNJEO, FMPROF=X'03', TSPROF=X'03', X
          PRIPROT=X'72', SECPROT=X'72', COMPROT=X'4020', X
          SSNDPAC=X'00', SRCVPAC=X'00', RUSIZES=X'0000', X
          PSNDPAC=X'00', PSERVIC=X'000000000000000000000000'
          MODEEEND
          END
```

Figure 129. Logmode Entry for RSCS Application

RSCS Application Link to Printer

Figure 130 shows the RSCS configuration file that defines the various nodes, including the PC/3270 V4.1 printer.

```

*****
*                               RSCS LOCAL NODEID SPECIFICATION                               *
*****
*          LOCAL
*          NODEID
*          -----
LOCAL      LSAVMSC5
*****
*                               RSCS OPERATOR FORM NAME SPECIFICATION                       *
*****
*          OPERATOR
*          FORM NAME
*          -----
OPFORM    STANDARD
*****
*                               RSCS CHANNEL RESERVATION SPECIFICATION                     *
*****
*          RESERVE THESE
*          CHANNELS
*          -----
CHANNELS  F E
*****
*                               RSCS STORE AND FORWARD CLASS SPECIFICATION                 *
*                               FOR RECEIVING FILES                                     *
*****
*          CLASS COMMENTS
*          -----
SAFCLASS  *      '*' MEANS USE THE CLASS OF THE RECEIVED FILE
*****
*          RSCS LINK, ROUTE, PARM, AND AUTH SPECIFICATIONS                             *
*****
*          LINK      VIRT  SPOOL KEEP  QUEUE          LOGMODE  AUTO
*          LINKID   TYPE  ADDR * CLASS SLOTS TYPE  DP  LUNAME  NAME      START
*          -----  - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
* Bisync link to AIC
LINK LSAVMIC1 NJE      B84 8 *    16    *    5    *    *    NOAST
* MVS/XA JES2 SNA link
LINK LSAMVSC1 SNANJE  *   * *    *    PRI  *    LAJES2  *    NOAST
LINK *LIST    LISTPROC *   * *    2    FIFO *    *    *    NOAST
*
*          LINKID   PARM TEXT
*          -----
PARM LSAVMIC1 STREAMS=2 TA=1 BUFF=1600 LIST=YES
PARM LSAMVSC1 STREAMS=2 TA=1 BUFF=1024

```

Figure 130 (Part 1 of 2). RSCS Configuration File

```

*      NODEID  LINKID  COMMENTS
*      -----
* Route to AIC systems
ROUTE DEMO14  LSAVMIC1
ROUTE LSAVMIC4 LSAVMIC1
ROUTE LSAVMIC5 LSAVMIC1
* Route VM/XA thru MVS/XA
ROUTE LSAVMSC1 LSAVMS1
*
*-----
*      LINK      VIRT  SPOOL KEEP  QUEUE      LOGMODE  AUTO
*      LINKID  TYPE  ADDR * CLASS SLOTS TYPE  DP  LUNAME  NAME      START
*-----
LINK PRT4001  SNA3270P * * * 2  PRI * LU400103 * AST
PARM PRT4001  SEP=NO
*****
*      GIVE COMPLETE RSCS AUTHORIZATION TO OPERATOR *
*****
*      LINKID  USERID  NODEID  CP/NOCP
*-----
AUTH *      OPERATOR *      CP
*****
*      RSCS SUPERVISOR SPECIFICATIONS *
*****
*
*      COMMENTS
*-----
TAGS      1000      NUMBER OF TAG SLOTS TO GENERATE

DUMP      VM  OPERATNS  DUMP TYPE AND USERID TO SEND IT TO

MSGNOH      SPECIFY NO HEADER
*****

```

Figure 130 (Part 2 of 2). RSCS Configuration File

11.8.2 MVS/VTAM JES2 and JES/328X Definitions for Host-Directed Printing

In the second example, the PC/3270 V4.1 workstation with its attached printer is connected via a 37xx Communication Controller token-ring gateway to an S/370 host. The PC/3270 V4.1 workstation is treated by the S/370 host as a PU type 2, with two LUs, attached on a switched line.

To get host-directed printing to work, we *must* do the following:

- Define the PC/3270 V4.1 workstation and its attached printer in VTAM.

In this example, we will define the PC/3270 V4.1 workstation with its attached printer in a switched major node because of the way it is attached to the host.

- Define JES2 and JES/328X applications in VTAM.

- Define appropriate logmode table entries for the PC/3270 V4.1 workstation display and printer sessions.
- Define appropriate logmode table entries for the JES2 and JES/328X applications.
- Define the JES/328X start procedure.
- Define the JES/328X printers.
- Define the parameters to start JES2 under MVS/ESA.
- Define nicknames for the PC/3270 V4.1 printer to be used in GDDM.

VTAM Definition for PC/3270 V4.1 Display and Printer

Figure 131 shows the VTAM switched major node used to define the PC/3270 V4.1 workstation with its attached printer.

```

          VBUILD TYPE=SWNET
*****
* PC/3270 WORKSTATION WITH HOST PRINTER *
*****

P4001    PU    ADDR=01,                X
          IDBLK=061,                  X
          IDNUM=04001,                 X
          ISTATUS=ACTIVE,              X
          PUTYPE=2,                    X
          SSCPFM=USSSCS,               X
          USSTAB=USSRLAN
L400102  LU    LOCADDR=2,MODETAB=MT3270,DLOGMOD=T3279M2
L400103  LU    LOCADDR=3,MODETAB=MTJESNJE,DLOGMOD=SCS

```

Figure 131. VTAM Switched Major Node Definition with Printer LU Definition

The first LU, LU400102, has a default logmode (DLOGMOD=T3279M2) for a 3279 Model 2 display.

The second LU, LU400103, has a default logmode (DLOGMOD=SCS) from a logmode table (MODETAB=MTJESNJE) used specifically by JES printers (see Figure 133 on page 215). This LU is used for an SCS printer session.

The LOCADDR=2 for LU400102 and the LOCADDR=LU400103 relate to the LU addresses specified in the PC/3270 V4.1 configuration (see Figure 122 on page 205).

VTAM JES2 and JES/328X Definitions

Figure 132 shows the VTAM definitions for JES2, JES/328X, JES/328X-supported printers and JES/328X ADMPRINT support. JES2 thinks that it is communicating with a printer (for example RMT3), but it is actually communicating with JES/328X's APPL for RMT3.

```

          VBUILD TYPE=APPL
*****
* JES2 APPL DEFINITION
*****
LAJES2  APPL  AUTH=ACQ,EAS=5,VPACING=4,MODETAB=MTJESNJE,      X
          DLOGMOD=JES2MODE
*
          STATOPT=' JES2 NJE'
*****
* APPL FOR JES/328X FOR USE BY GDDM PRINTING
* JSX1 IS THE JES/328X JOBNAME WHICH IS PASSED TO ADMOPUJ
*****
JSX1    APPL  AUTH=ACQ,EAS=1,VPACING=2
*
          STATOPT=' JES/328X GDDM'
*****
* APPLS FOR JES/328X RMT PRINTERS
* THESE ARE NOT REAL PRINTERS. JES/328X CREATES AN APPL-APPL SESSION
* FOR ALL JES2 RMT PRINTERS IN THE JES/328X STARTUP PARMS
*****
RMT3    APPL  AUTH=ACQ,EAS=1,VPACING=2,MODETAB=MTJESNJE,      X
          DLOGMOD=JES4096
*
          STATOPT=' JES/328X RMT3'
*****
* APPLS FOR DSPPRINT FOR GDDM
* ADM0001 THRU ADM0004 WILL PROVIDE FOR FOUR CONCURRENT DSPPRINTS
* THESE ARE THE DEFAULT NAMES FOR DSPPRINT GDDM(ACBNAME)
*****
ADM0001 APPL  AUTH=ACQ,EAS=1,VPACING=2
*
          STATOPT=' JES/328X GDDM DSPPRINT 1'
ADM0002 APPL  AUTH=ACQ,EAS=1,VPACING=2
*
          STATOPT=' JES/328X GDDM DSPPRINT 2'
ADM0003 APPL  AUTH=ACQ,EAS=1,VPACING=2
*
          STATOPT=' JES/328X GDDM DSPPRINT 3'
ADM0004 APPL  AUTH=ACQ,EAS=1,VPACING=2
*
          STATOPT=' JES/328X GDDM DSPPRINT 4'
```

Figure 132. JES Application Definition

VTAM Logmode Table for JES and JES/328X

Figure 133 shows the logmode table entries used by JES2 and the JES/328X printers.

```
MTJESNJE MODETAB
*****
* MODE FOR ** JES2 NJE *
*****
JES2MODE MODEENT LOGMODE=JES2MODE,FMPROF=X'03',TSPROF=X'03',      X
                PRIPROT=X'72',SECPROT=X'72',COMPROT=X'4020',      X
                PSNDPAC=X'02',SSNDPAC=X'02',                      X
                TYPE=X'01',ENCR=X'00',                             X
                RUSIZES=X'0000',PSERVIC=X'000000000000000000000000'
*****
* MODE FOR JES328X APPLICATION *
*****
JES4096  MODEENT LOGMODE=JES4096,FMPROF=X'03',TSPROF=X'03',      X
                PRIPROT=X'A1',SECPROT=X'A1',COMPROT=X'7080',      X
                RUSIZES=X'8589',PSERVIC=X'01102000B100C00000010000'
*****
* MODE FOR LU TYPE 1 PRINTER *
* SCS SUPPORT SNA - 256 byte RUSIZE *
*****
SCS      MODEENT LOGMODE=SCS,FMPROF=X'03',TSPROF=X'03',      X
                PRIPROT=X'B1',SECPROT=X'90',COMPROT=X'3080',      X
                PSNDPAC=X'01',SRCVPAC=X'01',                      X
                RUSIZES=X'8585',PSERVIC=X'01000000E100000000000000'
                MODEEND
                END
```

Figure 133. Logmode Table for JES Printers

The following three mode entries are used in this table:

- Entry JES2MODE is used by JES2.
- Entry JES4096 is used by JES/328X to communicate with JES2.
- Entry SCS is used by the LU to communicate with JES/328X.

JES/328X Startup Procedure

Figure 134 shows the JES/328X start procedure. Definitions are included here for GDDM printer support, but have not been tested.

```
//JSX1    PROC
//JSX1    EXEC PGM=JSXMAIN,TIME=1440,PARM='CONSLOGR=0200'
//IMAGELIB DD DSN=SYS1.IMAGELIB,DISP=SHR
//ADMSYMBL DD DSN=SYS1.ADMSYMBL,DISP=SHR
//ADMDEFS DD DSN=SYS1.ADMDEFS(JSX1),DISP=SHR
//ADMGGMAP DD DSN=SYS1.ADMGGMAP,DISP=SHR
//JSXLOG  DD DSN=SYS1.JSX.JSXLOG.JSX1,DISP=SHR
//SYSIN   DD DSN=SYS1.VTAMLST(JES328X),DISP=SHR
```

Figure 134. JES/328X Start Procedure

JES/328X Printer Definitions

Figure 135 shows the JES/328X printer definitions.

```
*****
*   PRINTER DEFINITIONS FOR JES/328X   *
*****
*
*           3287 LUTYPE 1
*
A,SLU=RMT3,PLU=LAJES2,TLU=L400103,DEVICE=3287,LUTYPE=1
F,SLU=RMT3,CONSLOGP='SYS1.JSX.JSXLOG',CONSD=30,CONSLOGR=200
F,SLU=RMT3,XLATE=TEXT,BUFSIZE=256,PASSTHRU=JSXGDDM
*
*           START ALL PRINTERS
*
S,ALL
```

Figure 135. JES/328X Printer Definition Deck

RMT3 is defined as a JES/328X printer. The TLU is the actual name of the LU (L400103).

JES2 Parameters to Start JES2 for MVS/ESA

Figure 136 shows a part of the JES2 parameters that applies to defining the JES/328X and its printers.

```
LOGON1  APPLID=LAJES2
:
:
APPL(LAJES2)  NODE=1
:
:
LINE(3) UNIT=SNA          /* SNA line to JES 328x for RMT3      */
:
:
RMT3  DEVTYPE=LUTYPE1,    /* Terminal type (no SNA default)    */
      BUFSIZE=3840,       /* Largest buffer sent/received       */
      COMPACT=NO,         /* No compaction                       */
      COMPRESS=NO,        /* No compression/expansion           */
      CONDEST=2,          /* Route code for cmd responses       */
      CONS=YES,           /* Operator console                     */
      DISCINTV=0,         /* Idle time (in secs) before auto    */
                          /* disconnect (No timeout if DISCINT=0) */
      LINE=3,             /* Attached to SNA line 3              */
      LOCAL190=ACTION,    /* Oper. setup messages are action     */
      NUMPR=1,            /* No. of printers at remote          */
      NUMPU=1,            /* No. of punches at remote           */
      NUMRD=0,            /* No. of readers at remote           */
      ROUTECDE=2,         /* Routecode - the default is the     */
      SETUP=MSG,          /* setup requirements (PDIR)           */
      WAITIME=1           /* Time to wait after input/output     */
R(3).PR(1) CLASS=A,      /* Output class A                      */
          CKPTPAGE=1,     /* Default                             */
          CKPTLINE=0,     /* Default                             */
          PRWIDTH=120,    /* Default                             */
          WS=(W,R,Q,PRM,LIM/F,P)
                          /* Work selection criteria             */
R(3).PU(1) CLASS=B,      /* Output class B                      */
          SELECT=BASIC,   /* Basic exchange                      */
          NOSEP,          /* No Separator pages                  */
          NOCCTL          /* No carriage control                 */
```

Figure 136. JES2 Parameters

ADMDEFS Nicknames for PC/3270 Printers

Figure 137 shows the printer definitions to be used for GDDM printing.

```
*****
* This is the ADMDEFS file for JES/328X      *
*****
NICKNAME NAME=RMT3,PROCOPT=((PRINTDST,B,RMT3))
NICKNAME NAME=L400103,PROCOPT=((PRINTDST,B,RMT3))
```

Figure 137. ADMDEFS Nicknames for PC/3270 V4.1 Printers

11.9 Using Non-IBM Printers with PC/3270 V4.1

For DOS mode, printer definition tables (PDTs) for a large number of IBM printers are included with the program. For a complete list of these, see 3.1.4, "Printer" on page 66.

In many cases, non-IBM printers can be made to work with PC/3270 V4.1 by editing an existing printer definition file (PDF) and re-compiling it using the PCSPTC.EXE printer table compiler for for DOS (Full-Function Mode) or by selecting the **Convert PDF...** button on Figure 117 on page 200 for Windows or OS/2.

PC/3270 V4.1 for DOS (Full-Function Mode) provides the printer definition file IBM4019H.PDF, and PC/3270 V4.1 for Windows or OS/2 also provides the printer definition table HPLJII.PDT. These PDF/PDT files can be used for the following printers:

- HP Printer emulation mode of IBM Personal Laser Printer (Model 4029-0X0)
- HP Printer emulation mode of IBM LaserPrinter (Model 4019-010)
- HP Printer emulation mode of IBM LaserPrinter E (Model 4019-E01)
- HP LaserJet Printer
- HP DeskJet Printer

Note: To use the IBM4019H.PDF, you *must* create the printer definition table IBM4019H.PDT by using PCSPTC.EXE.

The file IBM4019H.PDF is supplied on the 3.5" diskette #3 and on the 5.25" diskette #7. If you specify Install full set of PC/3270 during installation, this file is copied to the target automatically.

The PC/3270 for Windows or OS/2 PDT/PDF files are always in the subdirectory ..\PDTPDF. It's located on the 3.5" diskette #2 or in the program directory (default C:\PCSWIN\..) after installation on your system, if you have not erased it to save some disk space.

Chapter 12. File Transfer

PC/3270 V4.1 provides file transfer capability to the following host systems:

- VM/CMS - Virtual Machine/Conversational Monitor System
- MVS/TSO - Multiple Virtual Storage/Time Sharing Option
- MVS/CICS - MVS/Customer Information Control System
- VSE/CICS - Virtual Storage Extended/CICS
- OV/MVS - OfficeVision/MVS

PC/3270 V4.1 also provides the following three different file transfer methods:

- By using the SEND and RECEIVE commands at the DOS prompt (except for Windows or OS/2)
- By using the File Transfer Utility
- By using the Import/Export capability with OV/MVS

This chapter reviews the options and procedures available to the user with PC/3270 V4.1 for DOS (Entry-Level Mode), for DOS (Full-Function Mode) and for Windows or OS/2, including the following:

- General guidelines and information for DOS, for Windows or OS/2 users
- File transfer for DOS mode users
- File transfer for Windows or OS/2 users

Note: PC/3270 V4.1 is the 3270 terminal emulation capability for the Personal Communications AS/400 and 3270 Version 4.1 for PCs running DOS (3270 only), Windows 3.x, OS/2, OS/2 Warp, and Windows 95.

12.1 General Information for All Users

Before attempting a file transfer, you should ensure that the host session is in a suitable state for the transfer to occur. If the host session is not in a suitable state, incoming system messages, notes, or files, will interrupt the file transfer operation and cause it to fail, often with misleading symptoms. Ensure that the following is completed:

- Messages have been set off, as follows:
 - SET MSG OFF (in a VM/CMS environment)
 - PROFILE NOINTERCOM (in an MVS/TSO environment)
- The cursor in the host session is positioned at the READY or CMS prompt.

Note that this requirement applies to both DOS and for Windows or OS/2s of PC/3270 V4.1 operation. Turn the messages back *on* when the file transfer process has ended.

SNA file transfer block size can be set to 32,000 bytes provided the host system's file transfer module IND\$FILE is at Version 1.1.1 or higher. You can find out what release of IND\$FILE is in use by typing IND\$FILE?. If you use an unsuitable block size, you may get the following symptoms:

- Small files (less than 2KB) will transfer without problems.
- Larger files will fail part way through the transfer with a message indicating that the host has not responded.

12.1.1 Environment Prerequisites

Listed below are some things to keep in mind when you are attempting a file transfer for the first time or after a change has been made in a network environment.

- Host File Transfer Program Installed
- 3x74 Customization
 - Q125 Bit 6 - File Transfer AID Bit
 - Required For CUT and ASYNCH
 - Sometimes called the Query Bit
 - No Keyboard RPQs on the 3274
- VTAM Definitions
 - Extended Data Stream Support
 - Set high order bit of second byte of the PSERVIC
 - Required for DFT and DLC
 - *Do not* set if CUT and CU is 3274
 - Also called the Query Bit
- NCP Definitions
 - Extended Data Stream Support
 - FEATUR2 = EDATS
 - Only for BSC/3270
 - Required for DFT
 - *Do not* set if CUT and CU is 3274
- TSO Definitions
 - Specify NOBREAK
- VM Definitions
 - Set MSG/ERRMSG OFF
- CICS Definitions
 - Extended Data Stream Support
 - EXTDS feature defined in DFHTCT
 - Required for DFT and DLC
 - *Do not* set if CUT and CU is 3274

Logmode Table Entry - File Transfer Errors

For file transfers to be successful, the logical unit (LU) definition for the session, which will be in either a VTAM definition or an NCP definition (depending on your link to the host), *must* have a correct *logmode table entry*. In particular, the query bit *must* be set in the PSERVIC operand for the MODEENT macro. When the query bit is set, the third hexadecimal character in the PSERVIC value will be X'8'. For example:

```
PSERVIC=X'028000000000185000007E00'
```

An example of a logmode table entry for a PC/3270 V4.1 24x80 display LU is shown in Figure 128 on page 210.

12.2 File Transfer for DOS Mode Users

Two methods are provided in PC/3270 for DOS (Entry-Level Mode) and for DOS (Full-Function Mode) to allow file transfer to be initiated by the following:

- Issuing commands from the DOS prompt
- Using the File Transfer Utility (PCSUTIL)

12.2.1 File Transfer from the DOS Prompt

File transfer from the DOS prompt is invoked by the RECEIVE or SEND commands. These are followed by parameters which are described briefly below:

- PC file name (include the path if the default path is not to be used)
- Host session ID to be used and host file name
- Options indicating type of transfer (ASCII or BINARY), record length, format, etc.

Incorrect usage of these parameters will either result in no file transfer taking place or a file received at the destination with incorrect data format.

A quick reminder of the syntax required can be obtained by typing SEND or RECEIVE (without parameters) at the DOS prompt (for DOS (Full-Function Mode) only). Refer to the following manual for a detailed description of the correct syntax and usage of the RECEIVE and SEND commands:

- Chapter 3. "Transferring Files" in the *Personal Communications AS/400 and 3270 Version 4.1 for DOS Reference*, SC31-8265

When Using SEND or RECEIVE

Ensure that your PC/3270 V4.1 directory is current. If it is, then the SEND and RECEIVE modules in this directory will be used when file transfer is invoked.

If the PC/3270 V4.1 directory is not current, then ensure that no other directory that may contain SEND or RECEIVE modules precedes the PC/3270 V4.1 directory in your PATH statement. If this is not the case, very misleading results, such as Invalid syntax, can occur when the incorrect SEND or RECEIVE modules are used.

When file transfer is invoked, the DOS display is regularly updated with the number of data bytes and packets processed. When the file transfer is completed, the following statistics are displayed: bytes/sec, millisec/packet and file transfer duration in seconds. These statistics can be used to compare the result of changing user-definable options for the file transfer operation.

Packet size parameter: One user-definable option is the packet size parameter PKTSIZE. A packet is a block of bytes. The default packet size is 2500 bytes for an SNA connection and 7160 bytes for a non-SNA connection. However, the packet size can be changed by the user using the PKTSIZE parameter. Depending on the host loading, a possible file transfer performance improvement can be achieved. The file transfer packet size can be increased during the configuration process (see Figure 21 on page 107). There is no packet size parameter available for the Entry-Level Mode DOS user.

Time parameter: If you get timeouts with large buffer sizes defined, and large files or with slow host communications, experiment with the TIME parameter on the SEND and RECEIVE commands can help. For example, on an MVS/TSO system the following would give a two-minute (120 seconds) timeout period:

```
SEND d:\path\pcname.ext hostname hosttype TIME 120
```

The default for the TIME parameter is 20 seconds. There is no time parameter available for the DOS (Entry-Level User) user.

Backslash “\” delimiter: File transfer programs (SEND/RECEIVE) do not usually allow the host file ID to contain words which are reserved for SEND/RECEIVE options, such as APPEND or TIME.

However, the host file ID can contain these reserved words if a backslash “\” option-delimiter is used; this delimiter *must* be placed between the host file ID and the SEND/RECEIVE options. Even if no options are specified, a “\” delimiter *must* be placed after the host file ID. For example, on a VM/CMS system:

```
SEND c:\path\pcfile.ext a:fn APPEND fm \ (ASCII CRLF
```

```
RECEIVE c:\path\pcfile.ext a:fn TIMECARD fm \
```

12.2.2 File Transfer Using the File Transfer Utility (PCSUTIL)

For users who perform infrequent file transfers and are not familiar with the syntax of using the SEND and RECEIVE commands from the DOS prompt, a File Transfer Utility is provided on the 3270 Setup and Utility Menu (PCSUTIL.EXE). The 3270 Setup and Utility may be started automatically on loading the emulator, or by typing PCSUTIL at the C:\PC3270> DOS prompt. Selecting the **File Transfer Utility** option will give you a panel with the following three options:

- Send file
- Receive file
- Customize file transfer parameters

If you select the Customize file transfer parameters option, you will get another panel that allows you to change the default file transfer profile for any of the four host system types supported: VM/CMS, MVS/TSO, CICS and IWS (only for DOS (Entry-Level Mode) users). For example, if you select the host type VM/CMS, you will get the Customize VM/CMS Parameters panel shown in Figure 138.

```

-----
Customize VM/CMS Parameters
-----
Move cursor to desired choice, and press F2 to select.

Selected profile . . . . . 1

Send/Receive common parameters
ASCII to/from EBCDIC translation . . . ▶ YES      NO
Use CR/LF as record separator . . . ▶ YES      NO
Append to target file . . . . . YES      ▶ NO
Wait period in seconds . . . . . ▶ Default  Specify =[00020]
Packet size sent to the host . . . ▶ Default  Specify =[02500]
Suppress the sending of a Clear . . . YES      ▶ NO

Send parameters
Logical record length . . . . . ▶ Default  Specify =[00080]
Record format of host file . . . ▶ Default  Fixed   Variable

Esc=Cancel  F1=Help  F2=Select  F3=Exit

```

Figure 138. File Transfer - Customize VM/CMS Parameters Panel - DOS Mode

If Default is selected for the Packet size sent to the host field, the packet size that will be used is the SNA (or non-SNA) block size you have specified during configuration (see Figure 21 on page 107).

Other file transfer options may be selected in this profile.

Each host system type may have a maximum of three file transfer profiles defined to meet the user's specific needs.

Once profiles have been defined, the user can very easily perform file transfer operations by running PCSUTIL and selecting the appropriate Send file or Receive file option on the first panel displayed. For example, if you select the **Send file** option, you will get the Send File panel shown in Figure 139 on page 224. Select the file transfer profile to be used, select the host session identifier, and then enter the appropriate PC and host file names.

The File Transfer Utility panels are different if you are using for DOS (Entry-Level Mode). There are some options which PC/3270 for DOS (Entry-Level Mode) doesn't use.

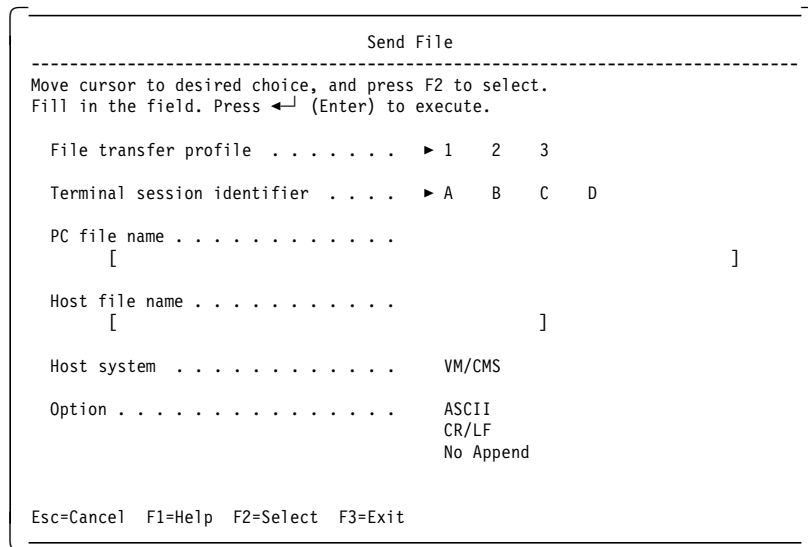


Figure 139. File Transfer - Send File Panel - DOS Mode

12.3 File Transfer for Windows or OS/2 Users

File transfer in PC/3270 for Windows or OS/2 is primarily invoked and managed using dialog boxes and is controlled by a separate program, SENDRECV.EXE, which runs as a background task. This allows you to work in other windows while the file transfer continues. Files can be transferred to and from multiple host sessions concurrently. PC/3270 V4.1 for Windows or OS/2, like DOS Mode, provides a facility for the user to initiate file transfer by typing the SEND or RECEIVE commands at the DOS prompt.

12.3.1 File Transfer from the DOS Prompt

The SEND and RECEIVE commands (SEND.EXE and RECEIVE.EXE) are installed in the `d:\SDK\SAMPLES\DOSXFER` subdirectory where PC/3270 V4.1 is installed (only when a full or selective partial installation is done). These programs have the same functions and format as those provided in PC/3270 DOS (Full-Function Mode) with the following exceptions:

- PKTSIZE is not supported.
This parameter is set in the Miscellaneous Settings dialog of the Transfer menu bar item.
- PROGRESS and QUIET shrinks the file transfer status window to an icon.
- CLEAR *must* be explicitly added.
NOCLEAR is the default.

12.3.2 Send/Receive as a Macro

This new function for PC/3270 V4.1 allows you to invoke the file transfer operation from macros. This can be most helpful when there is a need to automate file transfer.

The syntax for the command is the same as for DOS (Full-Function Mode). There are a few restrictions, as follows:

- The macro statement *must* be coded in lowercase alphanumerics.
- Files cannot be directly exchanged between the sessions without being sent and received at the host system.
- The following statements *must* be inserted immediately after the send or receive statement for the correct execution of successive statements in the macro:
 - [wait inp inh] followed by
 - [pause] or [rpause] or 'wait until cursor at(row,col)' or 'wait until Field Attribute xx at (row,col)'

12.3.3 Setting Up for File Transfer

Before considering an actual file transfer operation, we should be aware of the other considerations that directly affect the success or otherwise of transferring files between the host and the workstation. The Setup option is provided for exactly this purpose, and is available from the Transfer pull-down menu.

Select the WorkStation window for the appropriate host session and then click on **Transfer** from the WorkStation window action bar. Clicking on Setup makes additional options available to enhance the capabilities of PC/3270 V4.1. The Setup options for file transfer are as follows:

- Define Transfer Types...
- Translation Table...
- Miscellaneous Settings...
- Create IDP File...

Before you can start to define setup options, you should verify that the correct host system is selected in the Transfer pull-down menu. Figure 140 shows the Transfer pull-down menu which has a check mark before the VM/CMS host system type.

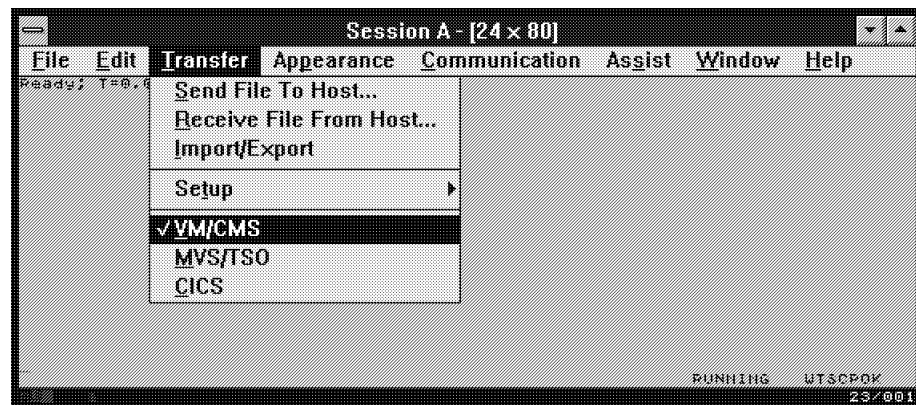


Figure 140. File Transfer - Transfer Pull-Down Menu Window - Windows and OS/2 modes

Defining File Transfer Types

A File Transfer Type defines options for file transfer, such as the record format for the host file (variable/fixed), the character translation (ASCII to EBCDIC), and so on. Up to 16 transfer types can be defined for each host system. PC/3270 V4.1 provides three transfer types: text, binary and append. Additional types can be added by the user.

The transfer type options you can choose depend on the host system you have selected. The options available are as follows:

- File Options:
 - ASCII
 - CRLF
 - APPEND (VM/CMS and MVS/TSO ONLY)
- Record Format (VM/CMS and MVS/TSO only):
 - Default
 - Fixed
 - Variable
- Logical Record Length (VM/CMS and MVS/TSO only)
- TSO Allocation Parameters (MVS/TSO only):
 - Allocation amounts - PRIMARY or SECONDARY
 - Allocation units - TRACKS, CYLINDERS or AVBLOCKS
- Additional Options

This rectangular empty box is to allow the user to add any options for the file transfer that are not available elsewhere in the Transfer Type Definition window.

An example of the Transfer Type Definition - VM/CMS window is shown in Figure 141.

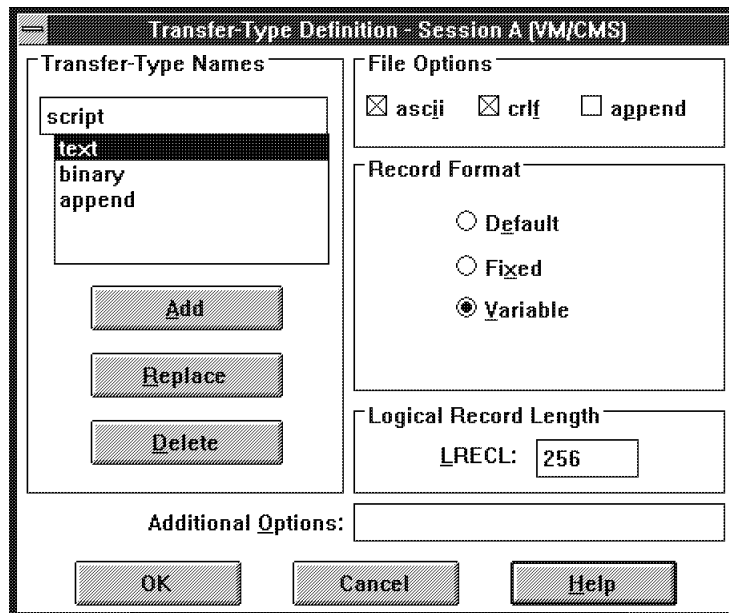


Figure 141. File Transfer - Transfer Type Definition - VM/CMS Window - Windows and OS/2 modes

Changing Translation Tables

The Translation Table... option on the Setup menu for the Transfer/Setup pull-down menu lets you create and customize the translation table which is used for file transfer. In this dialog you can create and customize the translation table for uploading files or downloading files independently.

The Upload Translation Table is used for ASCII to EBCDIC translation if you are sending text files to the host system. The Download Translation Table is used for EBCDIC-to-ASCII translation if you are receiving text files from the host system. Normally the IBM Default *can be used*.

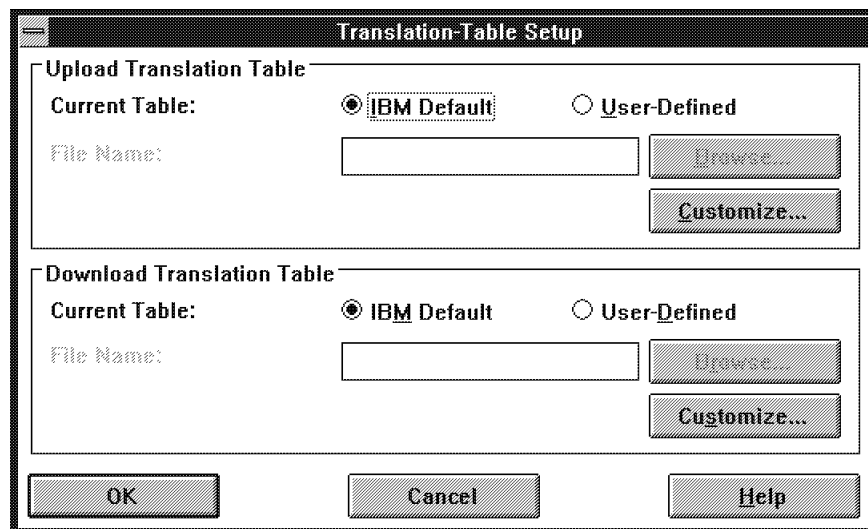


Figure 142. File Transfer - Translation Table Setup Window - Windows and OS/2 modes

To create or customize a translation table, click on the **Customize...** button. The Customize Translation (File Transfer Up or Download) window comes up and shows you the hex values of the IBM default or your selected translation table.

	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	00	10	40	F0	7C	D7	79	97	68	71	45	3C	76	2B	36	E1
-1	01	11	5A	F1	C1	D8	81	98	DC	9C	55	3D	77	2C	59	8F
-2	02	12	7F	F2	C2	D9	82	99	51	9E	CE	62	78	09	08	46
-3	03	13	7B	F3	C3	E2	83	A2	42	CB	DE	4F	80	0A	38	75
-4	37	B6	5B	F4	C4	E3	84	A3	43	CC	49	64	24	AC	BC	FD
-5	2D	B5	6C	F5	C5	E4	85	A4	44	CD	69	65	15	AD	39	EB
-6	2E	32	50	F6	C6	E5	86	A5	47	DB	9A	66	8C	AE	A0	EE
-7	2F	26	7D	F7	C7	E6	87	A6	48	DD	9B	20	8D	AF	BF	ED
-8	16	18	4D	F8	C8	E7	88	A7	52	DF	AB	21	8E	1B	CA	90
-9	05	19	5D	F9	C9	E8	89	A8	53	EC	0F	22	41	30	3A	EF
-A	25	3F	5C	7A	D1	E9	91	A9	54	FC	5F	70	06	31	FE	B3
-B	0B	27	4E	5E	D2	BA	92	C0	57	4A	B8	23	17	FA	3B	FB
-C	0C	1C	6B	4C	D3	E0	93	6A	56	B1	B7	72	28	1A	04	B9
-D	0D	1D	60	7E	D4	BB	94	D0	58	B2	AA	73	29	33	CF	EA
-E	0E	1E	4B	6E	D5	B0	95	A1	63	3E	8A	74	9D	34	DA	BD
-F	9F	1F	61	6F	D6	6D	96	07	67	B4	8B	BE	2A	35	14	FF

Figure 143. File Transfer - Customize Translation (File Transfer Up or Down)

The horizontal and vertical hexadecimal numbers are the translation source codes, as follows:

- For customizing the upload translation table, these are the ASCII (PC) codes.
- For customizing the download translation table, these are the EBCDIC (Host) codes.
- The hexadecimal numbers inside the table are the translation target codes, as follows:
 - For customizing the upload translation table, these are the EBCDIC (Host) codes.
 - For customizing the download translation table, these are the ASCII (PC) codes.

Note: The IBM default translation table is dependent on the PC code page.

Double-click on the values in the table you want to change. For example, we want to change the ASCII value 9A from this upload translation table. The values 9- vertical and -A horizontal cross on the EBCDIC value FC. Double-clicking on **FC** will show you the Translate 9A to window to be changed.

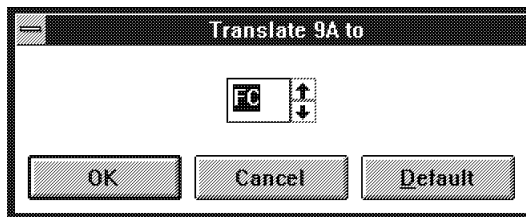


Figure 144. File Transfer - Translate 9A to Window - Windows and OS/2 modes

Note: If you make changes, don't forget to save your new translation table.

Defining File Transfer Miscellaneous Settings

Miscellaneous Settings... allows users to customize default values of other file transfer options. An example of the Miscellaneous Settings - Session A window is shown in Figure 145.

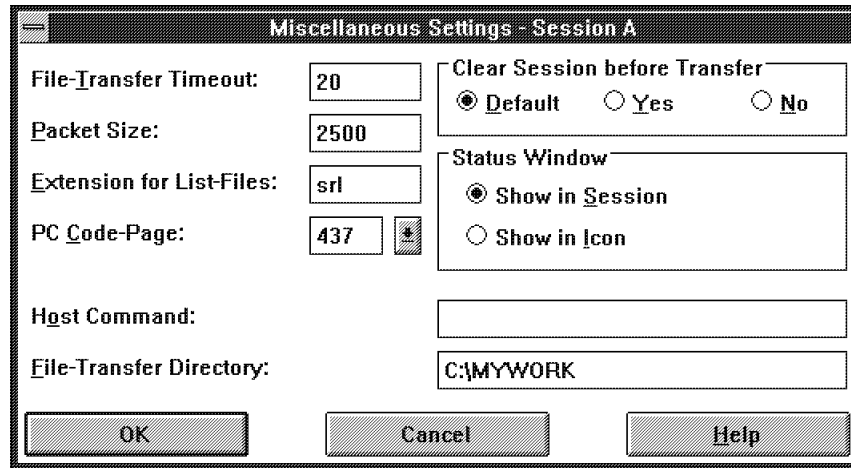


Figure 145. File Transfer - Miscellaneous Settings - Session A Window - Windows and OS/2 modes

Some of the settings could affect the success or failure of a file transfer and are, therefore, important. These settings are as follows:

- File Transfer Timeout

File Transfer Timeout is the length of time in seconds that the workstation waits for a response from the host. The default setting is 20 seconds. However, each time a host fails to respond before the timeout period expires, a file transfer error message will be issued which could confuse an inexperienced operator.

If file transfer is to a relatively slow host, it may be necessary to increase the timeout value above the 20-second default. A value of 150 seconds is recommended for slow communication lines such as SDLC and ASYNC, or other communications in case of large packet sizes or large block sizes.

An increase in the timeout value may also be necessary on a network station in a situation where file transfers are likely to be carried out from several host sessions concurrently, or when multiple network stations are likely to be doing file transfers simultaneously through a PC gateway.

- File Transfer Packet Size

File Transfer Packet Size is the file size in bytes that the workstation sends or receives. Increasing the packet size can improve file transfer performance. However, other considerations in the environment, such as the amount of memory available, could mean that file transfer could fail if the size is increased to too high a value.

The default value for SNA is 2500, and 7160 for non-SNA connections. The acceptable range is from 256 to 13000 for the LAN attachment through a 3270 Emulation Program Gateway attachment. For other attachments, the acceptable range is from 256 to 32000, but the packet size is limited by the host system.

Therefore, we recommend that you leave the size at the default value until file transfer is known to be working. Only then should it be changed to possibly optimize file transfer performance.

- PC Code Page

Code Page is a table to translate EBCDIC code to and from ASCII code when transferring files. The selected PC code page is used as the IBM default for the translation table (see “Changing Translation Tables” on page 227). Valid values are 437, 850, 860, 861, 863 and 865. The default code page is 437.

- Clear Session before Transfer

Clear Session before Transfer defines whether a Clear key is sent to the host at the beginning of a file transfer. When Default is selected, a Clear key is sent only on VM/CMS or CICS at the beginning of a file transfer. When Yes is selected, a Clear key is sent to the host at the beginning of a file transfer. When No is selected, a Clear key is not sent to the host at the beginning of a file transfer. However, when using MVS/TSO hosts, it may need to be changed from the default to No in some circumstances, for example, when file transfer is attempted within the ISPF application. The default is Default.

- Host Command

The default Host Command isn't shown in this field. If this field is empty, the IND\$FILE host command is used, which will be invoked when the file transfer is started. Ask your system administrator what host communication program you use.

12.3.4 Transferring Files to and from the Host System

To transfer files, the user will need to select the WorkStation window for the appropriate host session and then the Transfer pull-down menu from the WorkStation window action bar. If the title and action menu bar is hidden, the Alt+Space key combination should be used to display the pop-up menu bar.

Both SEND and RECEIVE operations can be selected from the Transfer pull-down menu. But before you select one of them, check this pull-down menu to see whether the correct host system type has been selected by a check mark (refer to Figure 140 on page 225). We use the VM/CMS host system in our examples.

Note: PC/3270 V4.1 for Windows or OS/2 doesn't provide you with two different file transfer dialogs as it did for Short and Long Dialogs in PC/3270 V2.0 for Windows or in the *IBM Windows Connection* manual.

Send File(s) to the Host System

Sending files to the host system is the process of transferring files from the PC to the host (also known as uploading files to the host). Assuming we wish to send files one at a time or multiple files all at once to the host, select the **Send File To Host...** option from the Transfer pull-down menu.

The result is the Send File to Host window panel, as shown in Figure 146 on page 231.

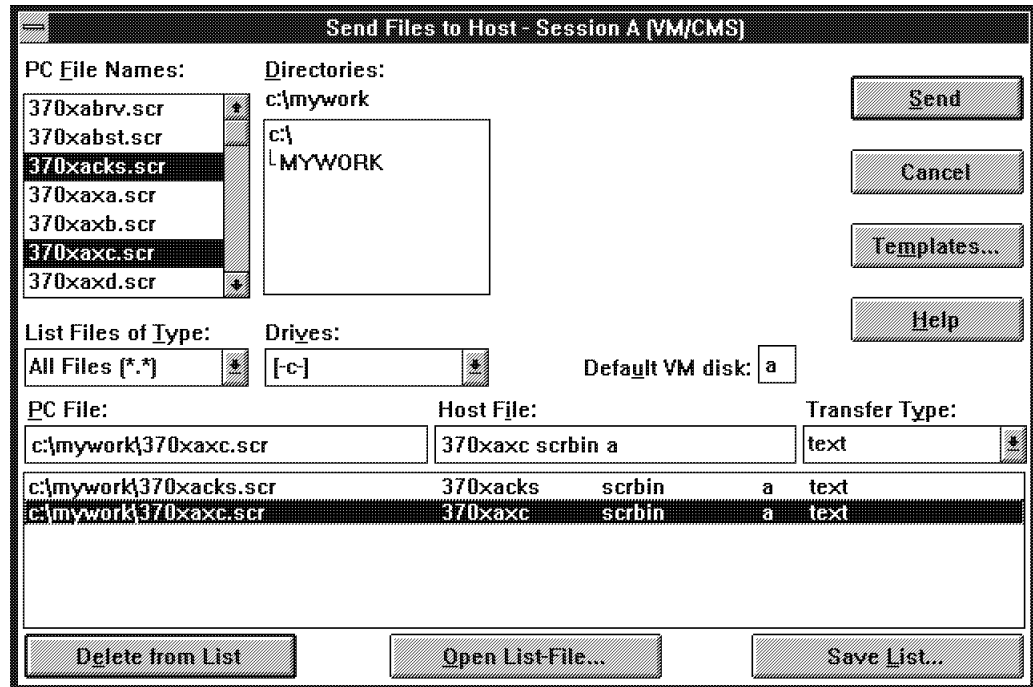


Figure 146. File Transfer - Send File to Host - Session A (VM/CMS) Window - Windows and OS/2 modes

The cursor will be positioned at the PC File entry box, ready for entry from the keyboard if required. The default directory C:\PCSWIN is shown in the Directories field if no other directory was specified in miscellaneous settings.

There are different ways to select files, as follows:

1. You may type the PC drive, directory and file name in the PC File: entry box, from the keyboard. Pressing the Tab key brings you to the Host File: entry box, where the PC file name will be translated to the host file name. Make corrections if necessary and select the Transfer Type by using the mouse. Only one file can be entered in this way. Then click on the **Send** button to start the transfer of data.
2. A file can also be selected by using the mouse. After selecting the drive, directory and file name, and checking that the host file name and the Transfer Type in the list box below are correct, we may start the transfer by clicking on the **Send** button.

Hint

You can double-click on the file name to be transferred if you know everything is correct, and the transfer will start immediately. You do not need to use the Send button in this case.

3. To select multiple files from a directory and send them all at one time, *press and hold* the Ctrl key while clicking on the file names in the PC File Names: box. Check the list box below to make sure the names are all correct. If not, select the wrong name and make the correction for the host file name or transfer type. Click on the **Send** button to start the transfer when finished.

Hint

You can *press and hold* the left mouse button and move down to select multiple consecutive files from the PC File Names: box.

Receive File(s) from the Host System

Receiving files from the host system is the process of transferring files from the host to the PC (also known as downloading files to the PC). Assuming we wish to receive files one at a time or multiple files all at once from the host, select the **Receive File From Host...** option from the Transfer pull-down menu. This will cause the corresponding Receive File from Host window to be displayed as shown in Figure 147 with the cursor automatically positioned at the Host File: name entry box.

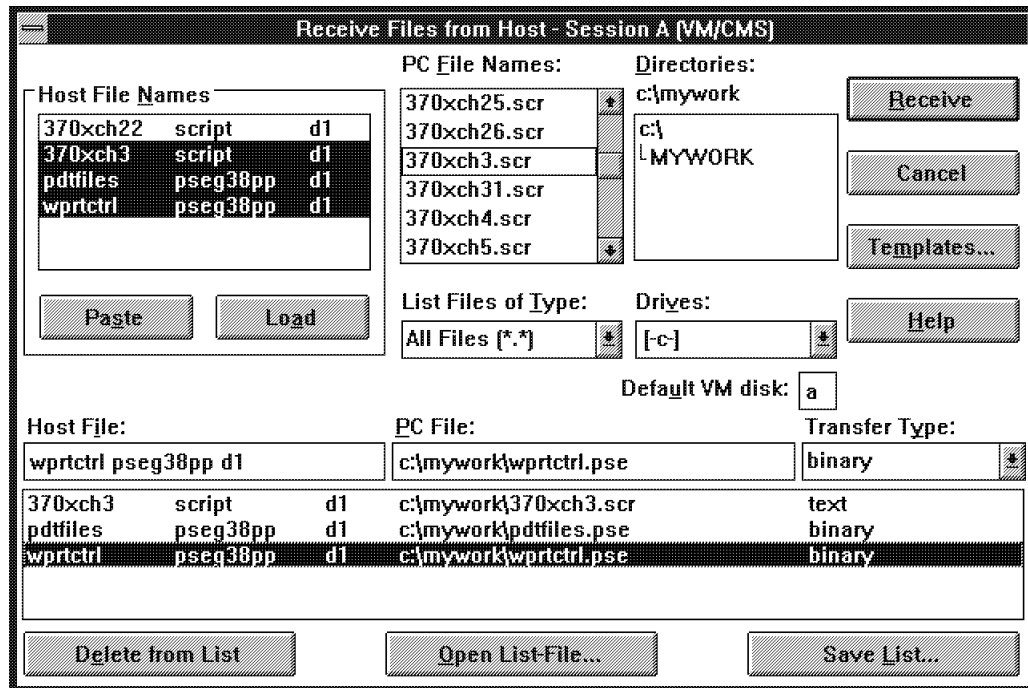


Figure 147. File Transfer - Receive File from Host - Session A (VM/CMS) Window - Windows and OS/2 modes

As described in "Send File(s) to the Host System" on page 230, you can also work with this RECEIVE dialog by typing in the host file name manually from the keyboard or by selecting the drive, directory and file name of an existing PC file from the Directories and PC File Names: boxes using the mouse. The file names and transfer type information are automatically entered in the list box below. Necessary corrections can be made in the same manner. Click on the **Receive** button to start the transfer when everything is correct.

The Receive File from Host window has one box more than the Send File to Host window. See the Host File Names: box in Figure 147. There are two push buttons in this box, as follows:

- Paste** Allows you to fill host file names into this box by using the Cut and Paste function
- Load** Allows you to fill host file names into this box by using the DDE function

The Cut and Paste function is useful. Note that you first *must* copy a list of files on the host system to the Microsoft Windows V3.0/3.1 Clipboard Viewer by using the Edit pull-down menu and selecting the **Copy** option from your WorkStation, before you open the Receive File from Host window. Afterwards you can paste the list to the Host File Names: box and continue as in earlier transfer examples.

Using File Transfer Templates

When you enter the name of a file to be transferred, PC/3270 V4.1 WorkStation scans the relevant send or receive templates for as close a match as possible to the source file name supplied by the user, and generates a target PC or host file name and transfer type. (A target file is the host file when you are sending files; a target file is the PC file when you are receiving files.) In other words, templates define rules for automatically generating PC or host file names and transfer types. This can save the operator a significant amount of time, especially when transferring multiple files.

For example, common PC file name extensions such as EXE, COM, and TXT are automatically converted to an appropriate host file type and type of transfer (text or binary), according to information contained in a supplied template. The following table shows an example of how the supplied templates handle some of the more common PC file extensions.

PC File Extension	Host VM/CMS File Type	Transfer Type
.EXE	EXEBIN	binary
.COM	COMBIN	binary
.TXT	TEXT	text
.DOC	DOC	text
.SCR	SCRIPT	text

Table 26. Example of Template File Transfer Handling

Defining File Transfer Templates

A number of templates are predefined and supplied with the PC/3270 V4.1 product. PC/3270 V4.1 provides two types of templates: *Send templates* and *Receive templates*. Up to 32 templates can be defined for each host system (VM/CMS, MVS/TSO and CICS). The templates are common for all WorkStations and are used for both sending and receiving files.

The following Templates window is displayed by clicking on the **Templates...** button in the Send File to Host or Receive File from Host windows. Three kinds of dialog windows are supported according to the IBM host systems where the check mark is put on the Transfer pull-down menu.

When users select **VM/CMS** in the Transfer pull-down menu and the **Templates...** button is selected, the Templates - Session A (VM/CMS) window is shown as in Figure 148 on page 234.

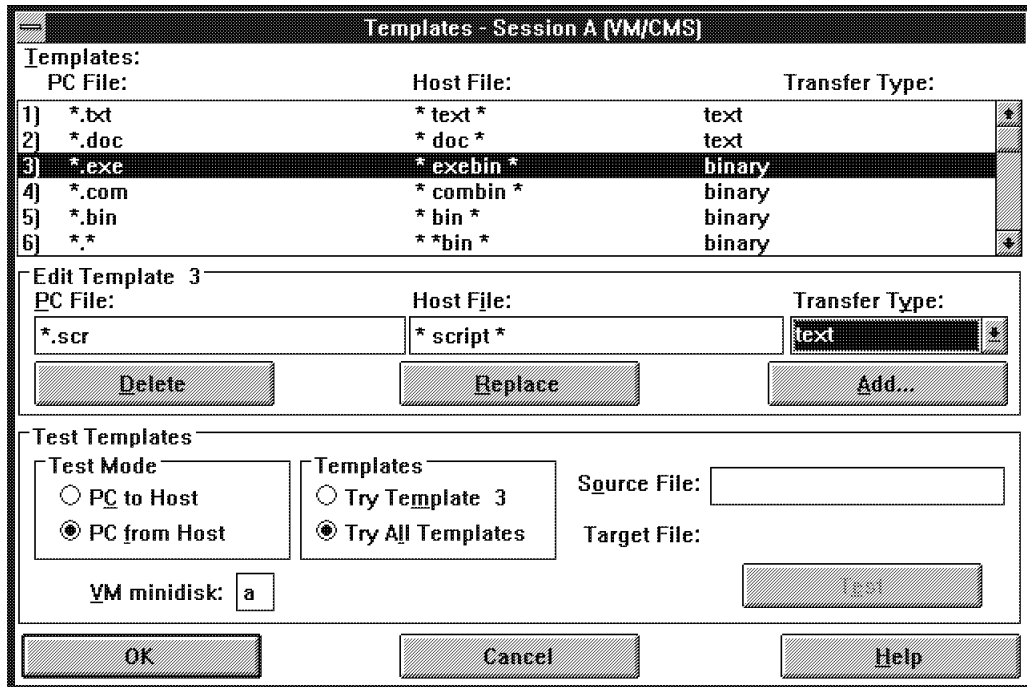


Figure 148. File Transfer - Templates - Session A (VM/CMS) Window - Windows and OS/2 modes

Templates can be deleted, replaced or added. When defining templates, the asterisk character (*) can be used for global searching of file names. For example, *.EXE can be used for all files having a file name extension of EXE.

When PC/3270 V4.1 generates file names, the templates are searched starting with template 1 until the first matching template is found. You can choose to add a template at any position, but be aware that they are searched sequentially in ascending order. The last template supplied with the product is always the GLOBAL or *catch all* template. Therefore, additional templates added by the user should *always be added before the last one* or their contents will be ignored.

Using List Files

If you often send or receive the same list of files, you can also save the list of file names. There are three push buttons on the Send File to Host window (Figure 146 on page 231) or Receive File from Host window (Figure 147 on page 232) for using list files.

Having selected your files, you can save the file names in a list. Click on the **Save List** option and enter a name for the list file when prompted. The list file is saved with a *.SRL file extension.

If we wish to load a previously saved list file, in the PC File box, select or enter the name of the list file (*.SRL). Then select the **Open List File** option at the bottom of the panel. This will expand the list file into its component PC file names and the transfer can then proceed as normal by selecting the **Send** push button.

12.4 Import/Export

Import/Export is another file transfer capability, and involves sending and receiving files to and from a host application, using the controls defined by functions of the Document Interchange Architecture (DIA). The PC/3270 V4.1 for DOS (Full-Function Mode) and for Windows or OS/2 users have the ability to do the following:

- Write a host-produced file to a DOS medium (Export)
- Send a DOS file to a host application (Import)

The feature is now provided by IBM 3270 Workstation Program Version 1.12 and Personal Communications Version 3.0 and 3.1.

For more information about Document Interchange Architecture (DIA), refer to the following publications:

- *Document Interchange Architecture: Technical Reference*, SC23-0781
- *Document Interchange Architecture: Interchange Document Profile Reference*, SC23-0764

The Import/Export implementation in PC/3270 V4.1 exchanges documents with OfficeVision/MVS on the host system. OfficeVision/MVS is a menu-driven office systems communication program that runs under the IBM Customer Information Control System (CICS) application program. It allows IBM 3270 series terminals to exchange documents with IBM products that use the Distributed Office Support System (DISOSS) network.

12.4.1 Using Import/Export Function in PC/3270 for DOS (Full-Function Mode)

A new PC/3270 V4.1 for DOS (Full-Function Mode) utility called TRANSFER.COM is used to transfer files that are in Final Form Text (FFT) format between a PC and OV/MVS; the process is commonly known as Import/Export.

Before you set up the TRANSFER program to send and receive documents through OfficeVision/MVS, make sure you are on the OfficeVision file transfer menu on the host side. Jump to your PC session and enter the TRANSFER command and a session ID, as follows:

```
TRANSFER a
```

If you want to send an FFT document to OV/MVS, which you have created on your PC, you *must* also create an interchange document profile (IDP) file so that it is available to accompany the document; you *must* use the INDIDP.COM program, also provided in PC/3270 V4.1 for DOS (Full-Function Mode) to do this. Enter the INDIDP command and the document.FFT name as follows:

```
INDIDP mydoc.fft
```

Important note

If you rename the *.FFT, you *must* also rename its *.IDP file. If you don't, you will not be able to send the document back to OfficeVision.

This is only a brief look at how the Import/Export function works in DOS (Full-Function Mode).

12.4.2 Using Import/Export Function in PC/3270 for Windows or OS/2

To use the Import/Export function, the user will need to select the WorkStation window for the appropriate host session and then the Transfer pull-down menu from the WorkStation window action bar.

Before the Import/Export operations can be selected from the Transfer pull-down menu, the CICS host system type has to be selected by a check mark (refer to Figure 140 on page 225).

When you select **CICS** and **Import/Export**, a transfer module is loaded into memory, which shows you the Import/Export Status-Session A icon. After that, you can invoke the Import/Export function in the appropriate WorkStation host menu panel. When you receive a file by using the export function, you receive two files; one is the target document file (*.FFT), another is the interchange document profile (*.IDP). The IDP file has the header information for the document.

When you send a file using the import function, the file *must* be an IDP file. If you want to import a document that can be created in a DOS environment, you can create the IDP file by selecting the **Create IDP File...** option under Setup of the Transfer pull-down menu.

Note: If there is no IDP file, a default IDP file is created automatically.

IDP File panel

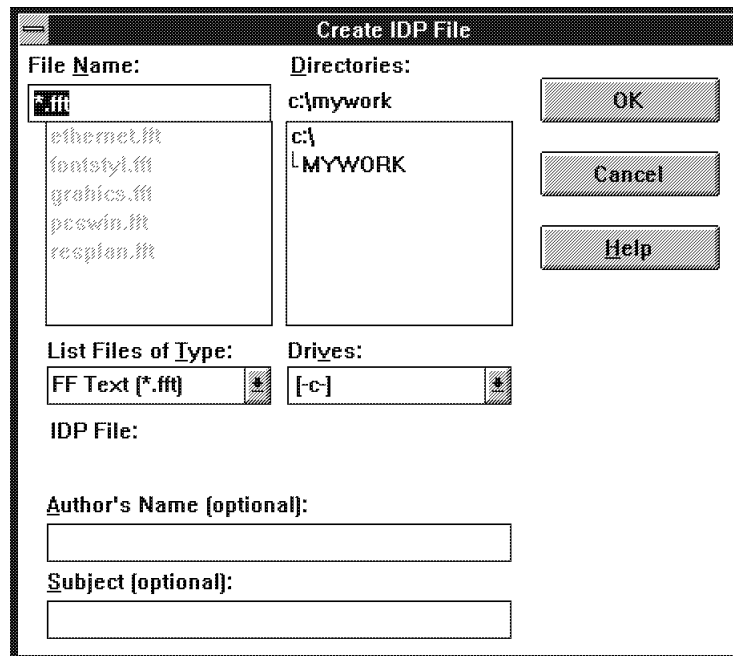


Figure 149. File Transfer - Create IDP File Window - Windows and OS/2 Modes

Chapter 13. Personal Communications AnyNet Support

In this section we provide a description of AnyNet SNA over TCP/IP Version 1.0 for Windows. This product is included in the Personal Communications AS/400 and 3270 for Windows and Personal Communications AS/400 for Windows packages.

Note: For OS/2 environment, AnyNet SNA over TCP/IP support is included in the OS/2 Access feature.

13.1 What Does SNA over TCP/IP Do?

The support provided by SNA over TCP/IP is determined by the SNA transport user you select.

- APPC Networking Services for Windows
 - CPI-C application programs
 - APPC application programs
- Personal Communications for Windows
 - 3270 Emulation
 - 5250 Emulation
 - Printer Support

Note: For information on CPI-C APIs, see CPI-C 2.0 Reference. For information on APPC APIs, see the API and Technical Reference. The APPC API supported by APPC Networking Services for Windows is the Client Access/400 for Windows 3.1 Communications Router API.

13.2 SNA over TCP/IP for Windows Overview

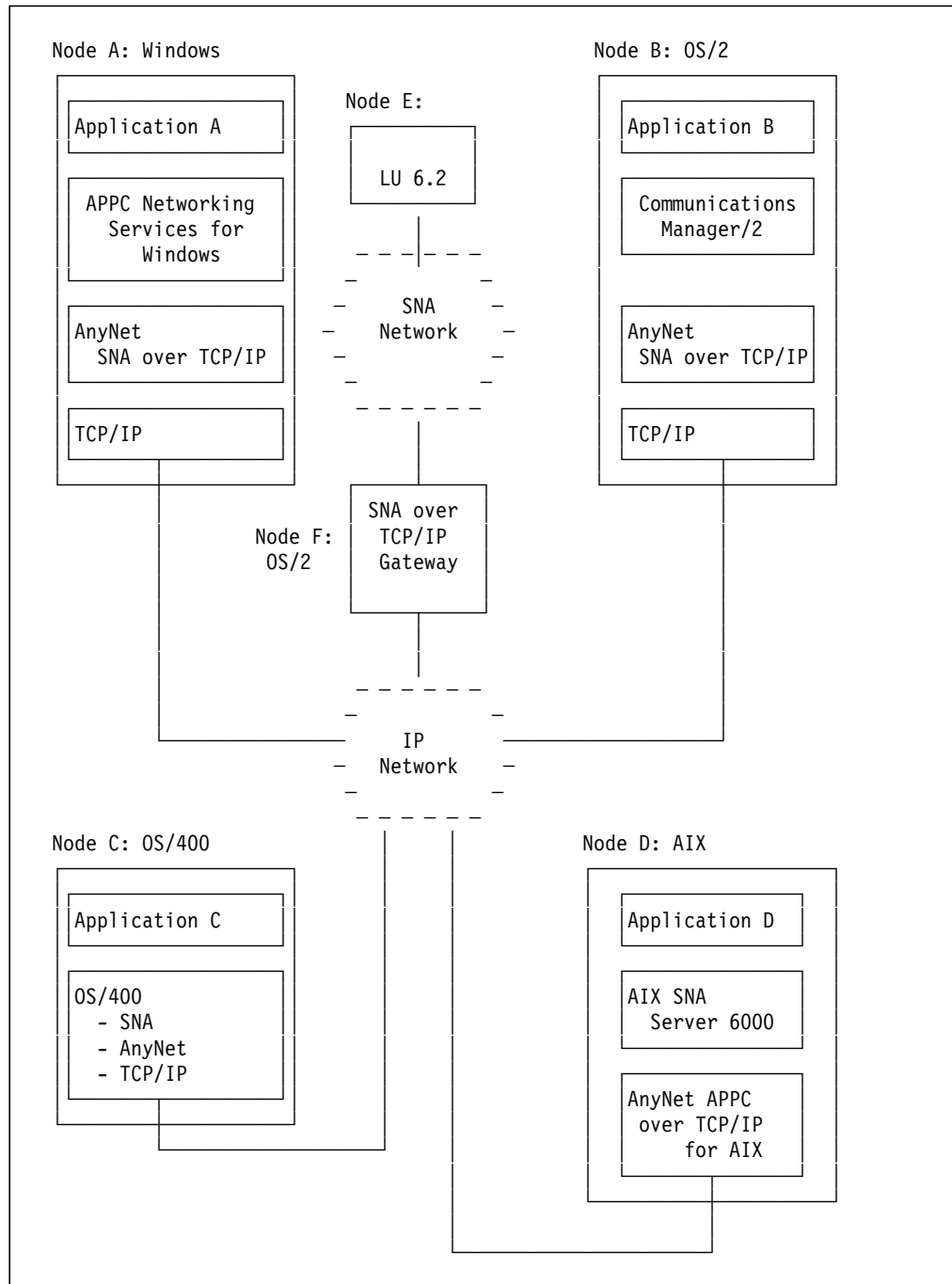


Figure 150. Configuration to Connect Windows, OS/2, OS/400, and AIX Nodes

Figure 150 shows how application A, running on a Windows node, communicates with applications running on nodes B, C, D, and E.

In this configuration, all applications are either APPC or CPI-C applications.

- Node A is running:
 - IBM APPC Networking Services for Windows
 - IBM AnyNet SNA over TCP/IP for Windows
 - IBM TCP/IP for DOS
- Node B is running:
 - Communications Manager/2
 - IBM AnyNet SNA over TCP/IP for OS/2
 - IBM TCP/IP for OS/2
- Node C is running OS/400, which includes the SNA, TCP/IP, and AnyNet components.
- Node D is running:
 - IBM SNA Server/6000
 - IBM AnyNet APPC over TCP/IP for AIX
- Node E has independent LU 6.2 applications running on any operating system that supports SNA (AIX, MVS, VM, OS/2, DOS, OS/400, for example).
- Node F is running SNA over TCP/IP Gateway for OS/2.

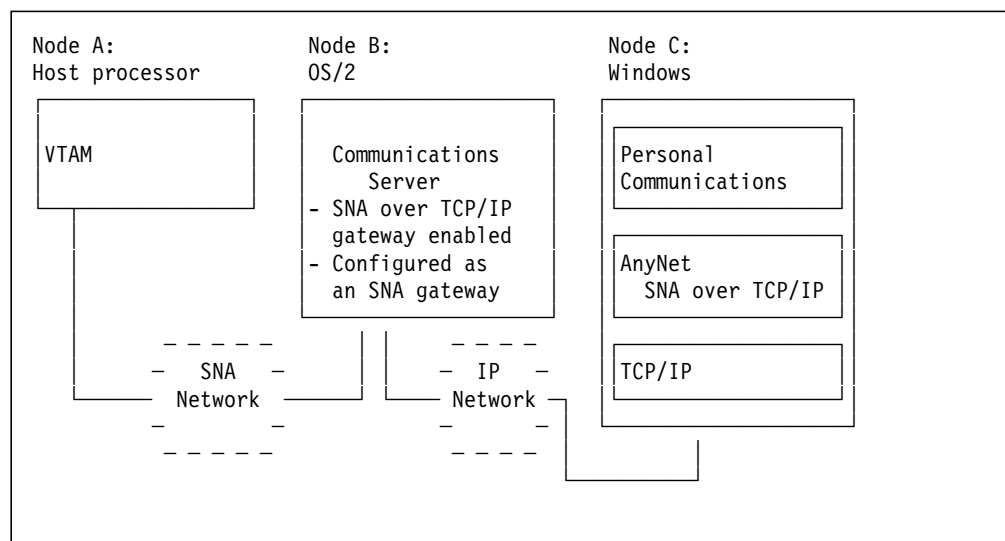


Figure 151. Configuration to Connect a Windows Downstream Workstation to a Subarea Network

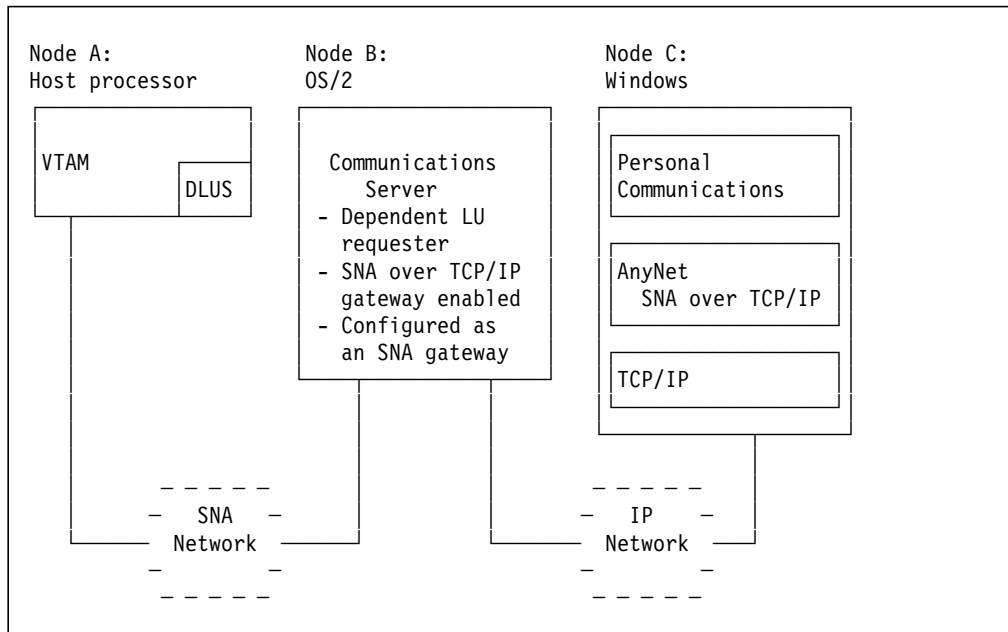


Figure 152. Configuration to Connect a Windows Downstream Workstation to an APPN Network

Figure 151 on page 239 shows a configuration that supports dependent LU communication for a downstream workstation using a subarea host.

- Node A is running VTAM.
- Node B is running Communications Server with the SNA over TCP/IP gateway function enabled. Node B is also configured as an SNA gateway.
- Node C, a 3270 emulator, is running:
 - IBM AnyNet SNA over TCP/IP for Windows
 - IBM Personal Communications for Windows
 - IBM TCP/IP for DOS

Figure 152 shows a configuration that supports dependent LU communication for a downstream workstation using an APPN host:

- Node A is running VTAM and is defined as a dependent LU server.
- Node B, is running Communications Server with the SNA over TCP/IP gateway function enabled. Node B is also configured as both a dependent LU requester and an SNA gateway.
- Node C, a 3270 emulator, is running the following:
 - IBM AnyNet SNA over TCP/IP for Windows
 - IBM Personal Communications for Windows
 - IBM TCP/IP for DOS

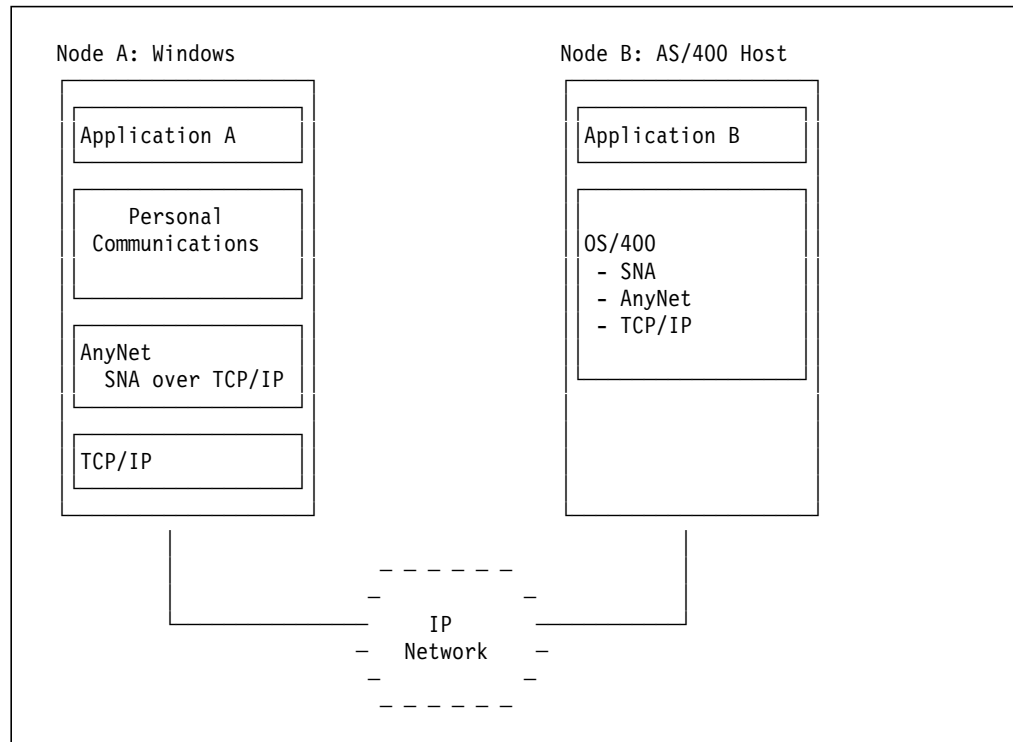


Figure 153. Configuration to Connect a Windows Workstation to an AS/400 Host

Figure 153 shows a configuration that provides terminal display and printer support for a Windows workstation using an AS/400 host:

- Node A, a 5250 emulator, is running:
 - IBM Personal Communications for Windows
 - IBM AnyNet PCOMM for OS/2
 - IBM TCP/IP for DOS
- Node B is an AS/400 host running OS/400. OS/400 includes the SNA, AnyNet, and TCP/IP components.

13.3 Hardware Requirements

For installation, a PC capable of running this product is required:

- 386SX, or compatible, processor
- 6MB RAM (8MB recommended)
- 2MB of fixed-disk drive space
- 3.5MB of additional fixed-disk drive space for Library Reader and documentation (optional)
- If installed from diskettes, a 3.5-inch diskette drive (high density)
- If installed from CD, a CD-ROM reader
- Any network adapter supported by TCP/IP

The product documentation and the Library Reader require additional disk space. Use the "Disk Space" push button during installation to determine whether there is adequate space on your hard disk to install the product documentation and the Library Reader.

13.4 Software Requirements

- Either of the following:
 - Microsoft Windows, Version 3.1, running in Enhanced Mode
 - Microsoft Windows for Workgroups, Version 3.1, running in Enhanced Mode
- One of the following TCP/IP products:
 - IBM TCP/IP for DOS, Version 2.1.1, with CSD UB10718
 - FTP PC/TCP Network Software for DOS/Windows, Version 3.0
 - FTP PC/TCP OnNet 1.1 for DOS/Windows (Windows VxD Kernel)
 - Microsoft TCP/IP 3.11a for Windows for Workgroups, Version 3.11
 - NetManage Chameleon TCP/IP for Windows, Version 4.5.1
 - Novell LAN WorkPlace for DOS, Version 5.0
- Additional software required is determined by the SNA transport user

There is a known problem using FTP PC/TCP Network Software for DOS/Windows in the CAWIN environment using Shared Folders. Rochester is working with FTP to get this resolved.

Our prior version AnyNet APPC over TCP/IP for windows stated support for Walker Richer Quinn (WRQ) TCP Connection for Windows, Version 4.01. We continue to have problems working with this TCP, but we are still trying to fix them. If we are able to resolve the problems, we will add WRQ's TCP Connection to the list of supported products.

Caution

AnyNet can only use only one SNA Transport user at a time. Select either APPC Networking Services or Personal Communications as the SNA transport user.

13.4.1 Software Requirements when using NSW

Software Requirements when NSW is the transport user:

- IBM APPC Networking Services for Windows, Version 1.0, with CSD IP20310
- If you connect to an:
 - AIX system running the APPC over TCP/IP AIX SNA Server/6000 AnyNet feature, Version 2.1.1
Apply PTF U435033 to the AIX system
 - AS/400 system running OS/400, Version 3.1
Apply APAR MA10996 to the AS/400 system

- MVS system running the VTAM 3.4.2 AnyNet/MVS APPC over TCP/IP feature
Apply PTF UW02865 to VTAM
- OS/2 system running AnyNet/2, Version 2.0
Apply APAR IC08464 to the OS/2 system

APPC Networking Services for Windows should be installed prior to installing AnyNet APPC over TCP/IP so the appropriate configuration changes can be made to the Networking Services configuration files.

13.4.2 Software Requirements when using PCOM

Software Requirements when PCOM is the transport user:

- IBM Personal Communications, Version 4.1 for Windows
- For 3270 support, Communications Server, Version 4.0

To enable 3270 support, you must have a host connection through a node that is running Communications Server with the following:

- The SNA over TCP/IP gateway function enabled.
- The node configured as an SNA gateway.

If the host connection is over an APPN network, the Communications Server node can also be defined as a dependent LU requester.

- For 5250 support, if the AS/400 system is running OS/400, Version 3.1
Apply APAR MA10996 to the AS/400 system

Note: For more information on configuring the Communications Server node, see the documentation listed in "Communications Server Publications."

13.5 How does SNA over TCP/IP work?

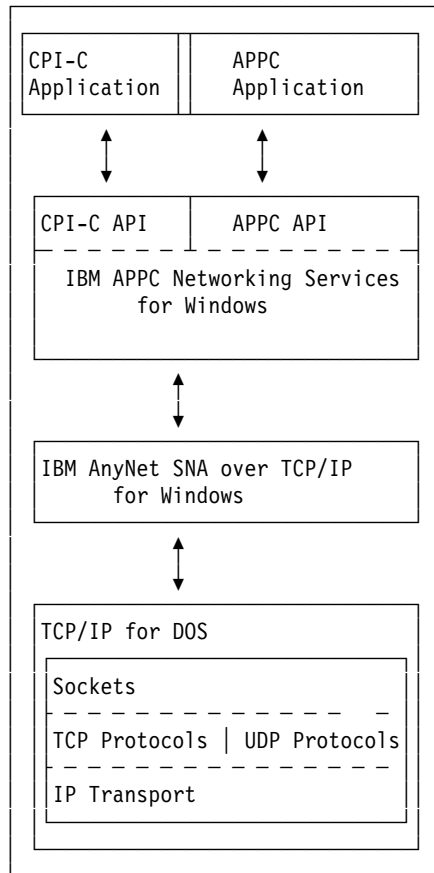


Figure 154. Structure of a Windows SNA over TCP/IP Node Running APPC Networking Services

An SNA over TCP/IP node can run only one SNA transport user at a time.

As illustrated in Figure 154, APPC or CPI-C applications use the APPC Networking Services for Windows application program interface (API) to initiate a session. Networking Services uses AnyNet APPC over TCP/IP for SNA path control.

Networking Services for Windows supports the following application program interfaces:

- CPI-C application program - For information on CPI-C APIs, see the CPI-C Reference.
- APPC application programs that use the Client Access/400 for Windows 3.1 Communications Router API - For information on APPC APIs, see the API and Technical Reference.

When Personal Communications initiates a session for an application program, AnyNet translates the SNA routing information into an IP address and uses the IP address to create a TCP connection to the appropriate system. The configuration information that you define enables AnyNet to determine the IP address associated with the SNA name. See the Planning chapter in the AnyNet SNA over TCP/IP documentation for additional information.

AnyNet uses both stream (TCP) and datagram (UDP) sockets that are bound to the well-known port (397). Any information received over this port is routed to AnyNet.

AnyNet APPC over TCP/IP for Windows uses the following support service provided by TCP/IP:

- Windows socket application program interface (API), Version 1.1
- Transmission Control Protocol (TCP) support
- User Datagram Protocol (UDP) support
- Internet Protocol (IP) support

The Windows socket application program interface, Version 1.1 is a standard industry wide interface. TCP/IP implementations supporting this interface will have a WINSOCK.DLL and should work with AnyNet. The API is commonly referred to as WINSOCK.

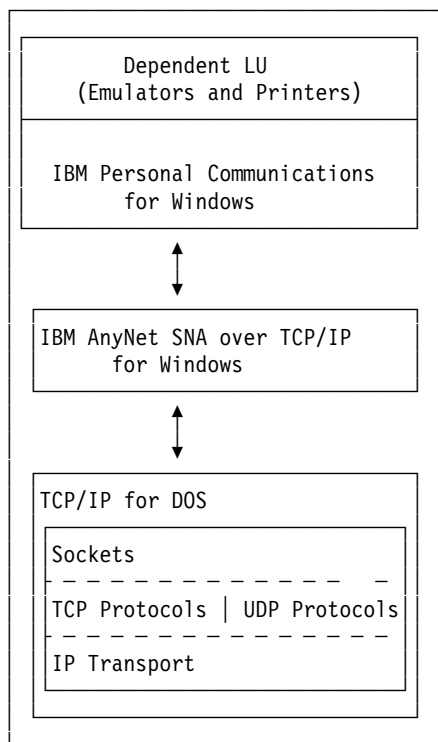


Figure 155. Structure of a Windows SNA over TCP/IP Node Running Personal Communications

An SNA over TCP/IP node can run only one SNA transport user at a time.

As illustrated in Figure 155, Dependent LUs, such as emulators and printer use Personal Communications for Windows to initiate a session. Personal Communications uses AnyNet APPC over TCP/IP for SNA path control.

When Personal Communications initiates a session for an application program, AnyNet translates the SNA routing information into an IP address and uses the IP address to create a TCP connection to the appropriate system. The configuration information that you define enables AnyNet to determine the IP address associated with the SNA name. See the Planning chapter in the AnyNet SNA over TCP/IP documentation for additional information.

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AnyNet APPC over TCP/IP for Windows uses the following support service provided by TCP/IP:

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- Internet Protocol (IP) support

The Windows socket application program interface, Version 1.1 is a standard industry wide interface. TCP/IP implementations supporting this interface will have a WINSOCK.DLL and should work with AnyNet. The API is commonly referred to as WINSOCK.

13.6 Installing AnyNet SNA over TCP/IP for Windows

This section describes how to install AnyNet SNA over TCP/IP for Windows.

- Installation can be done from:
 - Diskettes
 - CD
 - CID
- Install SNA transport user:
 - NSW must be installed before AnyNet
 - PCOM can be installed before or after AnyNet
- Delete prior version of APPC over TCP/IP

Note: CD Installation - The instructions for the CD installation will be provided in the package containing the product.

CID Installation

- The AnyNet CID Setup Tool allows creation of a response file that can be used for automating an install, restore, or delete of AnyNet from a code server.
 - Remote Network Administrator install
 - Individual install from code server

Caution

If you do not delete the prior version of APPC over TCP/IP for Windows, both APPC over TCP/IP and SNA over TCP/IP will appear in the list of "Installed Products" in the "View" menu bar option of the Anynet installation program.

If either product is later deleted using the Anynet installation program, the product files for both products are deleted. Therefore, it is recommended the prior version of APPC over TCP/IP be deleted before installing SNA over TCP/IP, Version 1.0.

The product files are the same for both products. If you install the SNA over TCP/IP with out deleting APPC over TCP/IP, the old files will be replaced by the new ones. Thus, only one copy of the product is actually installed. However, Software Installer has both products listed in the list of installed products. If the user selects delete either of those products, the one existing product will be deleted.

To delete from diskettes, Insert diskette labeled AnyNet Diskette 1 in the A: drive, and do one of the following.

- From the DOS prompt, type:
win a:\install
- In the Windows Program Manager
 1. Select "File" from the menu bar and choose "Run"
 2. Type a:\install
 3. Press the OK button
- In the "Installation and Maintenance" window, select the "View" menu bar option. Click on "installed Products" to view the AnyNet products that ar installed on your system.
- Select the APPC over TCP/IP product.
- Select the "action menu bar option. Click on "Delete" to remove the product files from your system.
- When the "delete" action is complete, shutdown and restart your system.

13.6.1 Installing AnyNet from diskettes

This section describes how to install AnyNet SNA over TCP/IP for Windows from diskettes.

1. To install from diskettes, Insert diskette labeled AnyNet Diskette 1 in the A: drive, and do one of the following.
 - From the DOS prompt, type:
win a:\install
 - In the Windows Program Manager
 - a. Select "File" from the menu bar and choose "Run"
 - b. Type a:\install
 - c. Press the OK button
2. Follow installation panel instructions to install product.

When installation is complete, there will be an AnyNet Program group with icons for the following:

- AnyNet Books (if selected for installation)
- AnyNet Configuration Tool
- Read Me

In the prior version, APPC over TCP/IP, an icon was added for the ABINFO Mapping Utility. This utility is only appropriate for NSW and not PCOM. Therefore, if the user is using NSW and would like to use the ABINFO Mapping Utility, information on adding the icon and using the utility can be found in the Troubleshooting chapter of the AnyNet SNA over TCP/IP documentation under "Troubleshooting Aids Provided by APPC Networking Services."

13.7 AnyNet Configuration

1. Select SNA Transport User
 - APPC Networking Services
 - Personal Communications
2. Change AnyNet environment variables:
 - SNA Domain Name Suffix
 - SNASUFFIX=SNA.IBM.COM
 - Connection Wait Time Limit
 - CONNWAIT_SECS=30
 - Connection Retry Duration
 - CONN_RETRY_SECS=300
 - Remote Node Inactivity Poll Interval
 - INACTIVITY_TIMER_SECS=60
 - Unacknowledged Datagram Retry Interval
 - UNACKED_DG_RETRY_SECS=30
 - Unsent Datagram Retry Interval
 - UNSENT_DG_RETRY_SECS=3

AnyNet configuration can be done:

- During installation
- By starting the AnyNet Configuration Tool

Use the AnyNet configuration tool to select either APPC Networking Service or Personal Communication as your SNA transport user. AnyNet can use only one SNA transport user at a time. By default, no SNA transport user is configured. However, SNA over TCP will not function until a SNA transport user is selected.

Environment settings are the values for the environment variables in your AUTOEXEC.BAT file. It is recommended that the only variable you change is the SNA Domain Name Suffix. The default settings for the other environment variables are adequate for most installations.

In order to use the least possible amount of low memory, the AnyNet environment setting which take the default will not be added to the AUTOEXEC.BAT.

- SNA Domain Name Suffix
 - The SNA domain name suffix is the name to be used when a domain name is created using the LU name and the network ID. For example, the domain name would be luname.netid.snasuffix.
- Connection Wait Time Limit
 - The maximum time AnyNet will wait for a connection setup response.
- Connection Retry Duration
 - The maximum time AnyNet will wait for connection setup while retrying multiple IP addresses associated with the LU name. This parameter will not be very useful in the Windows environment, because few LU names will be associated with multiple IP addresses.
- Remote Node Inactivity Poll Interval
 - The time at which keepalive datagrams start to be sent for an inactive connection.
- Unacknowledged Datagram Retry Interval
 - The time interval after which an unacknowledged datagram is re-sent. Datagrams are used for keepalive and to send expedited data.
- Unsent Datagram Retry Interval
 - Time interval after which an AnyNet will try to resend a datagram if TCP/IP was unable to send it.

Times are in seconds.

13.7.1 AnyNet Configuration Changes

- AUTOEXEC.BAT
 - ANYNETPATH=c:\anynet
 - c:\anynet\BIN is appended to the path statement
 - Configured Environment Settings added
 - SYSTEM.INI
 - In 386Enh section, add
DEVICE=c:\anynet\BIN\ANYVXD.386
 - ANYNET.CFN
 - If NSW is selected as SNA Transport User,
ANYNET.CFN will be the same as ANYNET.NSW
 - If PCOM is selected as SNA Transport User,
ANYNET.CFN will be the same as ANYNET.PCS
1. AUTOEXEC.BAT: In Windows, you will find things in the AUTOEXEC.BAT file that you would normally find in the CONFIG.SYS file for OS/2.
 2. PATH: The path for the executable is added to the end of the existing path statement. The path in DOS is limited to 128 characters, and will be

truncated if it is longer. If this happens, a pop-up will be displayed when starting the SNA transport user.

- File Error Cannot find "filename.ext"

To resolve this problem, the path should be modified so that the c:\anynet\BIN directory will fit.

When NSW is installed, the NSW path is added to the front of the path statement. This may cause existing applications to no longer work, and that is why AnyNet appends to the end.

3. Memory Considerations: Windows loads all environment variables in the "low memory" (ie, below 1M), and this memory is very constrained.

If the customer is low memory constrained, they may be able to free some of the memory by making some of their device drivers DEVICEHIGH in their CONFIG.SYS. Refer to Windows documentation for more information on relieving low memory constraints.

4. AnyNet can use only one SNA transport user at a time. The AnyNet Configuration Tool should be run if you want to switch between the SNA Transport Users.

13.8 NSW Configuration

- AnyNet Configuration makes the following changes to NSW configuration files:
 - NSD.INI
 - In Configuration section, change
DLCTYPE=MPTN
 - In Configuration section, add
EHNAPPCNonblocking=TRUE
 - Add MPTN section with
MPLD=ANYLINK
 - NSTRACE.CFG
 - Add line pointing to the ANYTRACE.CFG in the MISC directory
- The LOCALLUNAME must be defined to NSW:
 - Select "Configuration" from the "IBM APPC Networking Services" Program group. Select "Step 1" and enter the fully qualified local LU name in the format netid.luname.
 - Or, in the Configuration section of the NSD.INI file, add:
LOCALLUNAME=netid.luname

When Running NSW:

- Switching between Native and Non-Native: Unlike the other AnyNet products, the windows user cannot switch between running non-native and native dynamically. If switching from running native SNA to non-native TCP/IP, do the following:
 1. Change Connection Type in "Step 1" of the Networking Services Configuration panel to "Multiprotocol Transport Networking (MPTN)."

Changing the connection type would automatically change the DLCTYPE=MPTN in the NSD.INI file. This may also be changed manually.

2. Change Link Name in "Step 2" of the Networking Services Configuration panel to ANYLINK.

This will automatically set MLPD=ANYLINK in the NSD.INI file. This may also be changed manually.

3. Manually add EHNAPPCNonblocking=TRUE in the configuration section of the NSD.INI file.
4. Manually add a line pointing to the ANYTRACE.CFG in the MISC directory

If switching from running non-native TCP/IP to native SNA, do the following:

1. Change Connection Type in "Step 1" of the Networking Services Configuration panel to the preferred connection type.
 2. Change Link Name in "Step 2" of the Networking Services Configuration panel to the appropriate link name.
 3. Manually change EHNAPPCNonblocking=FALSE in the configuration section of the NSD.INI file.
- Delete and Install or Update: If AnyNet is already installed, and the user DELETES and re-INSTALLS NSW, then they will need to make the listed changes to the NSD.INI file and the NSTRACE.CFG. However, if they select to UPDATE, then all the AnyNet configuration changes will be kept.

Caution

Client Access/400 has its own installation so the NSW program group and configuration panels will not be available. The CAWIN install will change all the appropriate NSW configuration parameters except for the EHNAPPCNonblocking parameter. It will always be FALSE. The default is false, so if it is not in the NSD.INI, it is FALSE.

13.9 PCOM Configuration

1. Double-click on the "Start/Configure Session" icon in the Personal Communications folder.
2. For Anynet, select the following configuration options:
 - PC
 - LAN
 - TCP/IP Anynet
 - S/390 (3270 session) **or** AS/400 (5250 session)
3. Click on the "Configure..." push button. The "Customize Communication" window is displayed.
 - **To configure a 3270 session:**
 - a. In the "Link Parameters" section, click on the "Configure Link" push button. The "AnyNet" window is displayed.
 - b. Enter the following values:

IBM TCP/IP recommends FILES=50

2. Verify sufficient TCP and UDP sockets available

Recommended ≥ 10

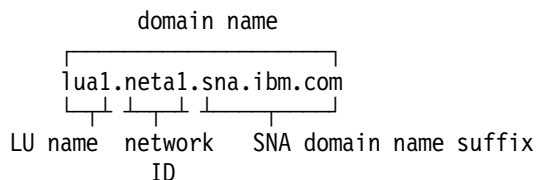
3. mtu size

Recommended $> 8K$

- Sockets are files. If there are not enough files, then TCP/IP will have various socket failures depending on when it runs out of files. The FILES parameter in the CONFIG.SYS should always be at least what the TCP/IP recommends.
- Some of the TCP/IPs have low socket limits which will cause AnyNet to have socket failures when trying to set up connections. Check the appropriate TCP/IP documentation to verify the number of sockets for TCP and UDP connections are sufficient.
- AnyNet performance will be poor if the mtu size for TCP/IP is too low. AnyNet will send buffers as large as the maximum RU size up to 8K. If the mtu size is significantly lower, then the packets must be broken down by TCP/IP before they can be sent. This will cause significant performance degradation. Note that the mtu size on the receiving side may also have to be tuned.

13.11 How a Destination LU Gets an IP Address

1. AnyNet receives the SNA LU name in the format netid.luname.
2. AnyNet takes the LU name (netid.luname) and generates a domain name in the format luname.netid.snasuffix.



The domain name must be added to the HOSTS file or DNS. For example, add the following to the HOSTS file:

```
9.10.11.1 lua1.neta1.sna.ibm.com
```

3. AnyNet requests that the domain name be translated into an IP address.
4. TCP/IP uses the HOSTS file or the domain name server to translate the domain name into an IP address (for example, 9.10.11.1).

Incorrectly defining the destination host name has been the second most frequently reported customer problem.

One problem occurs because the customer does not notice the netid.luname are reversed from what is known to SNA and what is known to TCP/IP. The SNA LU name is:

```
neta1.lua1
```

and the TCP/IP domain name is:

lu1.neta1.snasuffix

13.12 Sample NSW Configuration

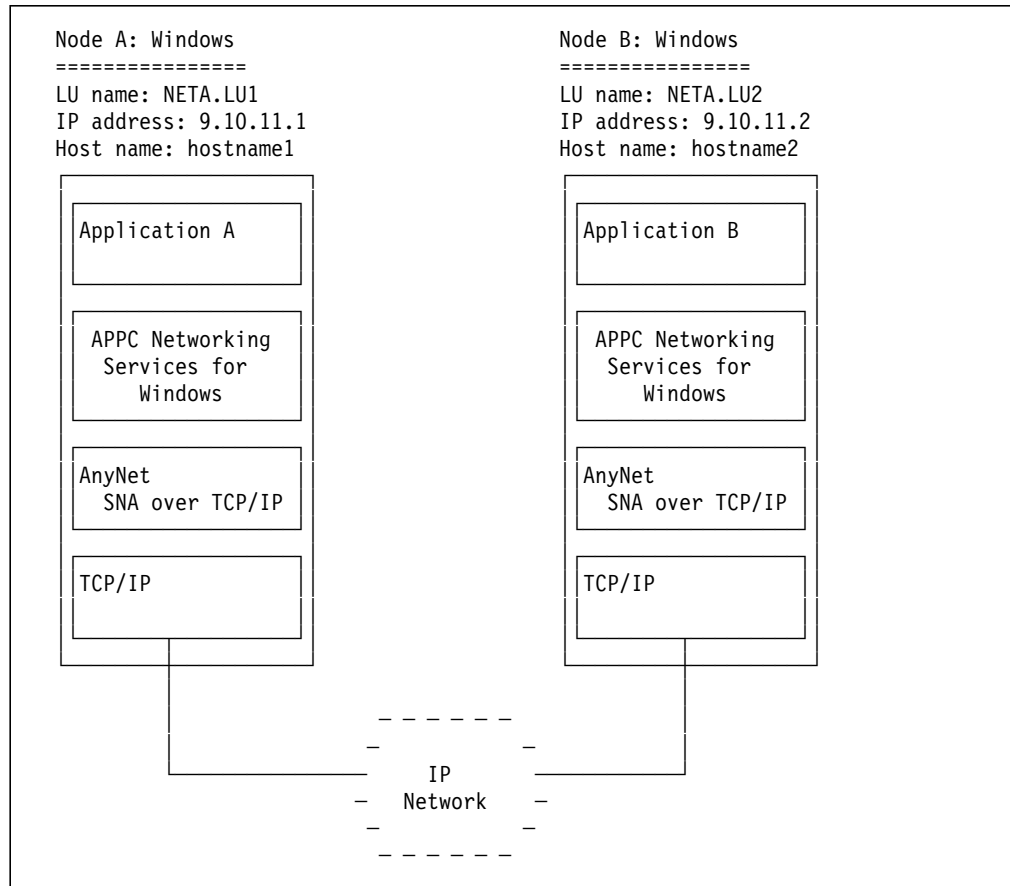


Figure 156. Address Assignments for Establishing Communication between Two Windows Nodes Running APPC or CPI-C Applications

In this example, use the following:

Node	A	B
Local LU name	NETA.LU1	NETA.LU2
Host name	hostname1	hostname2
IP address	9.10.11.1	9.10.11.2

1. Edit the TCP/IP HOSTS file as follows:

- Node A:
9.10.11.1 hostname1
9.10.11.2 LU2.NETA.SNA.IBM.COM
- Node B:
9.10.11.2 hostname2
9.10.11.1 LU1.NETA.SNA.IBM.COM

2. The NSW configuration should have the following:

- Node A:
fully qualified local LU name: NETA.LU1
 - Node B:
fully qualified local LU name: NETA.LU2
3. The NSD.INI file will then have the following:
- Node A: under [Configuration]
LOCALLUNAME=NETA.LU1
 - Node B: under [Configuration]
LOCALLUNAME=NETA.LU2

13.13 Sample 5250 Emulation

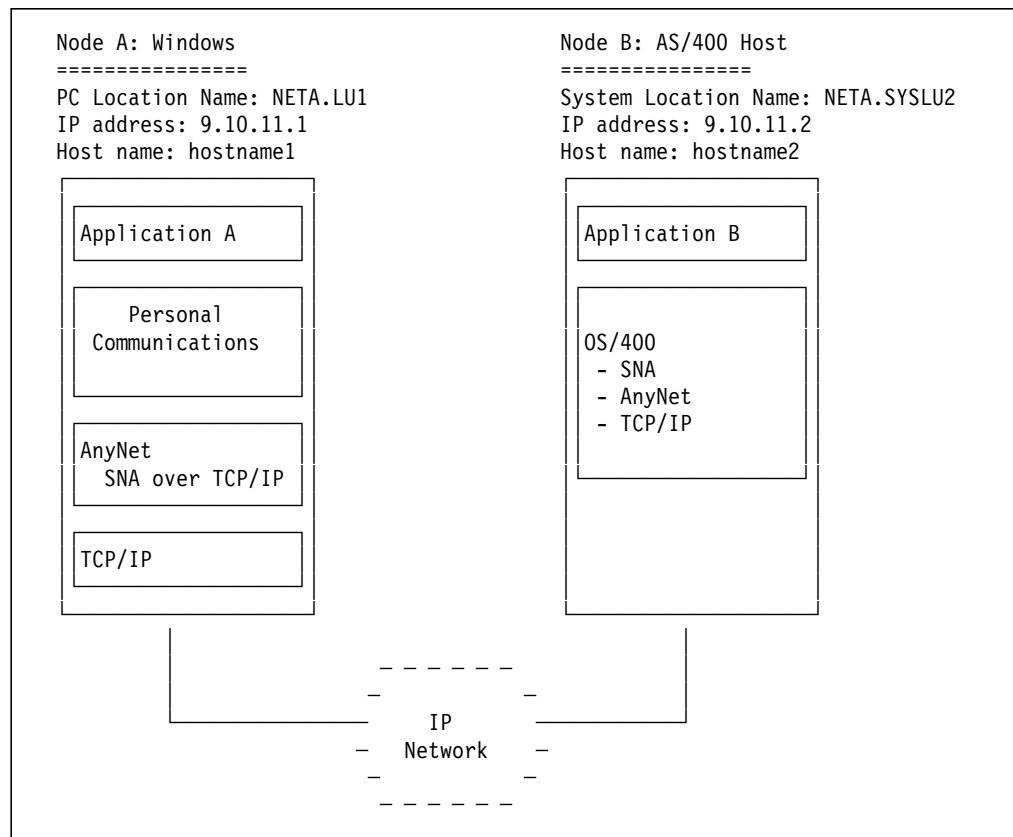


Figure 157. Communications to an AS/400 Host

In this example, use the following:

Node	A	B
PC Location Name	NETA.LU1	
System Location Name		NETA.SYSLU2
Host name	hostname1	hostname2
IP address	9.10.11.1	9.10.11.2

1. Edit the TCP/IP HOSTS file as follows:
 - Node A:

- 9.10.11.1 hostname1
 - 9.10.11.2 SYSLU2.NETA.SNA.IBM.COM
 - Node B:
 - 9.10.11.1 LU1.NETA.SNA.IBM.COM
2. The Node A: PCOM configuration should have:
- System Location Name: NETA.SYSLU1
PC Location Name: NETA.LU1
3. The *.WS file Node A: will then have following:
- [5250]
 - PartnerLU=NETA1.SYSLU2
 - LocalLu=NETA1.LU1
 - [AnyNet]
 - CPName=NETA1.LU1

13.14 Sample 3270 Emulation

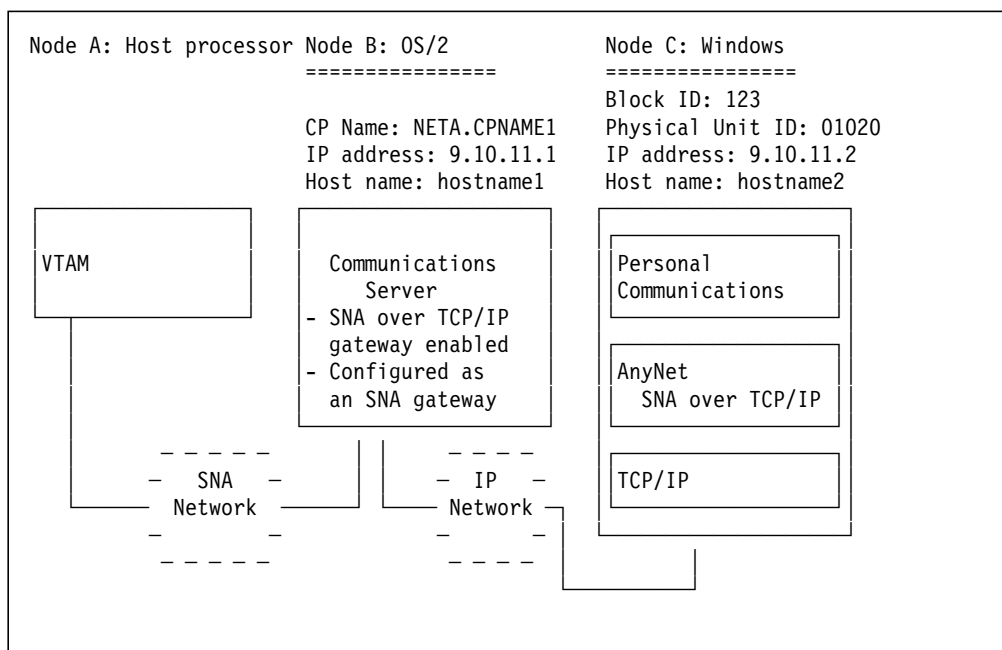


Figure 158. Communications to VTAM through Communications Server

In this example, use the following:

Node	B	C
Block ID		123
Physical Unit ID		01020
Local CP Name	NETA.CPNAME1	
Host name	hostname1	hostname2
IP address	9.10.11.1	9.10.11.2

1. Edit the TCP/IP HOSTS file as follows:
 - Node B:

9.10.11.2 12301020.sna.ibm.com

- Node C:

9.10.11.2 hostname2

9.10.11.1 CPNAME1.NETA.SNA.IBM.COM

2. The Node C: PCOM configuration should have:

Block ID: 123

Physical Unit ID: 01020

OS/2 Gateway Name: NETA.CPNAME1

3. The *.WS file on Node C: will then have the following:

- [AnyNet]

GateWayName=NETA.CPNAME1

Identifier=12301020

13.15 Starting AnyNet from NSW

- Ensure TCP/IP is started.
- Start APPC Networking Services:
 - Click on the "Autostart Networking Services" icon in the "IBM APPC Networking Services" window
 - In the "IBM APPC Networking Services" window
 1. Click on the "Advanced Operation" icon.
 2. Selection "Operation" on the menu bar and click on the "LU Control" option.
 3. Click on "Initialize LU".

AnyNet is active when the Networking Services LU is initialized.

Note: AnyNet will not initialize if TCP/IP is not started.

Some TCP/IP products will need to be started before Windows is started and some will have to be started after Windows is started. The user would need to refer to the documentation for his TCP/IP to determine how to start TCP/IP. IBM TCP/IP should be started before Windows is started.

If using IBM TCP/IP and TCP/IP is not started, a pop-up will be shown indicating that INET is not running. If this pop-up is displayed, the hourglass may not go away or the mouse may no longer be useful. However, the system is not hung. The user may be able to simply hit enter to clear the pop-up. This is a known NSW problem. If this occurs, the user should exit Windows, reboot, start TCP/IP, and then start NSW.

If using an OEM TCP/IP, the messages indicating TCP/IP is not started will differ. Refer to the product documentation for messages.

If there are initialization problems, NSW displays a pop-up window and issues message 5239. Check the message log to determine the cause of the failure.

13.16 Starting AnyNet from PCOM

- Ensure TCP/IP is started.
- Double-click on a PCOM workstation profile icon
- *Or*, create a workstation profile
 1. Double-click on "Start/Configure Session," select
 - PC
 - LAN
 - TCP/IP Anynet
 - S/390(3270 session) or AS/400(5250 session)
 2. Click on Configure
 - 3270 Emulation: select "Configure Link", enter:
 - Block ID
 - Physical Unit ID
 - OS/2 Gateway Name
 - 5250 Emulation: enter "Session Parameters":
 - System Location Name
 - PC Location Name
 3. Click on "OK" to save profile.

13.17 Client Access/400 for Windows 3.1

- AnyNet APPC/IP included in the Windows 3.1 client.
- Install is provided by Rochester.
- Code installed in directories under CAWIN directory.
- Informational APAR II08755 includes the latest PTF information.
- Trace Utility is not installed with base Client Access/400.
- In NSD.INI file, EHNAPPCNonblocking must be set to FALSE.

Note: The NSDTRACE tool can be found on QIWSTOOL on the AS/400.

- Create a shared folder
- CD to QDLS/QIWSTOOL
- Type IWSTOOL. This will bring a list of tools to download.
- Choose NSDTRACE

The trace must go into the CAWIN directory. When you create an icon for NSTRACE.EXE, the AnyNet option in the top pulldown menu should already be there.

13.18 Differences

The major functional differences in the AnyNet SNA over TCP/IP for Windows and other AnyNet workstation products are:

- Local hostname must be in the HOSTS or domain name server
- LULIST does not exist
 - NSW will only allow one DLC to be loaded at a time so the user cannot use a native connection if non-native fails and vice versa.
 - To switch between native and non-native, the user must terminate the LU, reconfigure, and re-initialize
- ABINFO exists only for NSW and is started from an icon

Appendix A. Communications Trace Facility

The trace facility, included in PC/3270 V4.1 for DOS (Full-Function Mode), for Windows or OS/2, provides a valuable tool for IBM and user problem determination.

When a problem is suspected with PC/3270 V4.1, IBM may request that you supply trace documentation to enable the product developers to analyze and identify the source of the problem.

Although some of the information contained in a trace is necessarily complex, the trace information can often help users in resolving their problems, especially those occurring when testing new configurations and environments.

When trace is implemented, it logs communication trace events into a table in *memory*. The size of the table is a maximum of 64 KB; the actual size is determined by the user at PC/3270 V4.1 startup time. If the trace table becomes full, it automatically wraps around and, therefore, will overwrite the earlier entries in the table. All entries in the trace table are time-stamped so that you can locate the desired time period for your analysis.

The trace can be viewed dynamically while the emulator is running by invoking the PCSMON monitor utility. Alternatively, the output from PCSMON can be redirected to disk or printed.

The trace facility is written at the DLC level. For a network station, the user is able to track link startup and basic SNA flows inbound and outbound from the host or gateway. For the PC/3270 V4.1 gateway, on the other hand, communication flows upstream and downstream. This means that the user needs to track communication events in both directions; the trace facility is able to track all flows into and out of the gateway.

The trace facility is available for all DLC configurations supported by PC/3270 V4.1, with the exception of the following conditions:

- All PC/3270 for DOS (Entry-Level Mode) configurations (Home3270 and CUT)
- Auto3270 quick start mode for DOS (Full-Function Mode)

Support for tracing of Home3270 for Windows or OS/2 is newly added in Personal Communications Version 3.1.

A.1 Interpreting the Trace

This section is covered in Appendix A of the ITSO redbook *Personal Communications Version 4.x Interoperability and Problem Determination*, GG24-4457-00.

Abbreviations

ABBREVIATION	MEANING	FFT	Final-Form-Text
ACTLU	activate logical unit	FOS	front of screen
ACTPU	activate physical unit	HMA	high memory area
AID	attention identifier	IDP	interchange document profile
APA	all points addressable	IEEE	Institute of Electrical and Electronics Engineers
ANSI	American National Standard Institute	ISDN	integrated services digital network
API	application programming interface	ITSO	International Technical Support Organization
ARP	Address Resolution Protocol	KB	kilobyte
ASCII	American Standard Code for Information Interchange	LAA	locally administered address
ASYNCH	asynchronous	LAN	local area network
BIOS	Basic Input/Output System	LIM	Lotus-Intel-Microsoft
bps	bits per second	LLLAPI	low-level language API
BSC	bisynchronous	LOCADDR	local address
CU	control unit	LSP	LAN Support Program
CUT	control unit terminal	LU	logical unit
DACTLU	deactivate logical unit	MAC	medium access control
DDE	dynamic data exchange	MACADDR	medium access control address
DFT	distributed function terminal	MB	megabyte
DIA	Document Interchange Architecture	NCP	network control program
DISOSS	Distributed Office Support System	NDIS	network device interface specification
DLC	data link control	NIF	network information file
DLOGMOD	default logmode	NMVT	network management vector transport
DSAP	destination service access point	NRZI	non-return to zero inverted
DSC	data stream compatible	NTRI	NCP token-ring interconnection
DSPU	downstream PU	NTS	network transport services
ECF	enhanced connectivity facilities	OIA	operator information area
EHLLAPI	emulator high-level language API	PC	personal computer
EMM	Expanded Memory Manager	PC/3270	Personal Communications/3270
EMS	Expanded Memory Specifications	PCLP	PC LAN Program
ES	extra SAPs	PDF	printer definition file
EST	extra stations	PDT	printer definition table
EVPD	extended vital product data	PIU	path information unit
FDDI	fiber distributed data interface	PROFS	Professional Office System
		PS/2	Personal System/2
		PTC	printer table compiler

PU	physical unit	SVC	switched virtual circuit
PUID	physical unit ID	TIC	token-ring interface coupler
PVC	permanent virtual circuit	TSR	terminate-and-stay-resident
RAM	random access memory	T2.0	type 2.0
RTM	response time monitor	T2.1	type 2.1
RU	request unit	UAA	universally administered address
SAP	service access point	UDD	user definable data
SCS	SNA character string	UMB	upper memory block
SDLC	synchronous data link control	VPD	vital product data
SDDL	self-defining dependent LU	VTAM	Virtual Telecommunications Access Method
SNA	Systems Network Architecture	WPCSP	3174 Workstation Peer Communication Support Program
SRPI	server-requester programming interface	XID	exchange identification
SSAP	source service access point	XMA	expanded memory adapter
SSCP	systems services control point		

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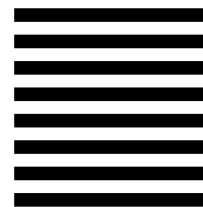
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