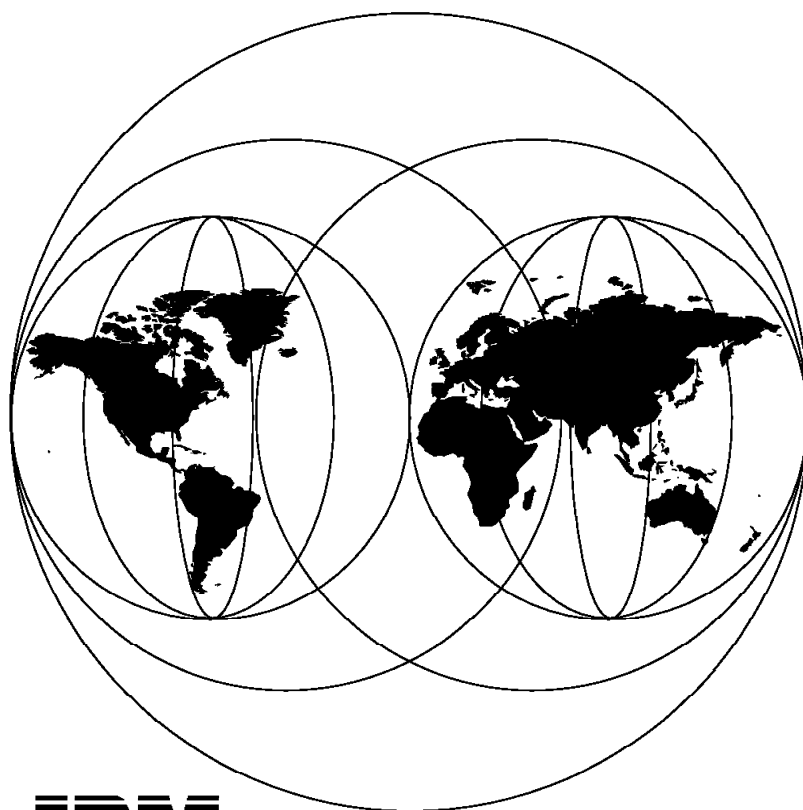


**Personal Communications for the Mobile Users  
DOS, Windows 3.1, and OS/2**

September 1996



**IBM**

**International Technical Support Organization  
Raleigh Center**





International Technical Support Organization

SG24-4456-00

**Personal Communications for the Mobile Users  
DOS, Windows 3.1, and OS/2**

September 1996

**Take Note!**

Before using this information and the product it supports, be sure to read the general information in Appendix D, "Special Notices" on page 387.

**First Edition (September 1996)**

This edition applies to Personal Communications Version 4.1 family of products for use with the IBM Operating System/2 (OS/2) or IBM Disk Operating System (DOS) environment.

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## Preface

This redbook describes how to customize and use Personal Communications for 3270 or 5250 host-system communications, and provides information about all the relevant connection options. It includes guidance on remote access to host systems via asynchronous and synchronous communications, and describes the use of Personal Communications in combination with LAN Distance and in a Wireless LAN environment. Definitions are included for related products, such as CM/2, 3174 Asynchronous Emulation Adapter, and the 8235 Dial-In Access to LANs (DIALs) Server.

This redbook is intended for mobile users of Personal Communications for DOS, Windows 3.1 or OS/2, and for administration and service personnel who have to set up Personal Communications family for use in a mobile environment.

This book is part of a series of three ITSO redbooks about Personal Communications family. It does not attempt to describe every feature of PCOMM, nor does it describe PCOMM's LAN or WAN capability (unless this is pertinent to a mobile connection). These subjects are covered in the following redbooks:

- *Personal Communications Version 4.1 Implementation Guide*, SG24-4681, which fully describes the Personal Communications family functions, requirements, compatibility and limitations. It includes guidance on installation and customization, and describes the use of many features, such as data and file transfer, printing or the trace facility.
- *Personal Communications for the LAN/WAN User - DOS, Windows and OS/2*, SG24-4688, which includes guidance on local LAN and WAN access to host systems. It describes customization of Coax, Twinax, and LAN connections, the non-switched SDLC and X.25 WAN connections and the PCOMM Gateway capability. This book will be available in 4Q96.

All these books should be used as a supplement to the product documentation, and assume a working knowledge of 3270 or 5250 workstation-to-host communications and of the OS/2, DOS or Windows environments.

This book does not include information about Personal Communications for Windows 95. That is dealt with in a separate book, *Personal Communications Version 4.1 for Windows 95 Implementation Guide*, SG24-4689.

**Note:** In many cases, Personal Communications will be referred to as PCOMM for the sake of brevity. Similarly, the 3270 emulator will be referred to as PC/3270, and the 5250 emulator as PC400.

---

## How This Redbook Is Organized

This redbook is organized as follows:

- Part 1, "Product Overview"

The first part of the book provides an introduction to the IBM Personal Communications family, describes the features that are new in Version 4.1, lists the connection types available, and gives brief details about installation and customization.

- Part 2, “Native Connections”

Part 2 describes the “native” connections that you can make with PCOMM in a mobile environment - those that do not need other products.

- Part 3, “Non-Native Connections”

The third part describes some “non-native” connections that you can make by using PCOMM with other IBM products.

- Part 4, “Appendixes”

The last part of the book provides information about communications terminology, a tutorial on communications, and a description of the Hayes AT Command Set, which is used to control modems.

---

## The Team That Wrote This Redbook

This redbook was produced by a team of specialists from around the world working at the Systems Management and Networking ITSO, Raleigh Center.

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Julian Over  
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Thanks to the following people for the invaluable advice and guidance provided in the production of this document:

Eamon Murphy  
Fergus Stewart  
International Technical Support Organization, Raleigh Center



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## Comments Welcome

We want our redbooks to be as helpful as possible. Should you have any comments about this or other redbooks, please send us a note at the following address:

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**Your comments are important to us!**



---

## Part 1. Product Overview

The first part of the book provides an introduction to the Personal Communications family and explains briefly how to install and customize the products.

- 1.1, "Personal Communications/3270 Version 4.1 (PC/3270)"
- 1.2, "Personal Communications AS/400 Version 4.1 (PC400)"
- 2.1, "Install PC/3270 for DOS (Entry-Level Mode)"
- 2.2, "Install PC/3270 for DOS (Full-Function Mode)"
- 2.3, "Install PCOMM for Windows"
- 2.4, "Install PCOMM for OS/2"
- 2.5, "Customize PCOMM for OS/2 and for Windows"



---

## Chapter 1. Personal Communications Version 4.1 Family Overview

The IBM Personal Communications (PCOMM) Version 4.1 family provides powerful client communications on all major PC operating systems. It offers 3270 and 5250 display and printer emulation and SNA-based client support for PCs running DOS (3270 only), Windows 3.1x, OS/2, and Windows 95. Personal Communications v4.1 for Windows 95 also provides 3270 and 5250 terminal emulation for Windows NT workstations.

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, which apply to the products for all operating systems. There are also PC400-only and combined CD-ROMs; apart from PCOMM itself, these include all the publications, overviews of PCOMM and other things.

The emulators provide many powerful, simple-to-use features, such as macros, keystroke record and playback, iconic toolbar (now customizable), Dynamic Data Exchange (DDE), and enhanced clipboard editing. PCOMM has the same look and feel whichever operating system you are using, and whether you are using 3270 or 5250 emulation. A greater flexibility is offered to OS/2 users by the inclusion of the OS/2 Access Feature.

In Version 4.1, there are several new connection types, APIs and other functions; these are listed in tables later in this chapter and are described if they are related to mobile communications. Full details are published in the ITSO redbook *Personal Communications Version 4.1 Implementation Guide*, SG24-4681.

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 three versions of the respective product.

---

## 1.1 Personal Communications/3270 Version 4.1 (PC/3270)

The 3270 members of the PCOMM family, collectively known as PC/3270, are as follows:

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

PC/3270 Entry DOS provides 3270-display emulation under DOS, with Control Unit Terminal (CUT) coax and Home3270 asynchronous dial-up connections. It includes the EHLLAPI and a keyboard-remap utility. Entry DOS needs only about 41 Kb of memory for a Home3270 session.

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

PC/3270 FF-DOS provides 3270 display and printer emulation under DOS, and also a 3270 gateway. It offers many different types of host connection, several APIs and a number of utilities.

**Note:** Entry and FF DOS are included in the Personal Communications AS/400 and 3270 Version 4.1 for Windows package.

### **Personal Communications/3270 for Windows**

PC/3270 for Windows provides 3270 display and printer emulation, as well as several utilities and administration tools. It offers many different types of host connection and is a native Microsoft Windows 3.1 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 for Windows 95**

PC/3270 for Windows 95 is a 32-bit application that runs on Windows 95 or Windows NT; it provides 3270 display and printer emulation, several utilities, and a number of programming interfaces, including APPC and CPI-C. It offers many types of host connection and operates as a SNA End-Node and includes support for HPR and DLUR. PC/3270 is part of Personal Communications AS/400 and 3270 Version 4.1 for Windows 95

### **Personal Communications/3270 for OS/2**

PC/3270 for OS/2 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).

## 1.1.1 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. Features of PCOMM for Windows 95 are included for comparison.

<i>Table 1 (Page 1 of 2). Enhancements and Features of PC/3270 V4.1</i>					
<b>Function</b>	<b>Version</b>	<b>DOS</b>	<b>WIN31</b>	<b>WIN95</b>	<b>OS/2</b>
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
Async performance enhancement (VCD)			X		
Autodial usability improvements		X	X	X	X
Idle timeout option (async and SDLC)			X	X	X
Additional modem support		X	X	(*4)	X
APPC3270 through APPN networks			X	X	(X)
APPN LEN/End node (APPC and CPI-C API)		(*1)	(*2)	X	(*3)
Dependent LU Requester (DLUR)				X	(*3)
High Performance Routing (HPR)				X	(*3)
SNA over TCP/IP (AnyNet)			X		(*3)
NetWare for SAA - for server & service names		X	X	X	X
TN3270E (LU1/LU3 host print, etc., over TCP/IP)			X	X	X
CM MOUSE automation utility		X	X	X	(X)
Toolbar pop-up description			X	X	X
Toolbar customization				X	X
Online publications				X	X
Printer Form-Feed options increased			X	X	X
Improved Drag-and-Drop GUI				X	X
32- and 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

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

### 1.1.2 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 - LU1 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 connections shown in the following table:

<i>Table 2 (Page 1 of 2). PC/3270 V4.1 Connections to S/390</i>					
<b>PC/3270 V4.1 to 3270 Host System</b>		<b>DOS Version</b>	<b>WIN31 Version</b>	<b>WIN95 Version</b>	<b>OS/2 Version</b>
<b>Interface</b>	<b>Attachment</b>				
<b>COM port</b>	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	(*4)



Table 2 (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				
<b>SDLC</b>	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	(*4)
<b>LAN</b> Token-Ring Ethernet FDDI ATM 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 (*6)	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
	DLUR			X	(*4)
	MS SNA Client (FMI) (*6)		X	X	
	MS SNA Client (LUA) (*1 *6)			X	
	MS SNA Client (APPC) (*1 *6)			X	
<b>Coaxial</b>	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
<b>Twinaxial</b>	3270 Passthrough via AS/400		X	X	X
	DLUR			X	(*4)
<b>SNA CM/2 or OS/2 AF</b>	LUA3270 via SNA Network (LU 0,1,2,3)				X
	APPC3270 via SNA Network (LU 6.2)				X
<b>X.25</b>	X.25 Co-Processor	X G			(*4)
<b>Frame Relay</b>	Wide Area Connector (WAC)				(*5)
<b>ISDN</b>	ISDN Co-Processor Card	X			(*4)
	WaveRunner ISDN				(*4)
<b>Notes:</b>					
<p>(G) 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 or CM/2 (except DLUR)</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>					

## 1.2 Personal Communications AS/400 Version 4.1 (PC400)

The 5250 members of the PCOMM family, collectively known as *PC400*, are described briefly below; all have support for Data Transfer, Text Assist and PC Organizer, and provide several administration tools.

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

### Personal Communications AS/400 for Windows

PC400 for Windows provides Windows-based 5250 terminal emulation

under Microsoft Windows 3.1 or Windows for Workgroups V3.11, and lets you connect to AS/400, System/36 or System/38 computers. AS/400 Utilities, ODBC drivers and Database Access are new features in Version 4.1. 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 CPI-C programming interfaces.

### Personal Communications AS/400 for Windows 95

PC400 for Windows 95 is a 32-bit application that runs on Windows 95 or Windows NT and provides 5250 display and printer emulation, several utilities, and a number of programming interfaces, including APPC and CPI-C. It offers many types of host connection, operates as an SNA end node, and includes HPR in an APPN network. It lets you connect only to AS/400s.

### Personal Communications AS/400 for OS/2

PC400 for OS/2 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. You can connect to AS/400, System/36 or System/38 computers. PC400 can run on top of the OS/2 Access Feature, which provides SNA End-Node, AnyNet, and HPR support, and is included in the packages.

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

### 1.2.1 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. Features of PCOMM for Windows 95 are included for comparison.

Function	Version	WIN31	WIN95	OS/2
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
System/3X attachment (Twinax only)		X		X
Virtual Printer		X		
PCS/400 Router API		X		

<i>Table 3 (Page 2 of 2). Enhancements and Features of PC400 V4.1</i>				
<b>Function</b>	<b>Version</b>	<b>WIN31</b>	<b>WIN95</b>	<b>OS/2</b>
ODBC driver		X		
Database Access		X		
Router session no longer needed for SF, DT		X		
Toolbar pop-up description		X	X	X
Toolbar customization			X	X
APPN LEN/End Node (APPC and CPI-C API)		(*1)	X	(*2)
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 EHLLAPI, SRPI, APPC			X	X
EHLLAPI multiple links			X	X
PCSAPI Connect/Disconnect Session			X	X
Setup utility for PCSMON trace parameters		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
<b>Notes:</b>				
(*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.

## 1.2.2 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. However, 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 connections shown in the following table:

<i>Table 4. Personal Communications AS/400 Version 4.1 Connections to AS/400 and S/3X</i>				
<b>PC400 V4.1 Connections</b>		<b>WIN31 Version</b>	<b>WIN95 Version</b>	<b>OS/2 Version</b>
<b>Interface</b>	<b>Attachment</b>			
<b>COM port</b>	Hayes AutoSync	X		X
	SNA-over-Async	X	X	X
	SNA-over-Async (Console)	X		X
<b>SDLC</b>	Synchronous Data Link Control	X	X	X
	PC Support/400 Router	X		X
<b>LAN</b> Token-Ring Ethernet FDDI ATM 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)		
<b>Twinaxial</b>	Twinaxial Data Link Control (APPC)	X	X	X
	Twinaxial Data Link Control (Console)	X		X
	PC Support/400 Router	X		X
<b>Coaxial</b>	3174 Peer Communication (IEEE 802.2)	(*4)		(*4)
<b>CM/2 or OS/2 AF</b>	APPC5250 via SNA Network (LU 6.2)			X
<b>X.25</b>	X.25 Co-Processor			(*2)
<b>Frame Relay</b>	Wide Area Connector (WAC)			(*5)
<b>ISDN</b>	ISDN Co-Processor			(*2)
	WaveRunner ISDN			(*2)
<b>Notes:</b>				
S/3x supports only a Twinax connection				
(*1) New attachment in this release				
(*2) Supported with OS/2 Access Feature or CM/2				
(*3) Can be used with the PC Support/400 Router attachment (only for emulation, no utilities)				
(*4) This works but is not a supported connection				
(*5) Supported with RouteXpander/2 and OS/2 Access Feature or CM/2				

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## Chapter 2. Installation and Customization

This chapter gives a brief description on installing the Personal Communications family and provides guidance, hints and tips on customizing PCOMM for DOS, Windows 3.1 and OS/2. For a complete description on installing the product, you should look at the appropriate *Up and Running* book and the Help of the installation procedure.

All examples given in this book are for mobile users. Therefore we used an IBM ThinkPad 755C with PCMCIA cards. We strongly recommend that you customize the PCMCIA support and/or built-in modem of your notebook computer first, so that it is ready for use before installing PCOMM. For more details on installing and customize PCMCIA support in a DOS/Windows or OS/2 environment, refer to Appendix A, "Special Considerations for PCMCIA" on page 335.

Personal Communications is as easy-to-install application package; for each PCOMM environment of operation, the installation program offers a different directory structure:

**PCS3270** for DOS (Entry-Level Mode)

**PC3270** for DOS (Full-Function Mode)

**PCOMWIN** for Windows

**PCOMOS2** for OS/2

Personal Communications is subdivided in 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.

Personal Communications is running in a SNA or non-SNA environment; 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

The following sections assume a new installation, performed from diskettes or CD-ROM.

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### 2.1 Install PC/3270 for DOS (Entry-Level Mode)

PC/3270 Entry DOS provides coaxial Control Unit Terminal (CUT) attachment, and Home3270 asynchronous attachment through a protocol converter.

Note that there are help panels for every field in the installation and configuration programs (INSTALL, PCSINST and CONFIG).

These panels contain much detailed information and we strongly recommend that you read each panel as you go through configuration for the first time.

To install PC/3270 Entry DOS:

- Insert diskette #1 into the A: drive.
- Type A:\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 follow the configuration panels.

**Note:** The CD-ROM contains PC/3270 Entry DOS in the \DOS\INSTALL\ENTRYEM directory.

For customizing the ASCII Connection (Home3270) refer to 3.2, "Home3270 Attachment" on page 33.

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## 2.2 Install PC/3270 for DOS (Full-Function Mode)

PC/3270 FF-DOS provides many different types of connection but in this book we discuss only those that provide communications for mobile users; they are:

- Hayes AutoSync
- SNA over Async
- Async IIN (Advantis Series/1 gateway)

If you are familiar with previous versions of PC/3270 for DOS (Full-Function Mode) installation, Version 4.1 has some enhancements on screens and functions but its installation procedure is still the same. PC/3270 FF-DOS lets you choose from two installation methods:

- Quick Installation allows you to install with a minimum of installation steps, using many parameters by default.
- Flexible Installation provides you maximum flexibility by allowing you to choose the value for nearly all the parameters.

Note that there are help panels for every field in the installation and configuration programs (INSTALL, PCSINST and CONFIG). These panels contain much detailed information and we strongly recommend that you read each panel as you go through configuration for the first time.

To install PC/3270 FF-DOS:

- Insert diskette #1 into the A: drive.
- Type A:\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 follow the configuration panels.

**Note:** The CD-ROM contains PC/3270 Entry DOS in the \DOS\INSTALL\FULLFUNC directory.

For customizing the attachments above, refer to its related section in Chapter 3, "PC/3270 Asynchronous Connections" on page 31. All others are published in the ITSO redbook *Personal Communications for the LAN/WAN User - DOS, Windows and OS/2*, SG24-4688 (available 4Q96).

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## 2.3 Install PCOMM for Windows

PC400 V4.1 and PC400 and 3270 V4.1 for Windows are easy-to-install application packages for Microsoft Windows 3.1 or Windows for Workgroups 3.11. Installation and customization are separate functions in PCOMM for Windows, so customization will be dealt with in the next chapter.

If you already have PCOMM V3.0, V3.1, or V4.0 installed, Version 4.1 will assume that you want to install it in the same directory (though you can change that); there is no difference in the format of .WS, .BCH, or .ADU files, so those that you already have will work with PCOMM V4.1.

**Note:** Do not install PCOMM over an existing version of AS/400 Client Access's PC5250. This causes some inexplicable problems.

### Windows for Workgroups

Up to V4.0, you could not use PCOMM's async connections if you were running Windows for Workgroups in its network mode because this mode does not support the use of TSRs. With PCOMM V4.1, this is no longer true, except for Hayes AutoSync, because the async connections use a virtual communications driver (VCD) instead of addressing the COM port directly.

The restriction still applies to Hayes AutoSync because Windows does not provide an interface that allows applications (such as PCOMM) to detect the parity and framing errors that Hayes AutoSync uses.

**Note:** PCOMM for Windows V4.1 does not support Microsoft Windows V3.0.

### Installation Options in Version 4.1

The installation procedure of PCOMM for Windows provides different parameters for an installation on local area networks. This allows you to install only PCOMM's configuration files on the local PC and to share the program files from an application server.

For a mobile user, we recommend that you have all program files on your own PC. Therefore, PCOMM lets you choose how much of the package to install and from where you install. It can be done from diskettes, CD-ROM, or from a network file server. The installation process lets you choose between the following choices:

- If you have the combined package, you can choose to install 3270 or 5250 emulation, or both
- On all packages, you can choose to install one of the following:
  - Full Installation, which requires about 11.8 MB disk space; all the files relating to your choice of emulator(s) are installed - this includes the sample programs, all the PDFs and PDTs, and help files.
  - Partial Installation, which requires 9.2 MB to 11.8 MB; you can choose whether to install the sample programs, any of three groups of PDFs and PDTs, and the help files.

- Minimum Installation, which requires about 9.2 MB; the sample programs, PDFs and PDTs, and help files are not installed.

Note that PCOMM for Windows has an excellent help feature. It provides help information for every field and parameter during the installation process. These panels contain much detailed information, which we strongly recommend you read.

To install PCOMM for Windows perform the following steps:

- Start Windows, and insert diskette #1 into the A: drive.
- Click on **File** in the Program Manager window and select **Run** to get the Run panel.
- Type A:\INSTALL and click on **OK**.

The installation process will start and after a few seconds you will see the IBM logo panel. Follow these panels and make your selections to install the product.

The CD-ROM contains PCOMM for Windows in the \WIN\INSTALL\EMULATOR directory. You can also use the File Manager to get there; double-click on the **INSTALL.EXE**.

For customizing PCOMM for Windows refer to 2.5, "Customize PCOMM for OS/2 and for Windows" on page 15.

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## 2.4 Install PCOMM for OS/2

PC400 V4.1 and PC400 and 3270 V4.1 for OS/2 are easy-to-install application packages for an OS/2 Warp environment. Installation and customization are separate functions in PCOMM for OS/2, so customization will be dealt with in the next chapter.

If you already have PCOMM V4.0 installed, Version 4.1 will assume that you want to install it in the same directory (though you can change that); there is no difference in the format of .WS, .BCH, or .ADU files, so those that you already have will work with PCOMM V4.1.

The installation procedure of PCOMM for OS/2 provides different parameters for an installation on a LAN. This allows you to install only PCOMM's configuration files on the local PC and to share the program files from an application server. PCOMM for OS/2 is fully CID enabled and can migrate CM/2 configurations.

For a mobile user, we recommend to have all program files on your own PC. Therefore, PCOMM let you choose how much of the package to install and from where you install. It can be done from diskettes, CD-ROM, or from a network file server. The installation process let you choose between the following choices:

- If you have the combined package, you can choose to install 3270 or 5250 emulation, or both
- On all packages, you can choose to install a
  - Full Installation, which requires about 17.6 MB disk space; all the files relating to your choice of emulator(s) are installed - this includes the sample programs, all the PDFs and PDTs, Help files, and online publications.



- Partial Installation, which requires 12.2 MB to 17.6 MB; you can choose whether to install the sample programs, any of three groups of PDFs and PDTs, the Help files, and the online publications.
- Minimum Installation, which requires about 12.2 MB; the sample programs, PDFs and PDTs, Help files and online publications are not installed.

Note that PCOMM for OS/2 has an excellent Help feature. It provides help information for every field and parameter during the installation process. These panels contain much detail information, we strongly recommend to read.

To install PCOMM for OS/2 perform the following steps:

- Open an OS/2 window.
- Insert diskette #1 into the A: drive.
- Type A:\INSTALL at the OS/2 prompt and press Enter.

The installation process will start and after a few seconds you will see the IBM logo panel. Follow these panels and make your selections, how to install the product.

The CD-ROM contains PCOMM for OS/2 in the \OS2\INSTALL\EMULATOR directory.

For customizing PCOMM for OS/2 refer to 2.5, "Customize PCOMM for OS/2 and for Windows."

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## 2.5 Customize PCOMM for OS/2 and for Windows

This section provides guidance on customizing Personal Communications Version 4.1 for OS/2 and Windows. For all these products, the customization process is the same. Therefore, we do not need to explain it in separate sections. If it is necessary to be specific, we are using PCOMM for OS/2 or PCOMM for Windows to differentiate the two environments.

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 more icons in it. These depend on your installation selections and the PCOMM package, as shown in Figure 1 (assuming a new installation of PC400 and 3270 V4.1 for OS/2). If you have migrated from a previous version, you'll find other icons for each migrated Session and Batch procedure, as you had before.

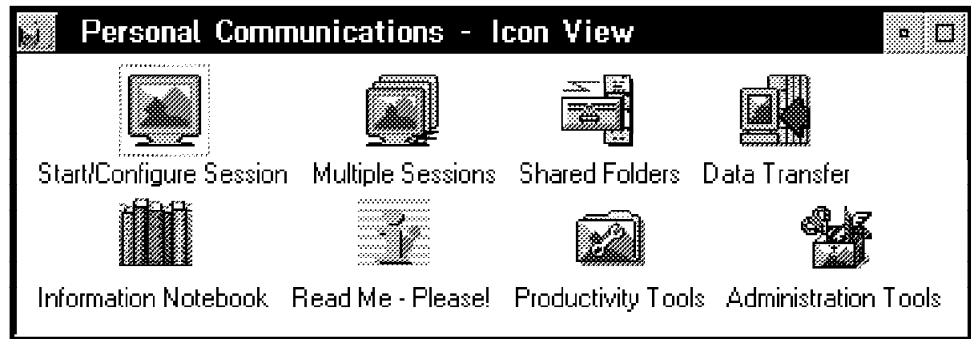


Figure 1. PC400 and 3270 V4.1 for OS/2 Program Folder

To customize PCOMM, we need only the first two icons. Let us briefly describe what these icons are for:

### **Start/Configure Session**

This icon let you start a single session and opens the Customize Communication panel automatically, as shown in Figure 2 on page 17. It represents the program PCSWS.EXE, which is used to start and/or create a configuration profile for each host session. When PCOMM was installed the first time, there are no additional session profiles; you must create them by double-clicking on this icon in order to configure your host connections.

After you have created a profile, you will be asked to name it. An icon with that name will be added to the program group you choose. This new icon then represents a host session, which is called a *WorkStation* in PCOMM's terminology. Each host session can be different from others and saved separately in a WorkStation profile (.WS) and can have its own icon. Start a WorkStation by double-clicking on its icon.

Refer to 2.5.1, "Customize a WorkStation" for further details.

### **Multiple Sessions**

This icon let you start multiple WorkStation profiles at once. It represents the program PCSBAT.EXE which allows you to start several sessions and other programs 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 can have 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, if no description is given. The default icons can also be distinguish by multiple (three) displays lying on top of each other. When you double-click on the icon, all the WorkStation sessions profiles, which are included in the Batch file, will start.

Refer to 2.5.2, "Starting Multiple WorkStations" on page 24 for further details.

## **2.5.1 Customize a WorkStation**

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 a WorkStation configuration.

If you have preconfigured or migrated WorkStation profiles or batch program files, just double-click the icons to start them. This should match the configuration you had before. If you want to change any of its definitions, choose **Configure** from the Communication pull-down menu at the top of the session window; you will then see the Customize Communication panel, as shown in Figure 2 on page 17.

When you double-clicked on the **Start/Configure Session** icon, you get a blank session window, which will be overlaid by the IBM logo and a Welcome message panel. Click on **OK** to get the Customize Communication panel, which allows you to begin your customization.

**Note:** Make sure that the PCMCIA support and/or built-in modem of your notebook computer is ready for use before customizing PCOMM. For more details on installing and customize PCMCIA support in a DOS/Windows or OS/2 environment, refer to Appendix A, "Special Considerations for PCMCIA" on page 335.

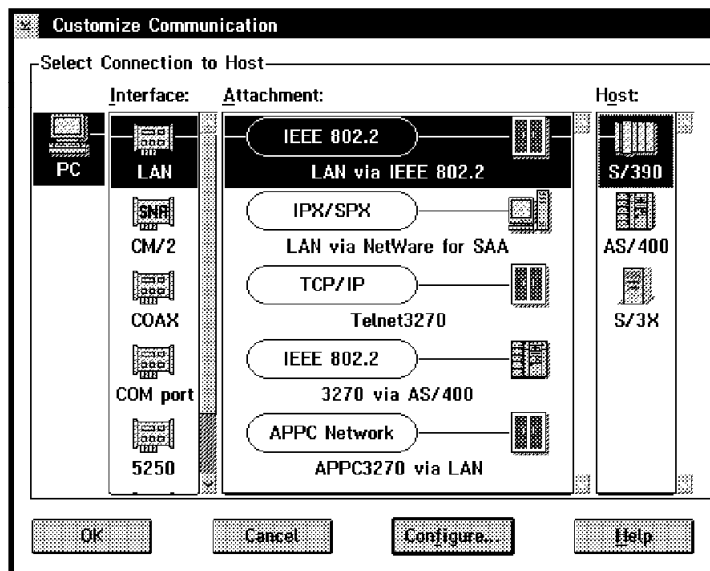


Figure 2. Customize Communication Panel of PC400 and 3270 V4.1

The Customize Communication panel shows you the default configuration of the first possible connection can be done depending on the communication adapter and device driver already installed. Choose the host, the interface, and the attachment you need, then click on **Configure....** This takes you to the Customize Communication - 3270 Host panel as shown in Figure 3 on page 18 or to the Customize Communication - 5250 Host panel as shown in Figure 5 on page 19, depending on your host selection.

**Note:** If you are doing a configuration and you have a good knowledge of PCOMM so you can directly double-click on the host and/or attachment type you want to get these customization panels.

### Customize Communication - 3270 Host

The Customize Communication - 3270 Host panel (see Figure 3 on page 18) contains up to four boxes, as follows:

- Session Parameters
- Graphics Parameters
- Link Parameters
- Response Time Monitor Parameters (PCOMM for Windows)

In the Session Parameters box you can specify session characteristics such as Screen Size, Session Type (Display or Printer), Host Code Page, LU/LT number and the SNA parameters (if you click on **Configure SNA...**).

The **LU/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, such as a printer session, or that predefined LU has unique network access privileges. If the host (VTAM and/or NCP) definitions are identical for all LUs in the PU, and all LUs have the same network access privileges, then you can select **Default (Next Available)** for LU/LT number.

**Note:** Be aware that the effective LU/LT number (address) used depends on the gateway or controller customization (mapping of sessions (any kind) to local addresses).

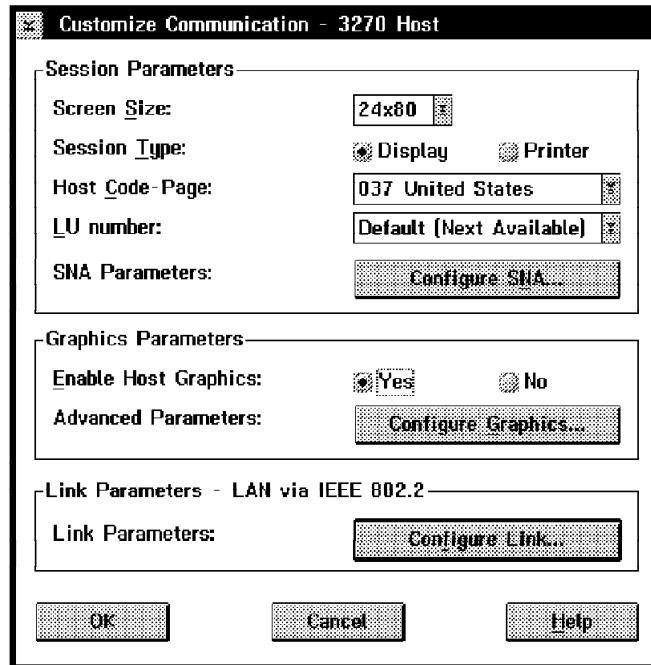


Figure 3. Customize Communication - 3270 Host Panel

## SNA Parameters

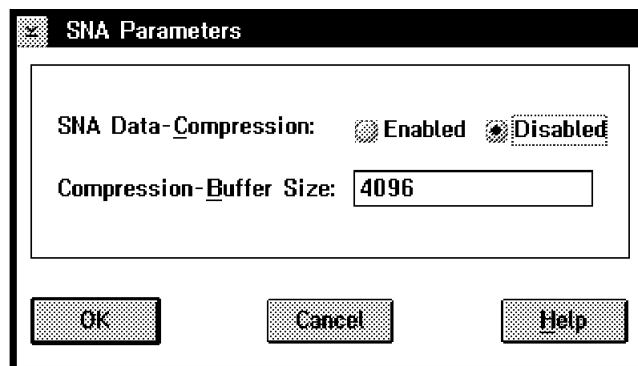


Figure 4. Customize Communication - SNA Parameters Panel

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
- IBM Global Network
- IPX/SPX (NetWare for SAA)
- TCP/IP (Telnet 3270)
- APPC3270

The SNA Parameters panel lets you specify the Compression Buffer Size, which is required when using SNA data compression. The proper buffer size is the larger of the maximum RU size specified for inbound or outbound in the session BIND. Notice that if the specified value is not enough for compression/decompression, this function may not be performed.

### Customize Communication - 5250 Host

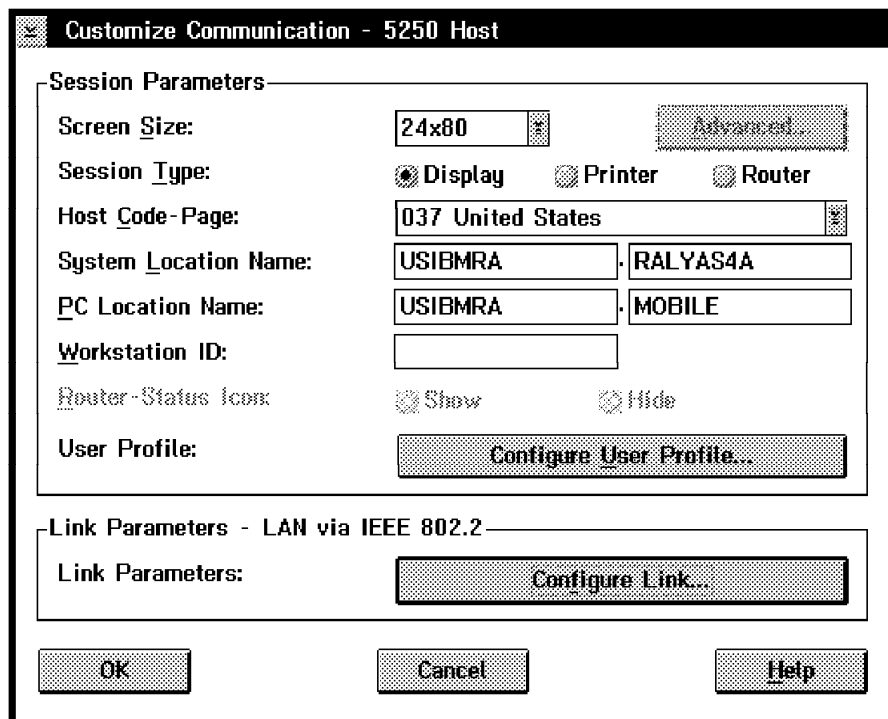


Figure 5. Customize Communication - 5250 Host Panel

The Customize Communication - 5250 Host panel contains up to two boxes, as follows:

- 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 names you give the System Location Name and PC Location Name depend on the APPC/APPN terminology of the SNA network. These names consists of the Network Identifier and the Location Name, which are also known together as the Fully Qualified Network Name of the resource, such as a control point (CP) or a logical unit (LU). 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 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. Normally this field left blank; the AS/400 will create a workstation ID for you. It creates this name by using the logical unit (LU) name and the short session ID. If you want to type in your own workstation ID, it *must* match the workstation definitions at the AS/400 system. Use the same rules as described above.

Enable the **User Profile** support. It let you do the Logon process automatically with the user-ID and password that are set in the user profile specified.

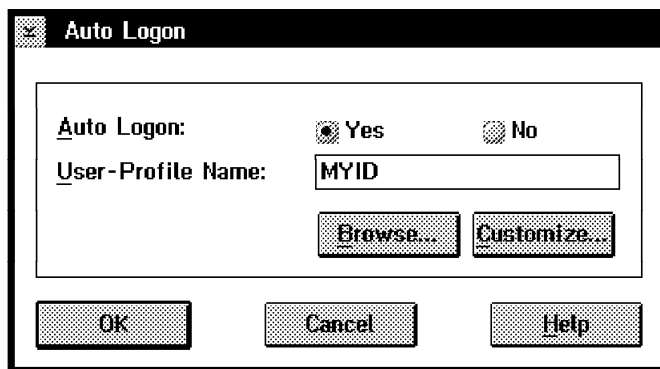


Figure 6. Customize User Profile - Auto Logon Panel

Select **Yes** and enter an User Profile name and then click on **Customize....** This let you enter your user-ID and password (twice). By saving your user-ID and password in a user profile, PCOMM will not prompt you, 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 3 on page 18 or Figure 5 on page 19) you can find 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 subsequent chapters for a mobile environment. Please refer to the relevant chapter(s) for your attachment type(s).

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 (LSP) or the Microsoft Data Link Control (MSDL) in a DOS/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 PCOMM. Therefore we will use this in later 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 PCSDLC010 message window, which requires changes to the system settings and the system needs to be restarted.

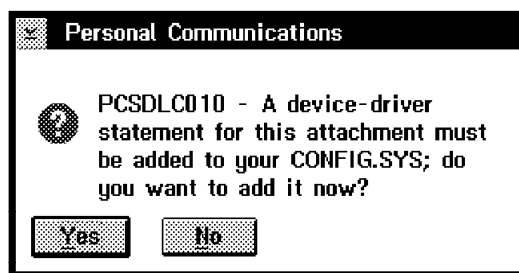


Figure 7. Personal Communications System Setting Message

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.

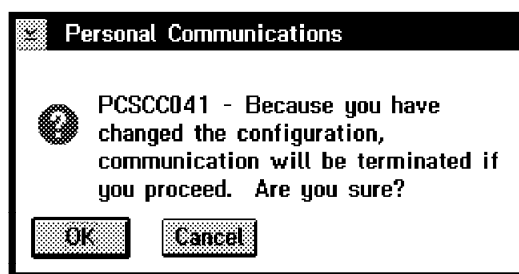


Figure 8. Personal Communications Termination Message

Click on **OK** to terminate your old communication and make the new setup active right now. If you click on **Cancel**, this takes you back to the Customize Communication panel shown in Figure 2 on page 17.

If you have configured a connection which requires changes to the system settings, the PCSDLC010 message panel (Figure 7) 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 10 on page 22, or you will receive a message that you need to shut down your system and reboot it under OS/2, before your configuration is active.

If you choose **No**, you will receive a stop message panel (PCSDLC011), which tells you to run the Configuration and Program Options Administration Tool to add the required communication driver.

It's easier to let the administration program do it for you.

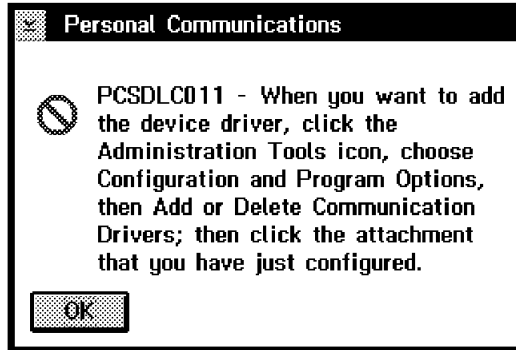


Figure 9. Personal Communications Stop System Setting Message

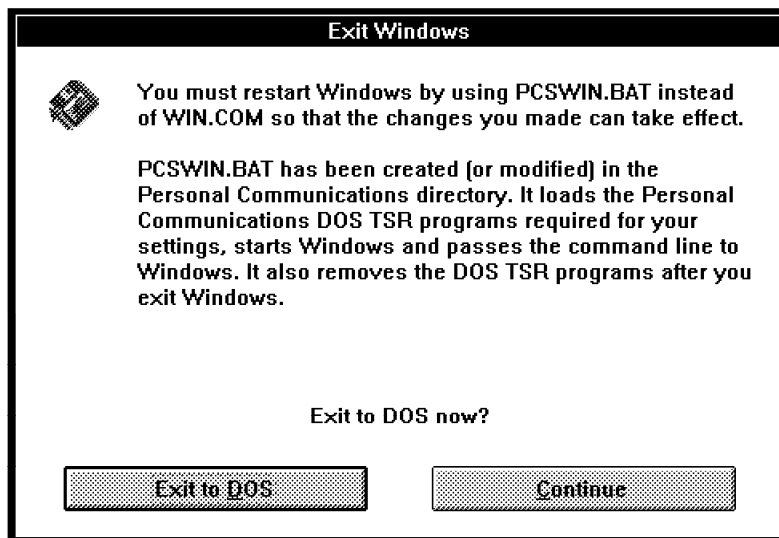


Figure 10. TSR Exit Windows Panel

#### 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, so 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.



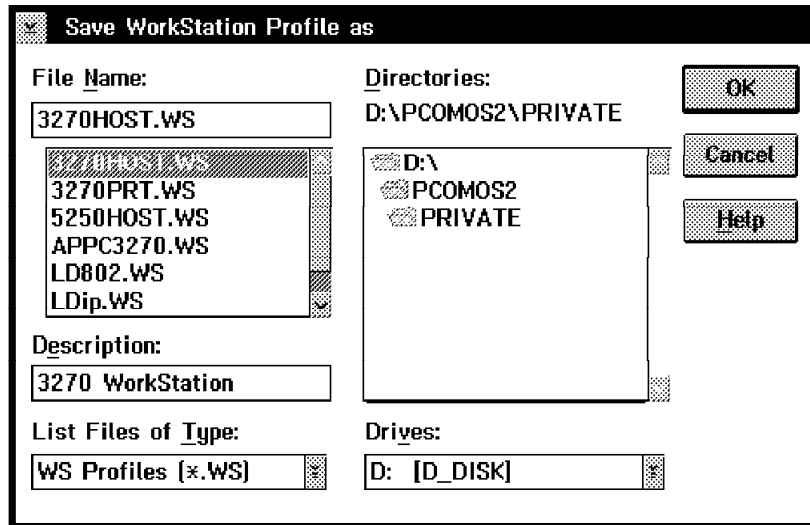


Figure 11. Save WorkStation Profile Panel

Type the name and description of your WorkStation profile, then click on **OK** in order to save it. The following message panel asks whether you want to add the new WorkStation icon to the OS/2 Desktop or the Windows Program Manager.

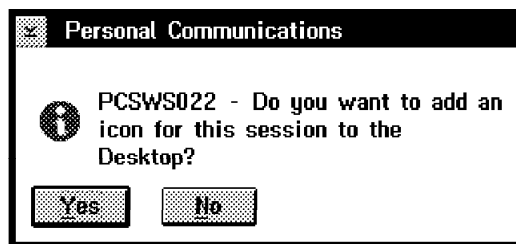


Figure 12. Add WorkStation (Session) Icon to OS/2 Desktop Message

Choose **Yes** and it will be added on the OS/2 Desktop, from which it can be moved wherever you want. You'll receive an information message, where the WorkStation profile icon will be.

PCOMM for Windows lets you select a program group for this WorkStation profile icon.

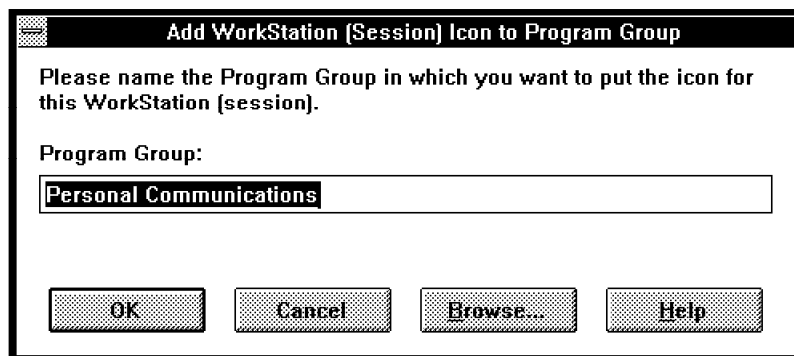


Figure 13. Add WorkStation (Session) Icon to Program Group Panel

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 **OK**, 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 from the previous WorkStation profile.

However, if you want to create another WorkStation that is exactly the same, just start that WorkStation multiple times.

If you want to create another WorkStation, which has only one or two parameters different from the original configuration, start the original WorkStation, select **Save As...** from the File pull-down menu and save the profile with a new name. Then go back to change the required parameters and save it again.

#### Important

Only a WorkStation that does *not* have a specified LU/LT number or Workstation ID can be started more times. This means that the LU/LT parameter for 3270 sessions on Figure 3 on page 18 must be at its Default (Next Available) or the Workstation ID field for 5250 sessions on Figure 5 on page 19 must be blank.

## 2.5.2 Starting Multiple WorkStations

There are different ways to start multiple Personal Communications WorkStation sessions.

- Double-click on your customized **WorkStation** icon to start the first session. Double-click 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 each 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. Just double-click on your customized Batch file icon to start all desired host sessions simultaneously.

## 2.5.3 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/LT number.

To customize a batch file, double-click on the **Multiple Sessions** icon. The batch program starts and shows you the Create/Modify Batch File panel as below.

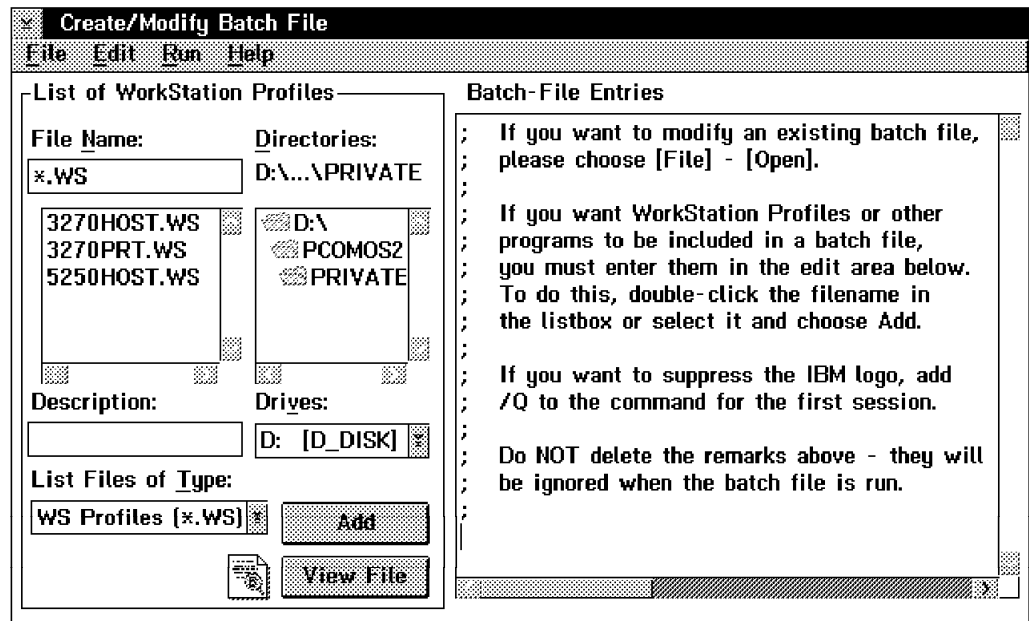


Figure 14. Create/Modify Batch File Panel

The Create/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 is (must be) LU/LT number dependent for the LU number 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 will be added on the right side in the batch file Entries box. Now we use the 3270PRT.WS profile for the LU number 03. Click on **Add** again. For the next three sessions, we use the 3270HOST.WS profile; these will have the LU numbers 04, 05 and 06. And for the last two sessions, we want to connect to an AS/400; therefore, we use the 5250HOST.WS profile.

**Note:** There are four methods of including profiles or programs in a batch file; you can use whichever is convenient:

1. Drag-and-drop the file name into the edit area (PCOMM for OS/2)
2. Double-click the file name
3. Select the file name and click on the **Add** button
4. Type the complete command in the edit area

**Notes:**

1. A LU/LT number dependent WorkStation profiles can only be used one at a time.
2. The Workstation-ID field must be blank for the 5250HOST.WS profile so that we can start it twice. If not, it can be used just one at a time, as a dependent WorkStation session.

If you want to see (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 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 PCSWS line in the Batch-File Entries box, as follows:  
D:\PCOMOS2\PCSWS.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\PCSWS.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\PCSWS.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 abc 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 15) 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\PCSWS.EXE D:\PCOMOS2\PRIVATE\3270HOST.WS /Q
D:\PCOMOS2\PCSWS.EXE /S=p D:\PCOMOS2\PRIVATE\3270PRT.WS /I
D:\PCOMOS2\PCSWS.EXE D:\PCOMOS2\PRIVATE\3270HOST.WS
D:\PCOMOS2\PCSWS.EXE D:\PCOMOS2\PRIVATE\3270HOST.WS /I
D:\PCOMOS2\PCSWS.EXE D:\PCOMOS2\PRIVATE\3270HOST.WS /I
D:\PCOMOS2\PCSWS.EXE /S=e D:\PCOMOS2\PRIVATE\5250HOST.WS
D:\PCOMOS2\PCSWS.EXE /S=f D:\PCOMOS2\PRIVATE\5250HOST.WS /I
```

Figure 15. Create/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 them 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 a S/390 and to an AS/400 host system, it is required that you set the Link Station Count parameter to a minimum of two. To do that:

1. Select **Configure Link** from Customize Communication panel
  - See Customize Communication - 3270 panel in Figure 3 on page 18
  - See Customize Communication - 5250 panel in Figure 5 on page 19
2. Click on **Advanced...** in the IEEE 802.2 Link Parameter panel
3. Set the Link Station Count parameter larger than 1

To let us save this WorkStation Batch File, select **File** on the menu bar and choose **Save as...** from the pull-down menu.

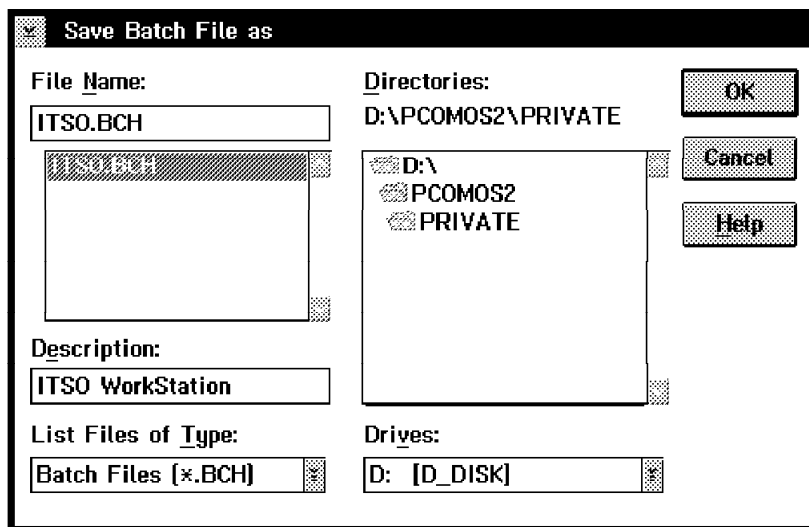


Figure 16. Save WorkStation Batch File Panel

The Save Batch file as panel opens and lets you enter the name and description for this new Workstation Batch file. Click on **OK** to save it. The name extension for a WorkStation Batch file is .BCH.

When you clicked 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.

Choose **Yes** (Figure 17 on page 28) and it will be added on the OS/2 Desktop, from which it can be moved wherever you want. You'll receive an information message telling you where the WorkStation Batch file icon will be.



Figure 17. Add WorkStation Batch File Icon to OS/2 Desktop Message

PCOMM for Windows let you select a program group for this WorkStation Batch file icon.

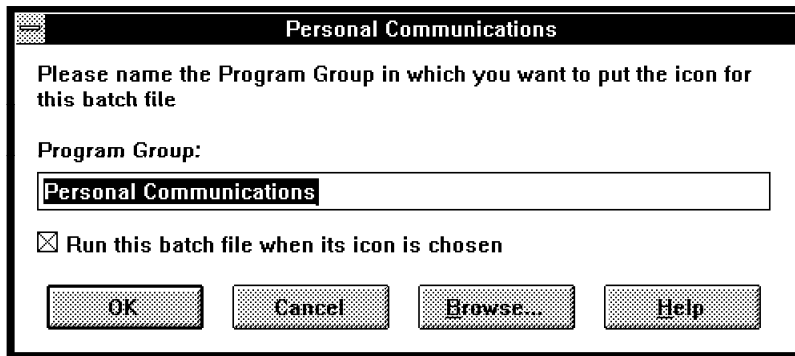


Figure 18. Program Group for the WorkStation Batch File Icon Panel

Choose the default program group, type in a new name, or select an existing one by clicking on the **Browse** button. After clicking on **OK** an information message appears which tells you where the icon for your WorkStation Batch file will be.

Note the X in the check-box of this panel to run this batch file when its icon is chosen. It starts the sessions specified in the PCSBAT batch file. If you remove this X, the PCSBAT.EXE opens its own panel, as shown in Figure 14 on page 25.

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 file, which need to communicate with the WorkStation via DDE, HLLAPI or whatever you want.

## 2.5.4 How to Start PCOMM Automatically

To start a PCOMM for OS/2 WorkStations automatically when OS/2 starts, follow these steps:

1. Open the **Startup** folder of OS/2.
2. Either move or copy the WorkStation profile or Batch file icon into the Startup folder. By pressing the Ctrl and Shift keys when moving the icon a shadow of the original icon is created in the Startup folder.

To start a PCOMM for Windows WorkStations automatically when Microsoft Windows 3.1 starts, follow these steps:

1. Double-click on the **AutoStart program group** icon
2. Either move or copy the Workstation profile or Batch file icon into the AutoStart program group.

## Part 2. Native Connections

The second part of the book describes the "native" connections that you can make with PCOMM in a mobile environment - those that do not need other products in order to connect to the host.

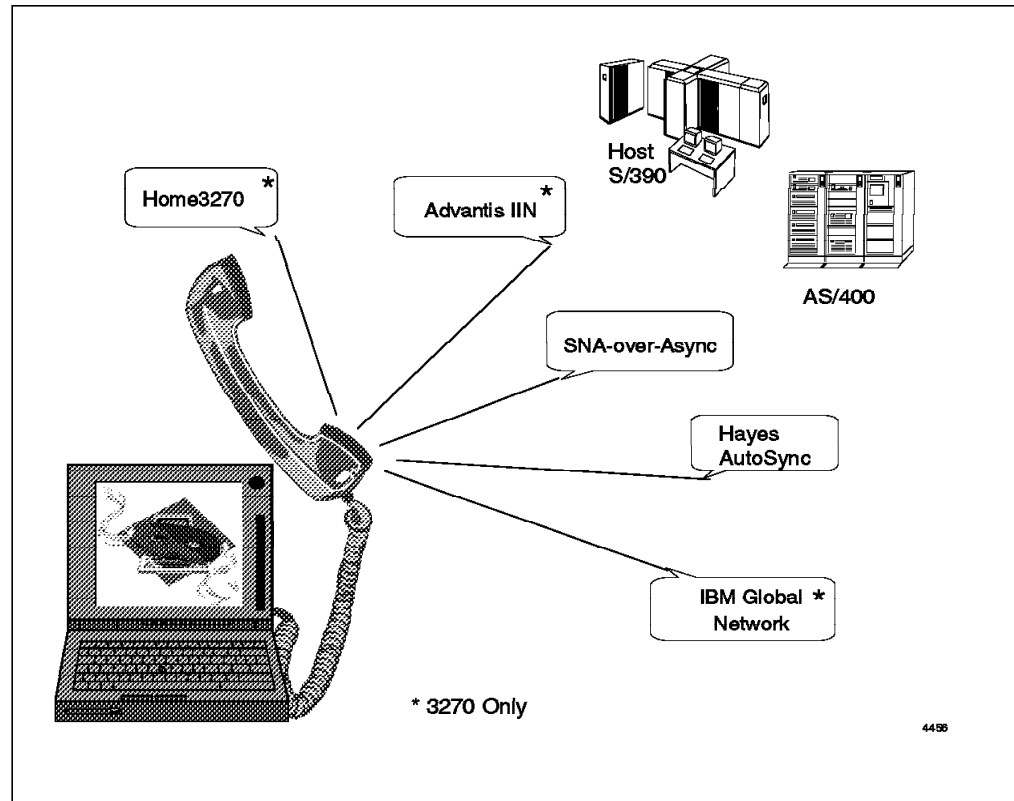


Figure 19. Personal Communications Native Connections

- Chapter 3, "PC/3270 Asynchronous Connections"
  - 3.2, "Home3270 Attachment"
  - 3.3, "Hayes AutoSync Attachment"
  - 3.4, "SNA-over-Async Attachment"
  - 3.5, "Advantis (IIN) S/1 SNA Gateway Attachment"
  - 3.6, "IBM Global Network Attachment"
- Chapter 4, "PC400 Asynchronous Connections"
  - 4.1, "Hayes AutoSync Attachment"
  - 4.2, "SNA-over-Async Attachment"
  - 4.3, "PC400 SNA-over-Async (Console) Attachment"





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## Chapter 3. PC/3270 Asynchronous Connections

Personal Communications Version 4.1 provides the following asynchronous connections:

### **Home3270 (Entry-Level DOS, Windows, OS/2)**

This lets you connect to a host system through a protocol converter, such as the Asynchronous Emulation Adapter of a 3174 controller, a 3708, or a 7171.

### **IBM Global Network (Windows and OS/2)**

With this connection, you can dial into an Intelligent Network Gateway provided by the IBM Global Network, which will route you to any host system that is available to you. The telephone numbers of gateways all over the world are built into the PCOMM program.

### **Async IIN (Advantis) (Full-Function DOS, Windows, OS/2)**

This type of connection is mainly available in the USA. It requires a Series/1 gateway provided by the Advantis organization.

### **SNA over Async (Full-Function DOS, Windows, OS/2)**

This connection lets SNA data flow over an async line, so it needs a gateway that is able to accept such traffic and forward it over a synchronous line to the host. The IBM Global Network provides such gateways.

### **Hayes AutoSync (Full-Function DOS, Windows, OS/2)**

This provides synchronous communication to the host, even though the modem is initially configured for async. As a result, the host system must be configured for synchronous communication. The modem attached to the PC must specifically support Hayes AutoSync.

Because we wanted to emulate a typical mobile environment, we used an IBM ThinkPad with an IBM PCMCIA Data/Fax Modem (14.4 kbps with integrated DAA) to make all the asynchronous connections that are described.

In Version 4.1, PCOMM's asynchronous dial-up connectivity has been enhanced to support more and faster modems. Modems must have certain characteristics to work properly with asynchronous communications; many allow you to change their characteristics by switch settings, commands from the personal computer, or both:

- The modem must break the connection to the remote system ("hang up") and return to its initial state when the Data Terminal Ready (DTR) line is turned off and then turned back on.
- The modem must turn off the Carrier Detect (CD) line when it loses the connection to the remote system.
- An autodial modem must send result codes to the workstation.

---

## 3.1 Asynchronous Enhancements

Many facilities have been added to PCOMM's asynchronous connections, supporting the functions of the newer modems and new features of the communication hardware. The newer modem functions allow the connection to be established with greater speed and increased reliability, while facilitating the dialing process.

- FIFO Use

Most PCs shipped nowadays are equipped with type-2 or second-generation COM ports, which provide 16-byte-deep FIFO queues for receiving and transmitting respectively. Such ports allow asynchronous data rates of over 38400 bps.

PCOMM makes good use of a type-2 COM port when a high-performance modem with CCITT V.32bis and/or V.42bis is attached; it examines the hardware and, if a type-2 COM port is available, all asynchronous communications will be done through the FIFO queues of the COM port. This operation is carried out automatically, and is transparent to the user.

- CCITT V.32bis Support

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.

- CCITT V.42bis Support

CCITT V.42bis is an international standard protocol for up to 4:1 compression and decompression using BTLZ<sup>1</sup>. PCOMM supports various V.42bis-capable modems when the type-2 COM port is available. V.42bis allows the connection between the serial port and the modem to be established at a speed (the port speed) greater than the line speed; for instance, you could have the line connection at 14400 bps and the connection between the COM port and modem at 38400 bps. This is possible because a V.42bis modem compresses the data so that it can be sent on a line that runs more slowly than the port speed. Some type of flow control (preferably hardware flow control) should be established between the modem and the serial port to interrupt the data flow if the data pattern does not allow enough compression such that the line can handle the amount of data being transported (before overrun occurs).

- Automatic Access Utility Improvements

A number of enhancements have been made to the Automatic Access Utility to provide:

- Improved auto dial customization (ease of use)
- Dial-setup without disconnection
- Idle timeout

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<sup>1</sup> British Telecom modified Lempel Ziv. This is a data compression protocol used in V.42bis, and offers compression of up to 4:1 (throughput to 38400 (V.32) or 57600 (V.32bis) bps. BTLZ connections can use either MNP or LAPM error correction.

- In Windows mode, a virtual communication driver (VCD) is used instead of a direct interface with the COM port through a TSR; this provides better performance and removes the complication of a TSR
- Support for V42bis modems with data compression
- Setup for dial mode, speaker volume, modem operational mode, and auto-answer mode
- Display of the phone title with the phone number
- Easy selection of a backup phone number
- Additional modem support

The main role for PCOMM concerning the previous enhancements, since they are, in fact, modem enhancements (V.32bis and V.42bis) or PC hardware enhancements (FIFO queues), is to support the higher speeds achieved (up to 57600 bps) and provide for the specification of the commands and/or parameters to better explore the modem's features.

### 3.2 Home3270 Attachment

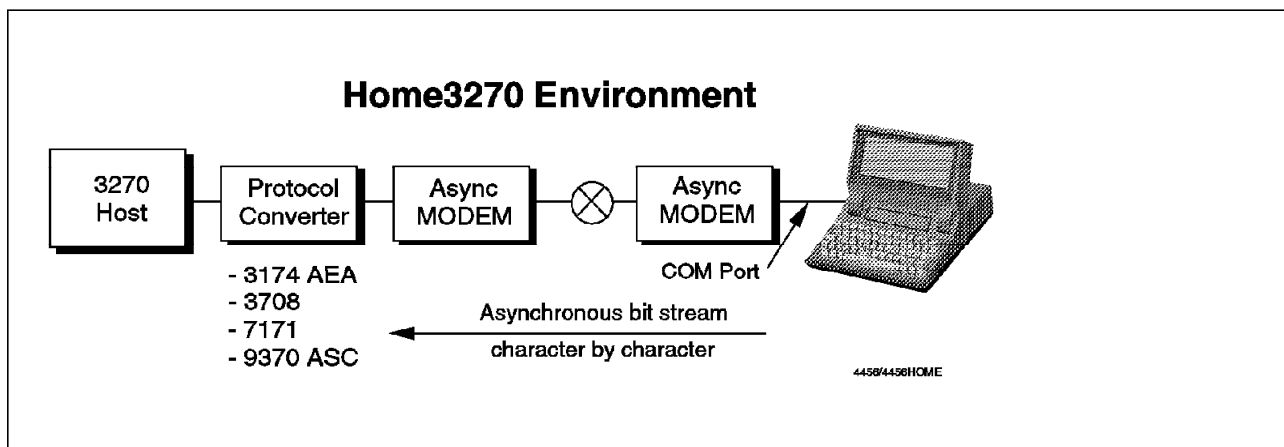


Figure 20. Personal Communications Home3270 Connections

In the Home3270 environment, a protocol converter transforms the asynchronous connection into an SNA synchronous connection.

The following IBM protocol converters are supported:

- IBM 3174 with Asynchronous Emulation Adapter (AEA)
- IBM 3708 Network Conversion Unit
- IBM 7171 ASCII Terminal Control Unit
- IBM 9370 ASCII Subsystem Controller

In this section, we cover the customization for DOS (Entry-Level Mode), Windows and OS/2, special considerations for this type of connection, and the host (NCP) definitions for an SDLC-attached 3174 with AEA. We use the connectivity scenario shown below.

### 3.2.1 Home3270 via an 3174 Establishment Controller

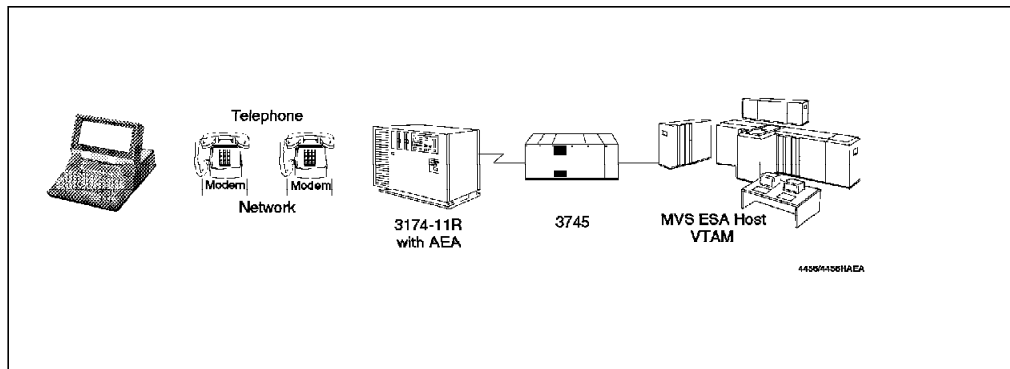


Figure 21. Home3270 via an 3174 ASYNC Emulation Adapter (AEA)

PC/3270 supports Home3270 connection to 3174s that have an Asynchronous Emulation Adapter (AEA) and which are locally (channel) or remotely (SDLC or BSC communication line) attached to a 37XX communications controller; Figure 21 shows an SDLC leased-line connection.

A PC/3270 workstation (IBM ThinkPad) is connected through an asynchronous communication port (COM2) to the Asynchronous Emulation Adapter (AEA) of the 3174-11R Establishment Controller.

For this example, we need to do the following:

- Configure the PC/3270 workstation to use the Home3270 asynchronous connection to the AEA of the 3174.
- Set up the modem for asynchronous communication.
- Customize the 3174 to map the 3270 sessions through the AEA.
- Define the NCP generation for the 3174 to provide the required LU for PC/3270.

#### Restrictions

The following restrictions apply to the Home3270 connection:

- Only one session will be available
- No host graphics
- Screen sizes 24x80 and 24x132 only
- Printer session not available

### 3.2.2 Configuring the Home3270 Connection for DOS (Entry-Level Mode)

In this section, we will show only the panels that are relevant to the Home3270 connection.

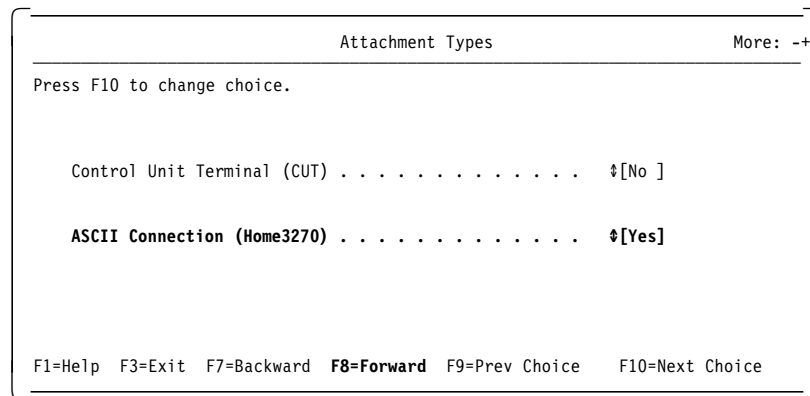


Figure 22. Attachment Types Panel - Home3270 Connection

Choose **No** for Control Unit Terminal (CUT) and **Yes** for ASCII Connection (Home3270) and press F8 to go to the Emulation Parameters panel.

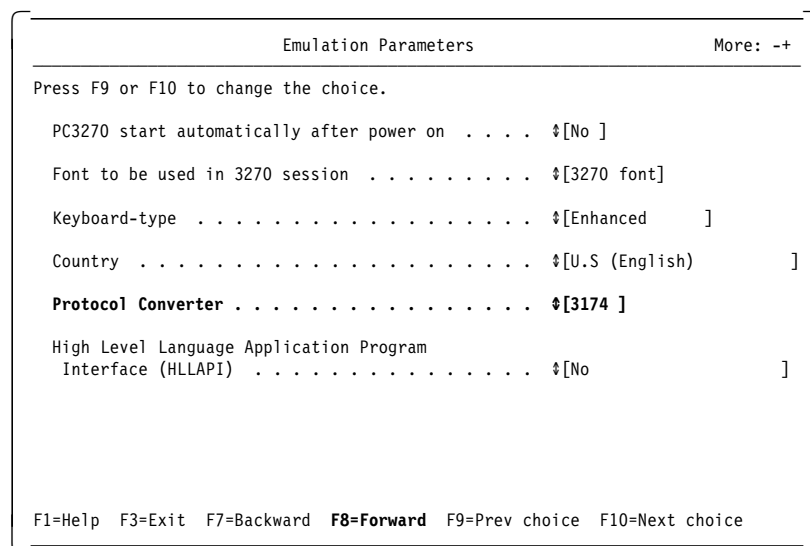


Figure 23. Emulation Parameters Panel - Home3270 Connection to 3174 AEA

Figure 23 shows you the emulation parameters. You can select the start option, the font to use for the display, the keyboard type and the language; choose the correct language for your country. It is very important to select the correct Protocol Converter since PCOMM will not operate correctly unless this is accurate. If you will be using a program that uses the High Level Language API, set that to **Yes** (it will take some extra memory, however).

Press F8 to go to the Communication Parameters panel.

## Communications Parameters panel

Communication Parameters		More: -+
Press F10 to change the choice.		
Line Speed (baud rate) . . . . .		↓[19200]
Number of Data Bits . . . . .		↓[8]
Parity . . . . .		↓[None ]
Stop Bits . . . . .		↓[1]
Flow Control . . . . .		↓[RTS/CTS ]
Communication . . . . .		↓[COM2]
ROLMphone with DCM Attachment . . . . .		↓[No ]
Disconnect from the host by Unload . . . . .		↓[Yes]
F1=Help F3=Exit F7=Backward <b>F8=Forward</b> F9=Prev choice F10=Next choice		

Figure 24. Communication Parameters - Home3270 Connection to 3174-11R AEA

The settings for the Number of Data Bits, Parity, Stop Bits, and Flow Control *must* match the modem and 3174 customization.

A line speed of 19200 bps (the maximum allowed) indicates that the modem being used is capable of MNP5 or V.42bis, because data compression is needed at this speed. Note that this is the speed at which data will move between the COMx serial port and the modem. The maximum speed of the communication line will be 14400 bps (without data compression) if the modem supports V.32bis.

**Note:** We used an IBM PCMCIA Data/Fax modem in our scenario; this has the following capabilities:

- 14.4 Kbps Data/14.4 Kbps Fax
- V.32bis, V.17, V.42, V.42bis
- MNP10
- Flash upload
- Internal DAA
- Hayes AutoSync support (in USA and Canada)

The number of data bits is set to 8 and the parity to none. Some countries need this setting to support their national-language character sets.

### Flow Control

The Flow Control field is set to **RTS/CTS**; this is recommended when you are using a modem with V.42bis capability. You can have three settings for flow control:

**No** No type of flow control is performed.

**XON/XOFF** This is also known as software flow control. It is better than having no flow control, but it has some limitations; for example, if your data includes the XON or XOFF characters, the result is unpredictable.

**RTS/CTS** This is also known as hardware flow control. It is the recommended type of flow control when you have the higher communication speeds provided by CCITT V.32bis and the compression achieved by means of V.42bis or MNP 5.

Make sure you specify the correct COMx port. We used **COM2** for our example.

ROLMphone with DCM Attachment indicates whether the workstation is attached to a ROLMphone with DCM (Data Communication Module) or not.

- If this is set to **Yes**, only "Data Set Ready" (DSR) will be used to determine connection.
- If this is set to **No** (the default), both "Data Set Ready" and "Data Carrier Detect" (DCD) will be used to determine connection.

The Disconnect from the host by Unload field indicates whether the COMx adapter will be closed (disconnected) when PC/3270 is terminated.

Press F8 to go to the Name Automatic-Access File panel shown below.

```

Name Automatic-Access File                               More: -+
-----
Enter a file-name and extension and, optionally, the path.

Name of file for Dial and Modem information

[PCSDIAL.DIR ]

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

```

Figure 25. Auto Dialing File Specification for Home3270

The panel in Figure 25 is used to indicate the file that will contain the dialing information, if you will be using automatic dialing. Use the default file name PCSDIAL.DIR or any name you prefer. If you don't want automatic dialing, just leave the field blank.

As we will be using automatic dialing, let's use the default name PCSDIAL.DIR and press F8 to go to the Directory Setup, Dial Information panel shown on the next page.

**Note:** You can customize automatic dialing later by invoking the Automatic Access Utility (type PCSAAU from the PC/3270 directory at the DOS command prompt). Please refer to 3.2.3, "The Home3270 Automatic Access Utility for DOS (Entry-Level Mode)" on page 41 for more details.

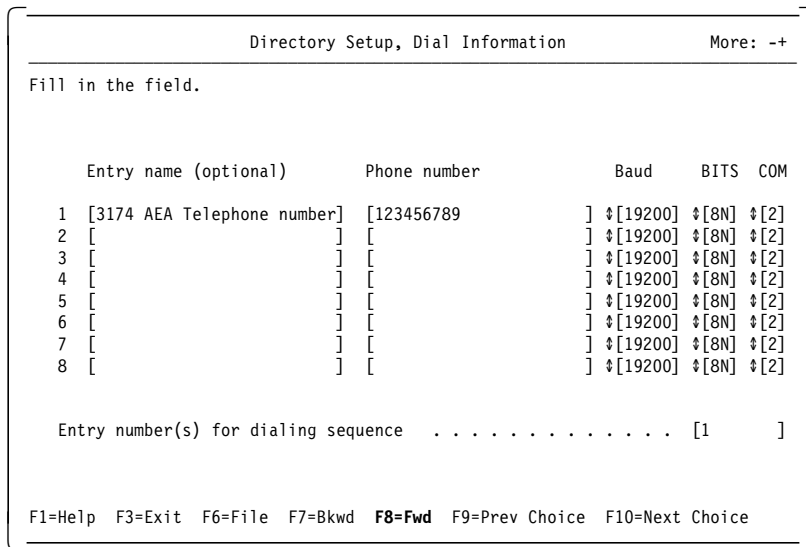


Figure 26. Directory Setup, Dial Information - Home3270

In this panel, you can make up to eight telephone-number entries, and you can specify in which order they will be used. The values for the Baud, BITS and COM fields were taken from the Communication Parameters panel (Figure 24 on page 36), but you can change them if you want to.

Press F8 to go to the Directory Setup, Modem Selection panel.

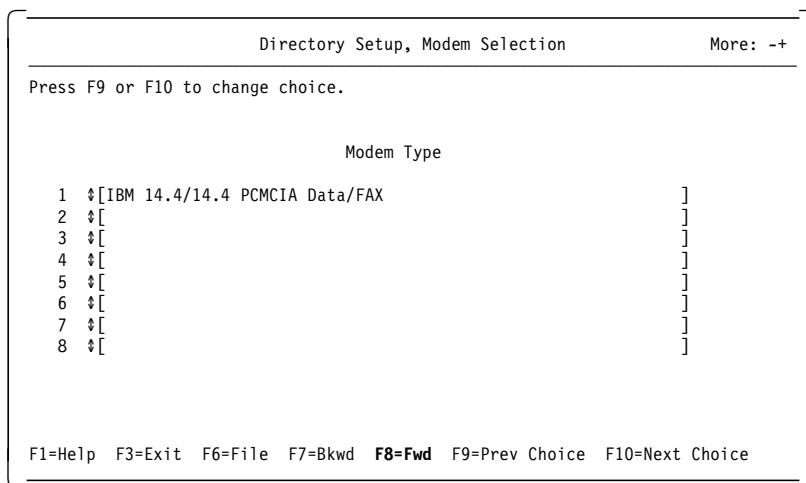


Figure 27. Directory Setup, Modem Selection - Home3270

On this panel, you can select the modem you will use for each directory entry. If you don't find the modem you want in the list provided, you can choose a similar one, or choose one of the user-programmable items and then customize it in the next panel.

Press F8 to go to the Directory Setup, Modem General Parameters panel.



Directory Setup, Modem General Parameters										More: -+
Fill in the field										
	Retries			Response Time			Keying Delay		Delay	
	Init	Config	Dial	Init	Config	Dial	Init	Config	between calls	
1	[0]	[0]	[0]	[5 ]	[2 ]	[60]	[10]	[2 ]	[20]	
2	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	
3	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	
4	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	
5	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	
6	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	
7	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	
8	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	
F1=Help F3=Exit F6=File F7=Backward <b>F8=Forward</b>										

Figure 28. Directory Setup, Modem General Parameters - Home3270

The information shown in Figure 28 is closely related to the Directory Setup, Modem Commands/Responses panel shown in Figure 29 on page 40. When you start Home3270 (configured for auto dialing) the following events occur:

1. Initialization command sent to the modem
2. Initialization response sent back by the modem (usually OK)
3. Configuration command sent to the modem
4. Configuration response sent back by the modem (usually OK)
5. Dial command sent to the modem (usually ATDT/tn\r)
6. Dial response sent back by the modem (usually CONNECT)

In the panel shown in Figure 28, you can specify how many times an Initialization, Configuration or Dial command should be repeated (retries) if it fails.

The Response Time columns (Init, Config and Dial) indicate the maximum time (in seconds) that PC/3270 must wait for the respective response. If the response doesn't arrive by the time specified, the command will fail.

The Keying Delay columns (Init and Config) indicate how long (in tenths of a second) PC/3270 will delay between characters while transmitting the Initialization and Configuration commands.

The Delay between calls column indicates how long PC/3270 will wait before it makes a new dialing attempt.

Having set the fields according to your modem requirements, press F8 to go to the Directory Setup, Modem Commands/Responses panel.

```

Directory Setup, Modem Commands/Responses          More: -+
-----
Press F9 or F10 to change choice.

Dial entry number
    ⚡[1] [IBM 14.4/14.4 PCMCIA Data/FAX          ]

Maximize throughput          ⚡[Off]

Initialization command      [ATZ0&F\r          ]
Initialization response     [OK          ]

Configuration command       [AT&C1&D3%CO%E1X4W2\r          ]
Configuration response      [OK          ]

Dial command
[ATDT/tn\r          ]
Dial response               [CONNECT          ]

Hang-up command             [+++ATH0\r          ]

Auto-answer on command      [+++ATS0=1\r          ]

F1=Help  F3=Exit  F6=File  F7=Bkwd  F8=Fwd  F9=Prev Choice  F10=Next Choice

```

Figure 29. Directory Setup, Modem Commands/Responses - Home3270

In this panel, you have the default settings for the modem you chose. If you specified more than one telephone number in the Directory Setup, Dial Information panel (Figure 26 on page 38), you can see the different entries by pressing F9 or F10 while the cursor is in the Dial entry number field.

The default settings are not necessarily coded for higher-speed connections (V.32bis), error correction (V.42 or MNP 2-4) and compression (V.42bis or MNP 5). To use those features, consult your modem documentation to set the required commands in the fields of the panel in Figure 29. Remember, the protocol converter modem may be different from the one you are using, and you must configure your workstation's modem to be compatible with the other.

Let us explain the meaning of some of the items in Figure 29:

- AT**                    An AT command follows.
- \r**                    This means a carriage return.
- /tn**                   This represents the telephone number to be dialed.
- ATZ0&F\r**            This sets the modem to the original factory settings. If these settings are unsuitable, change the Initialization and/or the Configuration command.
- ATDT/tn\r**            This is the Dial command. The number will be dialed in tone mode (DT). If it were a rotary (pulse) dialing, the DT would be replaced by DP.

If you set the Maximize throughput field to **On**, the Configuration command field will be cleared so that you can enter settings that will make best use of the modem's capabilities (V42bis, etc.).

Having finished the customization in Figure 29, press F6 to go to the End of Customization panel.

### 3.2.3 The Home3270 Automatic Access Utility for DOS (Entry-Level Mode)

When you configure the Home3270 attachment, you have the option to customize your automatic dialing by specifying a file name (default is PCSDIAL.DIR) that will contain dial and modem information. The Automatic Access Utility (AAU) uses this file.

The AAU can be used for two purposes:

1. Automatic-dial setup

You can establish or alter your dial setup for the chosen dialing directory file.

2. Automatic-dial execution

You can select specific entries to be dialed (this assumes that PCOMM is already started).

To invoke the Automatic Access Utility, type PCSAAU at the DOS command prompt. The panel shown below will appear.

```

Select Advanced Dial Options                                     More: -+
-----
Fill in the field.
Name of dialing directory file
      [PCSDIAL.DIR                                           ]

Automatic dial setup
Automatic dial execution

Exit to DOS

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

```

Figure 30. Select Advanced Dial Options - PCSAAU.EXE

#### Automatic dial setup

If you need to create or change a dial setup, type in the dialing-directory file name, choose **Automatic dial setup**, then press F8. You will get the Directory Setup, Dial Information panel shown in Figure 26 on page 38. Read the text that follows that panel.

#### Automatic dial execution

If you want to perform an automatic dial to a host, fill in the dialing-directory file-name, choose Automatic dial execution, then press F8. Follow the instructions displayed.

### 3.2.4 Configuring a Home3270 Connection for Windows or OS/2

To configure a Home3270 connection in a Windows 3.x or OS/2 environment, double-click the **Start/Configure Session** icon or, if you have already started a session, click **Communication** on the menu bar and then click **Configure...** in the pull-down menu, to get to the Customize Communication panel shown below.

**Note:** All the panels shown in this section are from the OS/2 version of PCOMM.

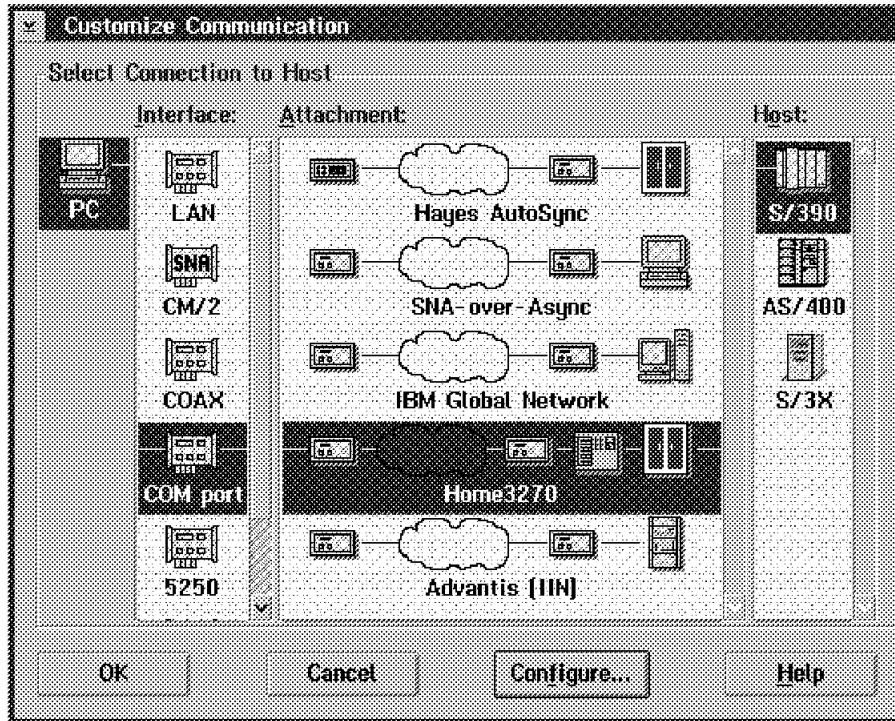


Figure 31. Customize Communication Panel - Home3270

Choose the **S/390** Host, the **COM port** Adapter or Interface, and the **Home3270** Attachment in that order. Then click **Configure...** to get to the Customize Communication-3270 Host panel. Make any choices you want, then click **Configure Link...** to get to the Home3270 Attachment panel shown below.

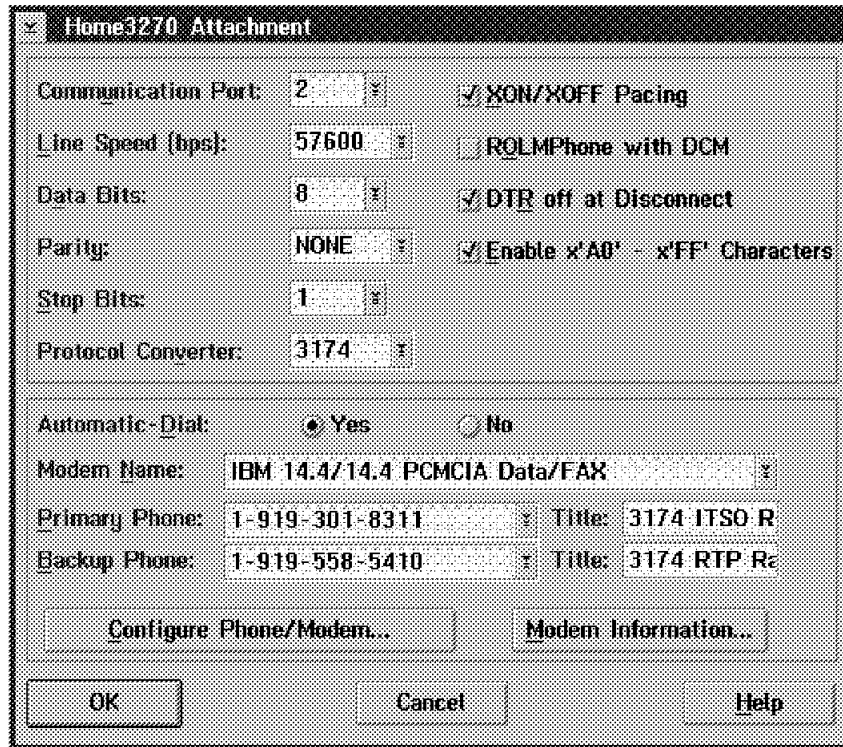


Figure 32. Home3270 Attachment Panel

The Home3270 Attachment panel lets you customize all relevant parameters for the communication line (in the upper box) and for the Automatic-Dial functions (in the lower box).

### The Upper Box

Let us start with the communication-line parameters in the upper box.

**Note:** If you are not familiar with how communications works and what the various options do, you might like to look at Appendix B, “Communications Terminology and Tutorial” on page 341.

#### Communication Port

Enter here the number (1, 2, 3 or 4) of the COM port that you will use.

#### Line Speed (bps)

This would be better called Port Speed; it represents the maximum amount of data (number of bits) that can be transmitted and received per second between the COM port and the modem. The usable speed depends on the capability of the processor and the port. The maximum speed currently supported is 57600 bps, if you are using modems with V.32bis and V.42bis capability. If your connection fails, try a lower speed.

#### Data Bits

This indicates how many bits make up a character. The default is 8, which is necessary for national language support in some countries.

**Parity**

Parity indicates the transmission-error-checking scheme, in which an extra bit is added to some unit of data. The default is **none**, which some countries need to support their national-language character sets.

**Stop Bits**

A Stop Bit is used to signify the end of a transmitted character. The valid values are 1 or 2. Use the default (1) unless you have to use 2 for some particular reason.

**Note:** The line speed, number of data bits, parity and number of stop bits must match those set for the protocol converter (3174 in our case) and modems.

**Protocol Converter**

A Protocol Converter is required between your PC and the host to translate your PC's ASCII codes into host EBCDIC codes so that they can talk to each other. PCOMM can be attached to the protocol converter directly, through ROLM equipment, or through a modem.

You can choose from the following options:

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

The difference between "3708" and "3708A" concerns the support level of the host-file-transfer system.

For our environment, we selected the **3174**.

**XON/XOFF Pacing**

This is also known as software flow control. It allows PCOMM to control (pace) the rate of character transfer so as to avoid sending or receiving characters faster than they can be processed.

If this is checked, PCOMM stops sending when it receives an XOFF (DC3) character from the host, and resumes when it receives an XON (DC1). PCOMM also sends XOFF and XON to the host when the host is sending characters faster than PCOMM can receive them. If this is not checked, PCOMM will not send or respond to XON/XOFF characters. However, if your data includes XOFF or XON characters, you may get some strange results. The default is checked.

**Note:** XON/XOFF pacing is required if you want to do file transfer.

**ROLMphone with DCM**

This indicates whether the workstation is attached to a ROLMphone with DCM (Data Communication Module) or not.

If this is checked, the workstation uses only "Data Set Ready" (DSR) to determine connection; some special communication processing is done. If this is not checked, the workstation uses both Data Set Ready and Data Carrier Detect (DCD) to determine connection.

**DTR off at Disconnect**

This lets you disconnect from the host if you choose **Disconnect** in the Communication pull-down menu or when you close the session; if this is checked, the host connection is dropped. Otherwise the host connection remains active (DTR stays on). The default is **checked**.

**Enable x'A0' - x'FF' Characters**

Enable x'A0' - x'FF' indicates how the characters between x'A0' and x'FF' are displayed in the session window. If this is checked, you can see the characters between x'A0' and x'FF' as they are. If it is not checked, characters between x'A0' and x'FF' are converted to characters between x'20' and x'7F' in 8-bit mode, and Shift Out (SO) is ignored in 7-bit mode. The default is **checked**.

**The Lower Box**

The explanation of fields in the lower box is as follows:

**Automatic Dial**

If you do not want to use **Automatic Dial**, click the **No** radio-button.

**Modem Name**

The **IBM 14.4/14.4 PCMCIA Data/FAX** modem has been selected in our example; select the modem you are using. The information required to configure, initialize and use many modems is included in PCOMM. If your own modem is not in the list, select one that is similar and change the modem information as necessary (Figure 35 on page 48).

Specify the telephone number to be dialed and the text that you want displayed when PCOMM makes the call:

**Primary Phone**

This is the first number that the modem dials; it can include delays for the dial tone and access codes for an outside line or for long-distance services.

**Backup Phone**

This is a backup number that will be dialed automatically if the primary number is unobtainable; it is optional.

**Title**

This is a message that displays when the number is dialed; its purpose is only to make the destination more easily recognized.

You may need to look at or change items in the Configure Phone/Modem panel, which lets you customize more specific information, including telephone numbers, communication-line parameters, and instructions to the modem that you will use. These are discussed in the next section.

### 3.2.5 The Home3270 Automatic-Dial Facility (ADF) for Windows or OS/2

If you chose **Yes** for Automatic-Dial on the Home3270 Attachment panel (Figure 32 on page 43), you can modify many of the ADF parameters by clicking the **Configure Phone/Modem...** button.

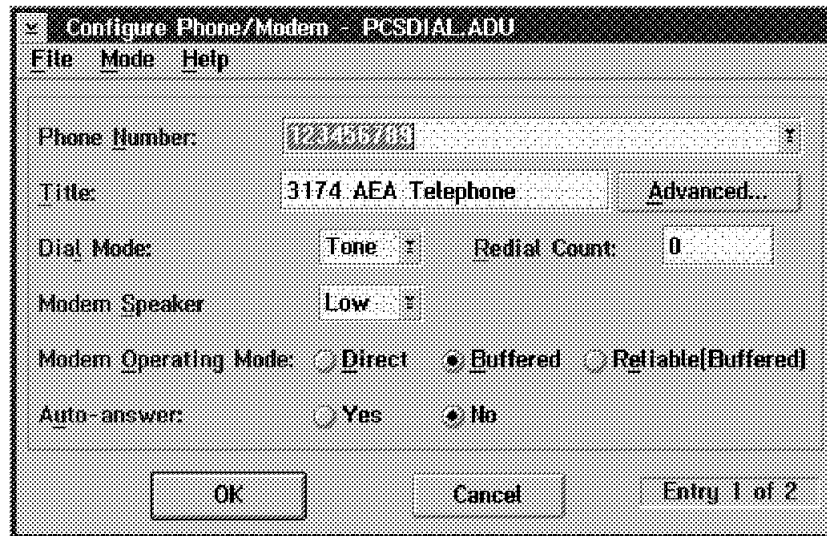


Figure 33. Configure Phone/Modem - PCSDIAL.ADU - Home3270

The Configure Phone/Modem - PCSDIAL.ADU panel allows you to create, save, and change information that is used by the Automatic-Dial Facility. The information includes telephone numbers, communication-line parameters, and instructions to the modem that you will use. A dial-configuration file can have up to 20 entries, and includes a single table that contains the information defining the commands sent to, and the responses expected from, a modem. More information is available by clicking **Help**.

If you have entered more than one telephone number, you will be presented with a list, from which you can select the one you need.

You can change the parameters discussed below. Note that you can change them separately for each number but you must save the changes for one number before you make changes for another; if you do not, the changes for the previous number will be lost.

#### **Dial Mode**

One of these dialing modes can be set:

**Tone** Select **Tone** for phone lines that support multifrequency dialing.

**Pulse** Select **Pulse** for older phones, such as those with a rotary dial, that use pulse dialing.

#### **Redial Count**

This specifies the number of times that the ADF dials the number if it cannot establish a connection with the previous dial. If it fails to connect at all, it tries the backup number.

#### **Modem Speaker Volume**

Lets you control the volume of the modem's speaker. The options are low, medium, high and off.



## Modem Operating Mode

There are three modes in which the modem can operate:

### Direct

This mode assumes that the DCE (modem) speed is identical to the serial-port speed. The modem must establish a direct mode, or non-buffered, normal connection. If your modem does not support CTS/RTS local flow control, choose this mode.

### Buffered Mode

In Buffered mode, the connection does not use any form of modem-to-modem flow control, error correction (ECL), or compression (MNP). The modem must establish a normal-mode (speed-buffered) connection. To do so, the modem uses unidirectional CTS local flow control.

### Reliable Mode (Buffered)

In Reliable mode, the modem must establish a reliable-mode (speed-buffered, error-correcting (ECL)) connection. This connection may optionally use modem data compression (MNP). Generally, ITU-T V.42bis data compression is achieved in addition to ITU-T V.42 error control. Because this standard usually provides a compression ratio of up to 4:1, the serial-port speed should be greater than modem-to-modem speed. The modem uses bidirectional CTS/RTS local flow control.

### Auto-answer

If you choose **Yes**, the modem will answer incoming calls automatically.

## Configure Phone/Modem - Advanced

Clicking the **Advanced...** button gives you some more options to customize:

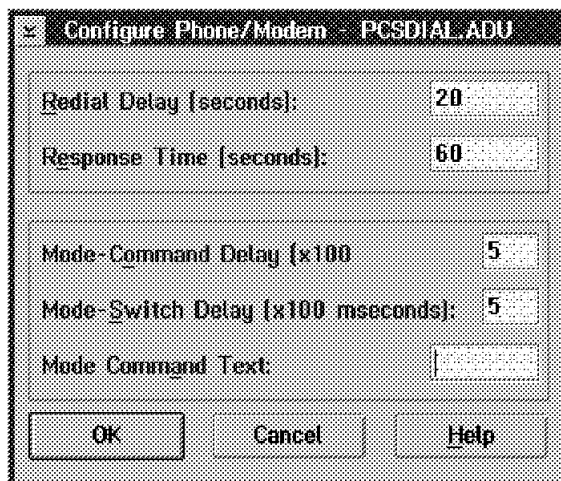


Figure 34. Configure Phone/Modem - PCSDIAL.ADU - Home3270 (Advanced)

### Redial Delay

This is the period, in seconds (1-99), that the ADF must wait before dialing again. The delay allows time for the modem and communication circuits to reset themselves and stabilize before the next attempt.

### Response Time

The period, in seconds, that the automatic-dial facility waits for the connection to be completed. If the period ends before the connection is made, the attempt fails.

### Mode-Command Delay

The length of the delay, in tenths of a second (0-99), between establishing the connection and transmitting the mode command text.

### Mode-Switch Delay

The length of the delay, in tenths of a second (0-99), between transmitting the mode command text and entering SNA mode. The receiving system configures itself to the specified mode in order to receive your transmission. If the delay is too small, the connection may not be stable when the mode command is sent, resulting in a lost command. If the delay is excessive, the network may automatically assume its default mode.

### Mode Command Text

You can enter here some text that is to be sent to the receiving host system; this tells the host how to configure itself to suit the characteristics of your transmission.

**Note:** For the 3174 AEA protocol converter, the Mode Command Text field must be left blank, otherwise the connection will fail.

When you have finished, close the Automatic-Dial Facility panels by clicking **OK**; you will be prompted to save the changes.

## 3.2.6 Modem-Control Information for Windows or OS/2

If you selected **Yes** for Automatic-Dial on the Home3270 Attachment panel (Figure 32 on page 43), you can modify or configure the commands that are sent to your modem by clicking the **Modem Information...** button.

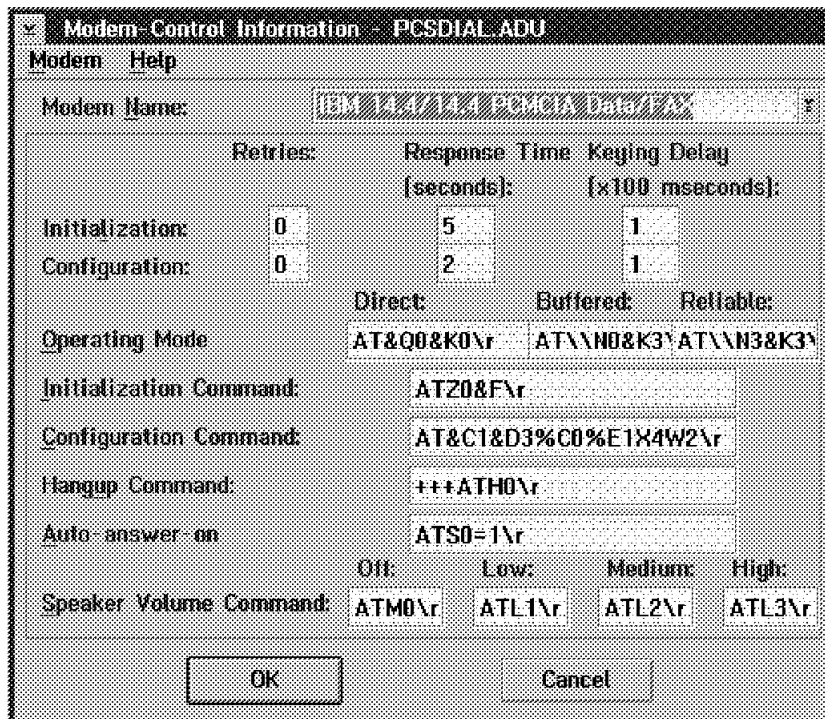


Figure 35. Modem-Control Information - PCSDIAL.ADU - Home3270

This panel allows you to change the predefined modem-control information and to add the information for your own modem. If your own modem is not in the list, select one that is similar and change the modem information as necessary.

To create a definition for a new modem, click **Modem** in the menu bar and then click **Add Modem**.

**Note:** We strongly recommend that you be familiar with the modem command set before changing anything.

### 3.2.7 Special Considerations for the Home3270 Connection

Pay special attention to the following Home3270 configurations.

The support provided by protocol converters for 3270 functions varies, as follows:

#### 25th Status Line (OIA)

When the workstation is attached to either a 3174 AEA or a 3708, the OIA can be used in the same manner as on a 3270 terminal.

#### Terminal Type and Terminal Definition Tables

When connecting to the 3270 session, enter the correct terminal type from the list below or select TDT (terminal definition table) for a 7171.

<i>Table 5. Terminal Type and Terminal Definition Tables</i>		
<b>Protocol Converter</b>	<b>Color</b>	<b>Monochrome</b>
3174 AEA	FC	FM
3708	FTTERM Color	FTTERM Mono
7171	TDT	TDT
9370 ASCII	FTTERMC	FTTERM

#### File Transfer Considerations

File Transfer uses the host file-transfer program commonly known as INDØFILE. The following list shows details of which versions of INDØFILE are required for the protocol converters. Your host system administrator can verify whether the host requirements are met.

Also, you need to configure XON/XOFF pacing in both the protocol converter and PCOMM.

- For 3174 AEA:
  - Home3270 configuration
    - XON/XOFF Pacing must be checked.
  - Protocol Converter setting
    - Bit 6 (File Transfer Aid) of Question 125 (Miscellaneous Feature Options) must be set 1
    - Question 731 (Flow Control Type) must be set 1 (XON/XOFF)
  - Host File Transfer programs
    - For VM/CMS, IBM 3270-PC File Transfer Program Release 1.1.1.
    - For MVS/TSO, IBM 3270-PC File Transfer Program Release 1.1.1.
    - VSE System Product 3.2 with Intelligent Work Station (IWS).

- For 9370:
  - Home3270 configuration
    - XON/XOFF Pacing must be checked
  - Protocol Converter settings
    - Parity Errors = 2 (Ignore) must be defined
    - Pacing must be set to 1 (XON/XOFF)
  - Host File Transfer programs
    - For VM/CMS, IBM 3270-PC File Transfer Program Release 1.1.1.
    - For MVS/TSO, IBM 3270-PC File Transfer Program Release 1.1.1.
    - VSE System Product 3.2 with Intelligent Work Station (IWS).
- For 7171:
  - Home3270 configuration
    - For 7171s at EC A31864 or later, XON/XOFF Pacing must be checked.
  - Host File Transfer programs
    - For VM/CMS, IBM 3270-PC File Transfer Program Release 1.1.1.
    - For MVS/TSO, IBM 3270-PC File Transfer Program Release 1.1.1.
    - VSE System Product 3.2 with Intelligent Work Station (IWS).
- For 3708:
  - Home3270 configuration
    - XON/XOFF Pacing must be checked.
  - Protocol Converter settings
    - Transmit XON/XOFF must be set 1.
  - Host File Transfer programs
    - For VM/CMS, IBM 3270-PC File Transfer Program Release 1 or later.
    - For MVS/TSO, IBM 3270-PC File Transfer Program Release 1 or later.
    - VSE System Product 2.1 with Intelligent Work Station (IWS).
    - VSE System Product 3.1 with Intelligent Work Station (IWS).
    - VSE System Product 3.2 with Intelligent Work Station (IWS).
    - For MVS/CICS and VSE/CICS, IBM CICS/VS 3270-PC File Transfer Program.

#### **Performance Consideration**

PCOMM's Home3270 connection supports line speeds up to 57,600 bps. However, depending on the system performance of your machine, you may lose characters at high line speeds. If you see garbage on the screen, or some lines on the screen shifted to the left, or frequent failure of file transfer, please try a lower line speed.

**FIFO mode support**

If the serial-port controller on your machine does not support FIFO mode, you may often experience a loss of characters. With the Home3270 connection, PCOMM does not support the use of PCs which do not have FIFO mode. However, you might be able to use a Home3270 connection on machines that have a port speed of 600 bps or less.

**EMS configurations *not* supported**

Note that PC/3270 Entry DOS doesn't support expanded memory (EMS) to increase the amount of memory available for DOS applications.

**Restriction on COM-Port settings**

PCOMM's asynchronous connections support only the default settings of the communication port. If you change the base I/O port address or Interrupt Request Line (IRQ), the program does not correctly recognize your port.

**Restriction on Interrupt Sharing**

PCOMM's asynchronous connection uses interrupt levels (IRQ) 3 and 4 for hardware control. If you try to share the same interrupt level with another device, this will stop communications.

**Communication-check indicators for Home3270**

A Home3270 connection requires both DSR (Data Set Ready) and CD (Carrier Detect) to determine the host-session condition.

- If DSR is not present, communication check 501 is displayed in the OIA.
- If CD is not present but DSR is, communication check 504 is displayed.
- When PCOMM Home3270 recognizes that both DSR and CD are present, an "A" is displayed in the first column of the OIA and the communication check indicator disappears.

If you select ROLMphone with DCM attachment in the customization, Home3270 requires only DSR to determine that the host session is active; communication check 504 is never displayed.

**Character Sequences *not* supported**

The following character sequences are accepted by the PCOMM Home3270 connection as valid character sequences, but do not function:

- ESC P 1 (Block Cursor command)
- ESC P 0 (Underline Cursor command)
- DLE DC2 (Start Printer command)
- DLE DC4 (Stop Printer command)

### 3.2.8 Customizing the 3174-11R AEA

In our example, we have an SDLC-connected 3174. This is just one model that supports the AEA adapter; the configuration of the AEA in other models will be the same, so you can use this as a guide.

The following panels show the options that were used to customize our 3174. Refer to the *IBM 3174 Establishment Controller Planning Guide*, GA27-3918 for details about these questions. Question 100 is the model number, and Question 101 is the Host Attachment, where 2 is SDLC Nonswitched.

```

                _____ Model / Attach _____

Online Test Password  098 -

Product Assistance Data
099 - 3174 11R ITS0 CARY with AEA

3174 Model          100 - 11R

Host Attachment      101 - 2  (1-BSC          6-SDLC, X.21 Switched
                             2-SDLC          7-Token-Ring
                             3-X.25         8-Ethernet
                             4-Non-SNA Channel 9-Frame Relay
                             5-SNA Channel  M-Multi-host)

LAN adapter type     102 - 0  (0-none
                             1-Token-Ring
                             2-Ethernet)

NS0 selection        103 - 0000000000000000

Select Test; press ENTER ==>

PF: 3=Quit 8=Fwd 12=Test Menu

```

Figure 36. 3174 Model Definition Panel

The 3174 Configuration Screen - SDLC Definitions (Figure 37 on page 53) has most of the questions and appears fairly complicated at first. We will review some of the questions, what they mean and how they relate to other definitions:

- Q 104: Controller Address is the SDLC Poll (station) address of the 3174; it must match the controller address specified on the ADDR operand of the NCP PU statement. See the NCP generation on Figure 45 on page 59.
- Q 105: Upper Limit Address, is the SDLC Poll address of the last Downstream Physical Unit. Since this 3174 does not have the Gateway feature enabled, the response is 00.
- Q 110: Presentation Space (PS) Storage Support (Includes MLT Support), is the level of MLT support (CUT terminals with multiple sessions). Entering anything other than a 0 will take up 3174 memory. We have 6MB of memory on this machine, so we will enter a 1 here.
- Q 116: Individual Port Assignment allows host logical units to be assigned to ports. We have entered 1 (Yes) in order to be able to assign the required number of addresses for each port later, in Q 117.
- Q 125: Miscellaneous Feature Options (A), Digit 2 - Unsupported Control Code Translate, is a 1, specifying that invalid hex characters will display as a hyphen instead of giving the user a PROG402 error. Digit 6 - File Transfer Aid *must* be a 1 if you want to do file transfer in CUT mode.

- Q 126: Miscellaneous Feature Options (B), Digit 2 - Coax Timeout Period, is set to a 1 to increase the coax timeout period from 50 to 100 microseconds. This reduces the likelihood of PROG207 errors.
- Q 127: Response Time Monitor (RTM) Definition, defines the response time monitor options. This takes some 3174 memory. We chose the full set of RTM support.
- Q 150 : Gateway (LAN and ISDN), is 0 0. This 3174 will not act as a LAN/ISDN gateway.
- Q 215 : Physical Unit Identification (Controller) is not applicable to SDLC nonswitched 3174s.
- Q 220 : Alert/CMIP Event Report Function defines the alert capability. Entering a 0 indicates none.
- Q 313 : NRZ or NZRI Encoding, must match your NCP Gen LINE NRZI= parameter. We entered a 1 here because we specified NRZI=YES in the NCP GEN. See Figure 45 on page 59.
- Q 340 : RTS Control Response Options, can be set to 1 if you have a point-to-point data link, and your modems will allow it. If you are in doubt, set this to a 0.
- Q 370 : Maximum Inbound I-Frame Size specifies the maximum size allowed for a frame that comes from the NCP. 1 represents 521 bytes. The matching value in the NCP is MAXDATA=521 on the PU macro. See Figure 45 on page 59.

```

          _____ SDLC _____
104 - C1      105 - 00      108 - 23H1811    110 - 1 0000    116 - 1  _
121 - 01      123 - 0       125 - 01001100    126 - 01000000    127 - 5 1
132 - 0 0 0 0  136 - 1 1 0 1  137 - 0 0 0 0    138 - 0
141 - A       150 - 0 0      165 - 1         166 - A         168 - 0
173 - 00000101 175 -         179 - 0 0 0
213 - 1       215 - 00000    220 - 0
310 - 0       313 - 1       317 - 0         318 - 0         340 - 1
365 - 0       370 - 1

```

Select Test; press ENTER ==>

PF: 3=Quit 7=Back 8=Fwd 12=Test Menu

Figure 37. 3174 Configuration Panel - SDLC Definitions

- Q 501 : Network ID, is left blank here. If you enter anything, this network ID must match the NETID parameter in your ATCSTRxx VTAM start list.
- Q 510 : APPN Network Controller - entering 0 indicates that APPN is not active.

```

          _____ Common SNA _____

500 - 0          501 - _____          502 - _____

APPN Support Fields:

510 - 0          511 - _____          512 - _____

PF: 3=Quit    4=Default    7=Back    8=Fwd    9=RtnH

```

Figure 38. 3174 Common SNA Panel

- Q 117 : Port Assignment is the port to host LU assignment. Ports 26-xx and 27-xx are for coax connections. Ports 21-xx through 23-xx are for the AEA connections. In our example, we will assign one host LU (IS=1) to AEA ports 21-00 through 21-07:

```

          _____ 117: Port Assignment _____

Host addresses          Host addresses
Port IS 1 2 3 4 5      Port IS 1 2 3 4 5

21-00 1 010  ___ ___ ___ ___
21-02 1 012  ___ ___ ___ ___
21-04 1 014  ___ ___ ___ ___
21-06 1 016  ___ ___ ___ ___

22-00 0  ___ ___ ___ ___
22-02 0  ___ ___ ___ ___
22-04 0  ___ ___ ___ ___
22-06 0  ___ ___ ___ ___

23-00 0  ___ ___ ___ ___
23-02 0  ___ ___ ___ ___
23-04 0  ___ ___ ___ ___
23-06 0  ___ ___ ___ ___

21-01 1 011  ___ ___ ___ ___
21-03 1 013  ___ ___ ___ ___
21-05 1 015  ___ ___ ___ ___
21-07 1 017  ___ ___ ___ ___

22-01 0  ___ ___ ___ ___
22-03 0  ___ ___ ___ ___
22-05 0  ___ ___ ___ ___
22-07 0  ___ ___ ___ ___

23-01 0  ___ ___ ___ ___
23-03 0  ___ ___ ___ ___
23-05 0  ___ ___ ___ ___
23-07 0  ___ ___ ___ ___

Select Test; press ENTER ==>

PF: 3=Quit  7=Back  8=Fwd  12=Test Menu

```

Figure 39. 3174 - Question 117 Port Assignment



### 3.2.9 AEA Configuration Questions

Here we configure a fairly simple AEA setup. You should review Chapter 15 "Planning for the AEA and TCP/IP", in the *3174 Establishment Controller Planning Guide*, GG27-3918-02.

Here is the configuration:

- Two port sets:
  1. 3270 Coax Ports
  2. Switched ports
- Three station sets:
  1. 3270 SNA Host
  2. 3270 Coax Displays
  3. PC/3270 9600bps switched lines

First we will answer the basic AEA setup questions:

- Question 700 : Configure the AEA and TCP/IP feature. 1 0 turns on the AEA feature and turns off the TCP/IP feature (assuming that you do not want to use TCP/IP).
- Question 702 : Control Key Assignment uses the default assignment of 1.
- Question 703 : Request MLT for AEA. We did not configure MLT support.
- Question 710 through 731 are miscellaneous options. In Question 710, we set the following:
  - Digit 2 - Automatic new line at end of print.
  - Digit 3 - DSR timing for deactivating connections, two second delay.
  - Digit 4 - DSR timing for activating connections, 500ms delay.
  - Digit 6 - Status Line Update to YES.

```
_____ AEA and TCP/IP Configure _____

700 - 1 0
702 - 1
703 - 0
710 - 01110100    711 - 00000000    712 - 00000000    713 - 00000000

Select Test; press ENTER ==>
PF: 3=Quit 8=Fwd 12=Test Menu
```

Figure 40. 3174 Configuration Panel - AEA Configure

Now we have to define the port sets. Port Set 1 is a 3270DSP port. Port Set 2, PCOMSW, is a switched-port set (2) with a Hayes-type modem (1) (actually an IBM7855). We will use Port Set PCOMSW for our PCOMM workstation (IBM ThinkPad). Both ports have only one session.

Port Set				
Name	Session Limit	Port Type	Modem Type	Password
1 = 3270DSP	1	1		
2 = <b>PCOMSW</b>	<b>1</b>	<b>2</b>	<b>1</b>	
3 = _____	-	-	-	
4 = _____	-	-	-	
5 = _____	-	-	-	
6 = _____	-	-	-	
7 = _____	-	-	-	
8 = _____	-	-	-	
9 = _____	-	-	-	
10 = _____	-	-	-	
11 = _____	-	-	-	
12 = _____	-	-	-	
13 = _____	-	-	-	
14 = _____	-	-	-	
15 = _____	-	-	-	
16 = _____	-	-	-	

Select Test; press ENTER ==>

PF: 3=Quit 7=Back 8=Fwd 12=Test Menu

Figure 41. 3174 Configuration Panel - AEA Port Set

Now we have to map the previously defined port sets to actual ports. We will map the 3270DSP port set to the coax hardware ports 26-00 through 26-07, and the PCOMSW switched-port set to AEA ports 21-00 through 21-07:

Port to Port Set Map								
Type the port set number to group the 3174 ports								
AEA Ports	0	1	2	3	4	5	6	7
21-00 to 21-07	2	2	2	2	2	2	2	2
22-00 to 22-07	-	-	-	-	-	-	-	-
23-00 to 23-07	-	-	-	-	-	-	-	-
Port Sets								
02 = PCOMSW								
Select Test; press ENTER ==>								
PF: 3=Quit 7=Back 8=Fwd 12=Test Menu								

Figure 42. 3174 Configuration Panel - AEA Port to Port Set Map

Now we have to define three station sets (Host, 3270DSP, and PC3270). The first two are fairly easy. The third is the switched port set, which will have several options that *must* match the PCOMM configuration.

1. 3270 Host Station Set:

- Q 721 is the host name. We entered the network name of our host USIBMRAL. You can enter anything you want, but make it something descriptive.
- Q 722 is a 3H for 3270 Host.
- The rest of the questions are ignored.

2. 3270 Display Station Set:

- Q 721 is the name of the display station set. We entered 3270 Displays, which was meaningful to us.
- Q 722 is 3D for 3270 Displays.
- Q 723 *must* match the previously defined 3270 Port Set: 3270DSP.
- The rest of the questions can be ignored.

```
_____ AEA and TCP/IP Station Set _____

1 721 - USIBMRAL_____ 722 - 3H 723 - _____ 725 - 1
731 - 1 732 - 1 733 - 0 734 - _____ 735 - 0 736 - 1 737 -
741 - 000 742 - 015 743 - 1 744 - 0 745 - 0 746 - 0 0
751 - _____ 752 - _____
761 - 1 762 - 1 763 - 1 764 - 1 765 - 0
771 - 1 772 - 1 773 - 1 774 - 1 775 - 1 776 - 1
781 - 0 782 - 0 783 - 066 784 - 1 785 - 11111000 786 - 132 787 - 0

2 721 - 3270 DISPLAYS_____ 722 - 3D 723 - 3270DSP_ 725 - 1
731 - 1 732 - 1 733 - 0 734 - _____ 735 - 0 736 - 1 737 -
741 - 000 742 - 015 743 - 1 744 - 0 745 - 0 746 - 0 0
751 - _____ 752 - _____
761 - 1 762 - 1 763 - 1 764 - 1 765 - 0
771 - 1 772 - 1 773 - 1 774 - 1 775 - 1 776 - 1
781 - 0 782 - 0 783 - 066 784 - 1 785 - 11111000 786 - 132 787 - 0

Select Test; press ENTER ==>

PF: 3=Quit 7=Back 8=Fwd 12=Test Menu
```

Figure 43 (Part 1 of 2). 3174 Configuration Panel - AEA Station Set

```
_____ AEA and TCP/IP Station Set _____

3 721 - PC3270 ASYNC THINKPAD_____ 722 - FC 723 - PCOMSW_ 725 - 0
731 - 0 732 - 1 733 - 7 734 - _____ 735 - 3 736 - 1 737 - 7
741 - 000 742 - 015 743 - 0 744 - 1 745 - 0 746 - 0 0
751 - _____ 752 - _____
761 - 1 762 - 1 763 - 1 764 - 1 765 - 0
771 - 1 772 - 1 773 - 1 774 - 1 775 - 1 776 - 1
781 - 0 782 - 0 783 - 066 784 - 1 785 - 11111000 786 - 132 787 - 0

4 721 - _____ 722 - _____ 723 - _____ 725 - 1
731 - 1 732 - 1 733 - 0 734 - _____ 735 - 0 736 - 1 737 -
741 - 000 742 - 015 743 - 1 744 - 0 745 - 0 746 - 0 0
751 - _____ 752 - _____
761 - 1 762 - 1 763 - 1 764 - 1 765 - 0
771 - 1 772 - 1 773 - 1 774 - 1 775 - 1 776 - 1
781 - 0 782 - 0 783 - 066 784 - 1 785 - 11111000 786 - 132 787 - 0

Select Test; press ENTER ==>

PF: 3=Quit 7=Back 8=Fwd 12=Test Menu
```

Figure 43 (Part 2 of 2). 3174 Configuration Panel - AEA Station Set

It is important to get these responses accurate and to match what is configured in PC/3270.

### 3. PC3270 ASYNC THINKPAD Station Set:

- Q 721 is the name of the switched station set. We entered PC3270 ASYNC THINKPAD, which was meaningful to us.
- Q 722 is an FC for FTTERM color station. This is also used for PC/3270 color stations.
- Q 723 *must* match the previously defined switched port set: PCOMSW.
- Q 725 is set to 0 because we have only one host.
- Q 731 is set to 0, which means no flow control. This setting is used because hardware flow control (RTS/CTS) will be used on the PC/3270 side.
- Q 732 does not apply as we are not using XON/XOFF flow control.
- Q 733 is the line speed; **7** = 19200bps, because we are using a modem that supports V.42bis (DTE speeds up to 57600 bps). The communication line speed will be up to 14400 bps with V.32bis. Make sure your modem supports these speeds; if in doubt, use slower speeds to start with.
- Q 734 is for hosts only (ignored).
- Q 735 is set to **3** which means no parity.
- Q 736 is set to **1** for 1 stop bit. This is the PC/3270 default and it *must* match.
- Q 737 is set to **7** for 19200 bps line speed.
- Q 744 is set to **1** for 8 data bits per character.
- The rest of the questions are ignored.

The last thing to configure is the default host destination for the display-station sets. In our case, station sets 2 and 3 will go to destination 1, which is the host.

_____ AEA and TCP/IP Default Destination _____							
Station Set	Station Set Name	Session Limit	Session				
			LT1	LT2	LT3	LT4	LT5
1	USIBMRAL	0	—	—	—	—	—
2	3270 DISPLAYS	1	1	—	—	—	—
3	PC3270 ASYNC THINKPAD	1	1	—	—	—	—
4		0	—	—	—	—	—
5		0	—	—	—	—	—
6		0	—	—	—	—	—
7		0	—	—	—	—	—
8		0	—	—	—	—	—
9		0	—	—	—	—	—
10		0	—	—	—	—	—
11		0	—	—	—	—	—
12		0	—	—	—	—	—
13		0	—	—	—	—	—
14		0	—	—	—	—	—
15		0	—	—	—	—	—

Select Test; press ENTER ==>

PF: 3=Quit 7=Back 8=Fwd 12=Test Menu

Figure 44. 3174 Configuration Panel - AEA Default Destination

### 3.2.10 NCP Generation for 3174-11R

These are the statements in the NCP GEN that define the Group, Line, PUs and LUs that are connected to the Remote 3174. The PU for the 3174 has 18 LUs defined; we could have defined more, but this is just a test system.

```

*****
* GROUP MACRO FOR SDLC LEASED LINES                                     *
*****
GSDLCLL  GROUP DIAL=NO,                                             *
          LNCTL=SDLC,                                             *
          REPLYTO=1.0,      ONE SECOND TIMEOUT                    *
          TYPE=NCP,                                             *
          CLOCKNG=EXT,      LN  MODEM CLOCKING                    *
          DUPLEX=FULL,      LN  REQUEST TO SEND ALWAYS UP        *
          ETRATIO=30,      LN  DEFAULT                            *
          LPDATS=(LPDA2),   LN  LPDA2 FOR 5866                    *
          NEWSYNC=NO,      LN  NO NEW SYNC FOR THIS LINE         *
          NPACOLL=YES,     LN  NPA COLLECTION                      *
          NRZI=YES,      LN  NRZI ENCODING                        *
          PAUSE=0,         LN  NO PAUSE                            *
          RETRIES=(3,4,5), LN  3 RETRIES, 4 SEC WAIT, 5 TIMES    *
          SPEED=14400,     LN  MODEM SPEED                        *
          SERVLIM=4,      LN  10 TIMES THRU SOT BEFORE RETRY     *
          ANS=CONT,       PU  DON'T BREAK X-DOMAIN SESSIONS      *
          MAXDATA=521,    PU  MAXIMUM PIU FOR 3174                *
          MAXOUT=7,      PU  SEND UP TO 7 PIUS BEFORE RESP      *
          PACING=0,      PU  LET PACING BE SET BY BIND           *
          PASSLIM=8,     PU  MAXIMUM CONSECUTIVE PIUS TO PU      *
          PUTYPE=2,      PU  PU TYPE 2.0 OR 2.1                  *
          SRT=(,64),     PU  ERROR THRESHOLD TO 64               *
          VPACING=0,     PU  VTAM PACING                          *
          MODETAB=MT3270, LU  DEFAULT LOGMODE TABLE            *
          DLOGMOD=DYNAMIC, LU  DEFAULT LOGMODE ENTRY            *
          SSCPFM=USSSCS, LU  CHARACTER CODED COMMANDS           *
          USSTAB=USSNSCS, LU  SNA USS TABLE                    *
          ISTATUS=ACTIVE
*****
* LINE MACRO FOR 3174 #8                                             *
*****
L37148  LINE ADDRESS=(00,HALF)      DATA HALF DUPLEX
          SERVICE ORDER=(PU31748)
PU31748  PU  ADDR=C1
LU317482 LU  LOCADDR=2,DLOGMOD=T3278M2
LU317483 LU  LOCADDR=3
LU317484 LU  LOCADDR=4
LU317485 LU  LOCADDR=5
LU317486 LU  LOCADDR=6
LU317487 LU  LOCADDR=7
LU317488 LU  LOCADDR=8
LU317489 LU  LOCADDR=9
LU31748A LU  LOCADDR=10
LU31748B LU  LOCADDR=11
LU31748C LU  LOCADDR=12
:
LU31748J LU  LOCADDR=19

```

Figure 45. Group Macro for a 3174 Attached by a SDLC Leased Line

### 3.3 Hayes AutoSync Attachment

Hayes AutoSync is a communication mode in which the modem provides synchronous communication to the host while using an asynchronous interface on the workstation. The modem calls asynchronously at first, then automatically switches to synchronous mode when the connection is established. You do not need a multiprotocol or SDLC adapter on the workstation - you use a serial (COM) port. Hayes AutoSync thus provides a simple, cost-effective way to communicate synchronously to the host over a telephone line. From the host-system point of view, the configuration is simple because it is a standard SDLC switched connection.

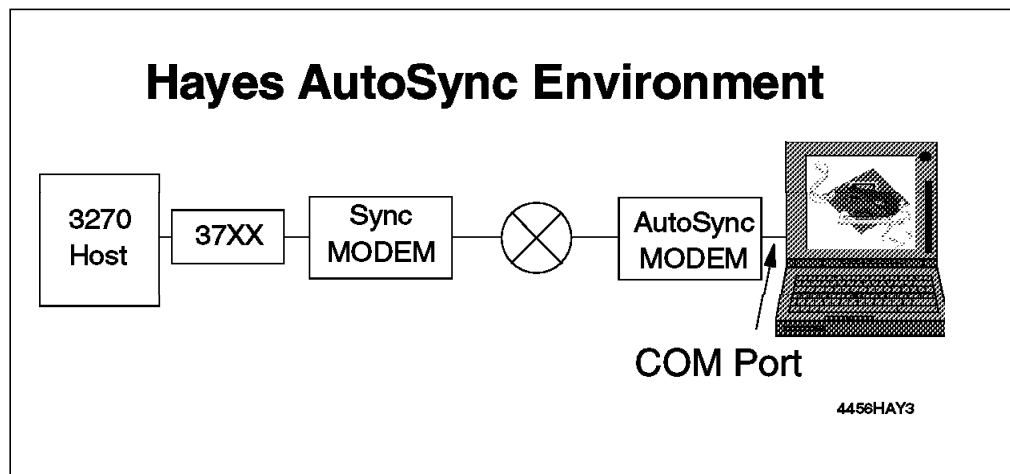


Figure 46. Personal Communications Hayes AutoSync Connections

There are four main requirements for Hayes AutoSync:

1. The modem must support Hayes AutoSync
2. The serial port must be able to use:
  - a. 9600 OR 19200 bps (intermediate speeds are not supported)
  - b. 8 bits
  - c. 1 stop bit
  - d. MARK parity

**Note:** Although you may configure some other parity value (and the default in the configuration panel is NONE because some modems require this when they dial), the Hayes AutoSync connection itself can use only MARK and will change the parity to this when the connection is established.

3. A 486-class PC with a 33MHz CPU (or better)
4. The maximum permissible line speed on the synchronous part of the link is 9600 bps.

### 3.3.1 Configuring a Hayes AutoSync Connection for DOS (Full-Function Mode)

In this section, only the panels related to the Hayes AutoSync configuration will be shown. For general installation and/or customization procedures, refer to 2.2, "Install PC/3270 for DOS (Full-Function Mode)" on page 12. Step through the installation (INSTALL) or configuration (CONFIG) program until you get the Attachment Types panel shown below.

```
Attachment Types                                     More: -+
-----
Enter the number of sessions you want to use.

Total number of sessions for:

Distributed Function Terminal (DFT) . . . . . [0]
LAN via 802.2 protocol . . . . . [0]
LAN via NETBIOS . . . . . [0]
LAN via TCP/IP (Telnet 3270 Attachment) . . . . . [0]
LAN via IPX/SPX (NetWare-for-SAA Gateway Attachment) . . . . . [0]
3174 Peer Communication . . . . . [0]

Synchronous Data Link Control (SDLC) . . . . . [0]

Asynchronous Data Link Control (ASYNCH) for IIN . . . . . [0]
SNA-over-Async . . . . . [0]
Hayes AutoSync . . . . . [2]

CCITT X.25 Network (X.25) . . . . . [0]

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

Figure 47. Attachment Types - Hayes AutoSync - for DOS (Full-Function Mode)

We have specified two sessions for Hayes AutoSync.

Press F8 to go to the Advanced Options for Asynchronous Attachment panel shown below.

```
Advanced Options for ASYNChronous Attachment       More: -+
-----
Press F9 or F10 to change the choice.

Total number of sessions . . . . . 2
Communication port . . . . . †[2]
Number of sessions for this port . . . . . [2]
SDLC station address . . . . . [C1]
PUI size . . . . . [0265]
NRZI encoding . . . . . †[Yes]
Physical Unit ID . . . . . [05428]
Block ID . . . . . [05D]

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

Figure 48. Advanced Options for Async Attachment

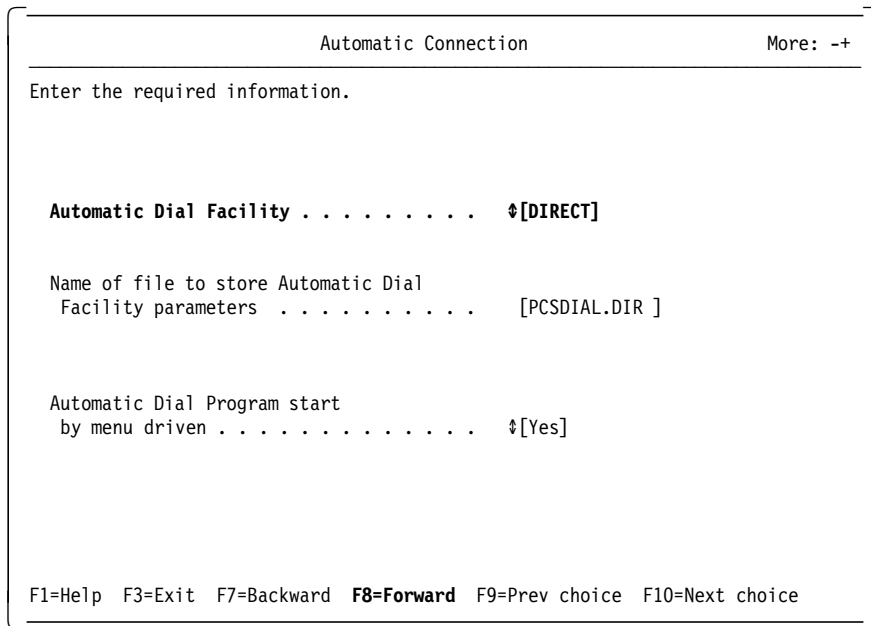


Figure 49. Automatic Connection - Hayes AutoAsync

DIRECT is the fixed setting for the Automatic Dial Facility field because you cannot use a PAD connection for Hayes AutoSync. You can change the name of the file that will contain the dialing parameters. To configure the dial facility, you will be led through a series of panels, which are explained in 3.5.2, “The Automatic Dial Facility - for DOS (Full-Function Mode)” on page 81.

The third option, Automatic Dial program start by menu-driven defaults to No. This means that you have to execute the PCSDIAL program manually from the DOS prompt. It is better to set this to Yes, which means that you will be presented with a menu, from which you can make PCOMM dial (and also hang up and other things).

### 3.3.2 Configuring a Hayes AutoSync Connection for Windows or OS/2

To configure a Hayes AutoSync connection in a Microsoft Windows 3.1 or OS/2 environment, double-click the **Start/Configure Session** icon or, if you have already started a session, click **Communication** on the menu bar, and then **Configure...** in the pull-down menu, to get to the Customize Communication panel shown below.

**Note:** All the panels shown in this section are from the OS/2 version of PCOMM.



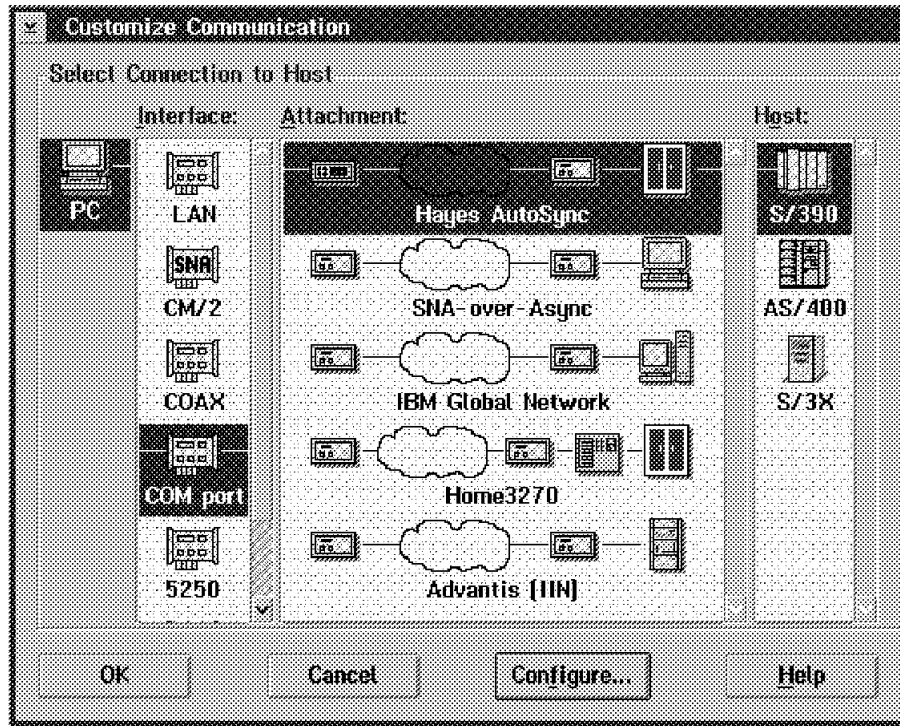


Figure 50. Customize Communication Panel - Hayes AutoSync

Choose the **S/390 Host**, the **COM port** and the **Hayes AutoSync** attachment, in that sequence, as shown in Figure 50. Then click **Configure...** to get to the Customize Communication-3270 Host panel. Make any choices you want, then click **Configure Link...** to get the Hayes AutoSync Attachment panel shown below.

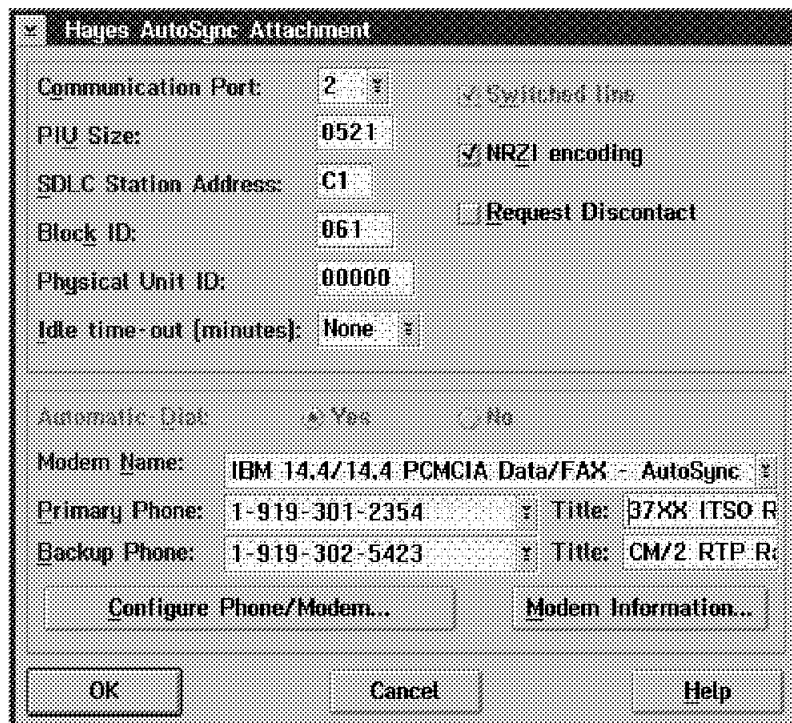


Figure 51. Hayes AutoSync Attachment Panel

This panel lets you customize the parameters for the communication line (in the upper box) and for the Automatic-Dial functions (in the lower box). Let us start with the communication-line parameters in the upper box.

### **The Upper Box**

**Note:** If you are not familiar with how communications works and what the various options do, you might like to look at Appendix B, "Communications Terminology and Tutorial" on page 341.

#### **Communication Port**

This is the number of the communication port. We chose **2** to match the PCMCIA configuration.

#### **SDLC Station Address**

This parameter represents the address of the secondary station (in this case, your workstation), which is defined in the NCP generation by the ADDR= keyword on the PU statement.

#### **Block ID**

This is the identification number for the type of device or program that is going to connect to the host system; it is concatenated with the physical unit ID and sent to the host via the XID (eXchange ID) command. The default is 061 but you can use whatever has been defined as the IDBLK at the host (often 017).

#### **Physical Unit ID**

The PUID identifies your workstation in an SNA network. The value must match the IDNUM= statement in the PU definition of the VTAM switched major node. The value entered is concatenated with the block ID to form an exchange ID (XID), which acts as a "password" by which your workstation is allowed to connect to the host.

#### **Idle Time-out**

PCOMM disconnects from the host if no screen or keyboard activity has taken place during the period that you specify here.

#### **Switched Line**

The Hayes AutoSync connection supports only a switched-line connection, so you cannot change this.

#### **NRZI encoding**

Specifies whether your connection will use Non Return to Zero Inverted encoding. The choice must match the way the line is defined at the host, in the NCP generation, by the NRZI= keyword on the LINE statement.

#### **Request Disconnect**

If this option is chosen, PCOMM sends a request for disconnection to the SSCP when you disconnect from the host. All currently activated sessions on the line will be made inactive and the line will be disconnected (you must re-dial to make a new connection).

### **The Lower Box**

You must use the Automatic-Dial Facility, so it is already chosen. Choose the modem you will use (or a similar one), and then enter a primary phone number and, optionally, a title for that, and a backup phone number and title.

The **IBM 14.4/14.4 PCMCIA Data/FAX** modem has been selected in our example; select the modem you are using. The information required to configure, initialize and use many modems is included in PCOMM. If your own modem is not in the list, select one that is similar and change the Modem Information as necessary (please refer to Figure 35 on page 48).

You may need to look at or change items in the Configure Phone/Modem panel, which lets you customize more specific information, including telephone numbers, communication line parameters, and instructions to the modem that you will use. These are discussed in 3.2.5, "The Home3270 Automatic-Dial Facility (ADF) for Windows or OS/2" on page 46. For Hayes AutoSync, you can change the line speed and the bits per character/parity by clicking **Advanced**.

### 3.3.3 Hayes AutoSync Configuration - the Last Step (Windows 3.x)

Hayes AutoSync cannot work with the virtual communications device driver that PCOMM v4.1 provides; it must use the type of attachment provided in PCOMM v4.0, which requires a DOS TSR program (PCSHAM.EXE).

When you configure this attachment, you will see a message telling you that you must start Windows with PCSWIN.BAT, not with the WIN command. The best thing is to call PCSWIN.BAT from AUTOEXEC.BAT. PCSWIN.BAT calls PCSTSR.BAT, which loads the TSR program, starts Windows, and ends the TSR program when you close Windows.

---

## 3.4 SNA-over-Async Attachment

The SNA-over-Async attachment allows SNA traffic to flow across asynchronous (start/stop) communication lines. You can use a switched (dial-up) or a dedicated, non-switched (leased) connection.

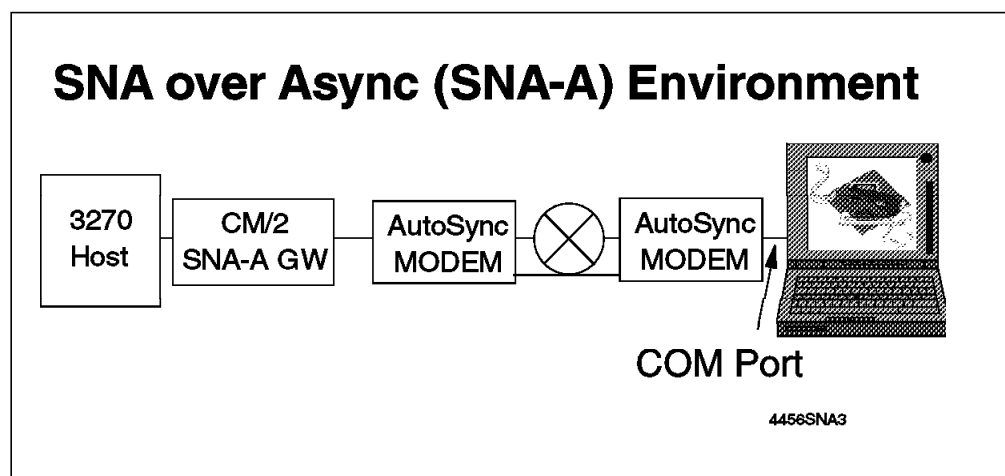


Figure 52. Personal Communications SNA-Over-Async Connections

For a 3270 session, you must connect to a gateway (Communications Server or other); for a 5250 session, you will normally connect to the ASCII Workstation Controller of an AS/400, though you could connect to a gateway, such as those provided by the IBM Global Network.

### 3.4.1 PC/3270 SNA-over-Async Attachment Scenario Description

In this environment, we have a ThinkPad connected to an IBM Communications Server SNA Gateway.

The equipment used is as follows:

- ThinkPad Model 720 with an IBM DATA/FAX Modem PCMCIA (14.4 kbps/14.4 kbps with Integrated DAA)
  - Personal Communications AS/400 and 3270 Version 4.1 for OS/2
- PS/VP Model 6384-189 with an IBM 7855 Model 10 modem
  - Communications Server configured for SNA-A Gateway

### 3.4.2 Configuring SNA-over-Async for DOS (Full-Function Mode)

In this section, only the panels related to the SNA-over-Async configuration will be shown. For general installation and/or customization procedures, refer to 2.2, “Install PC/3270 for DOS (Full-Function Mode)” on page 12.

Step through the installation (INSTALL) or configuration (CONFIG) program until you get to the Attachment Types panel shown in Figure 53.

SNA-OVER-ASYNC ATTACHMENT

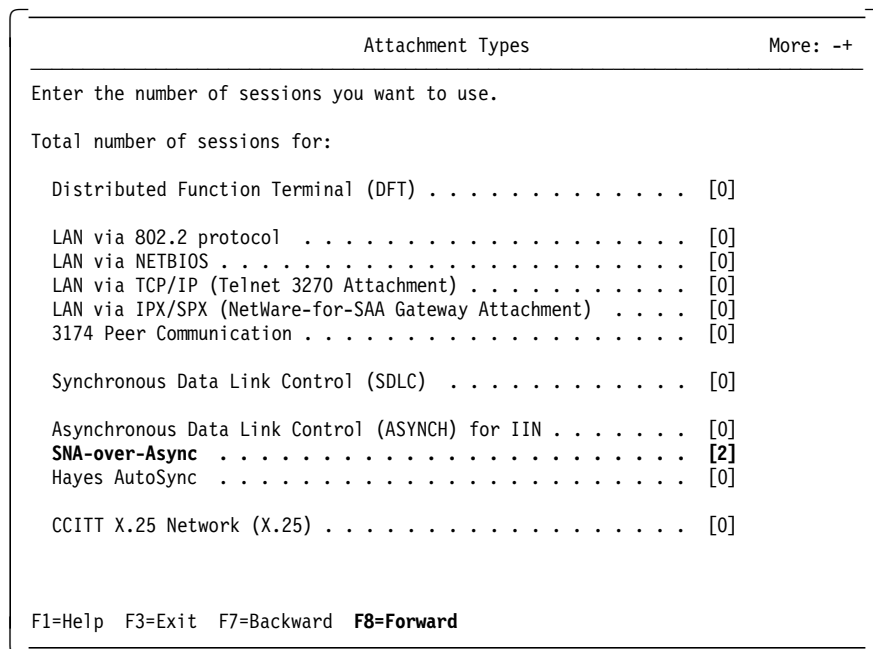


Figure 53. Attachment Types - SNA-over-Async - for DOS (Full-Function Mode)

Press F8 to go to the Advanced Options for Asynchronous Attachment panel shown in Figure 54 on page 67.

## Advanced Options for ASYNChronous Attachment - Part I

```
Advanced Options for ASYNChronous Attachment, part I      More: -+
-----
Press F9 or F10 to change the choice.

Total number of SNA/A sessions . . . . .      2
Communications port . . . . .                ⚡[2]
Number of sessions for this port . . . . .    [2]
Block ID . . . . .                          [05D]
Physical Unit ID . . . . .                  [05428]
Link-station address . . . . .              [C1]
PUI size . . . . .                          [0265]

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

Figure 54. Advanced Options - SNA-over-Async - for DOS (Full-Function Mode), part I

## Advanced Options for ASYNChronous Attachment - Part II

```
Advanced Options for ASYNChronous Attachment, part II    More: -+
-----
Press F10 to change the choice.

Line speed (bits per second) . . . . .      ⚡[1200 ]
Enable transparency negotiation . . . . .    ⚡[No]
Transparency level . . . . .                ⚡[Flow]
Bits per character and parity . . . . .     ⚡[8 None]
Automatic Dial Facility . . . . .          ⚡[DIRECT]
Name of file to store Automatic Dial
  Facility parameters . . . . .              [PCSDIAL.DIR ]
Automatic Dial Program start
  by menu driven . . . . .                  ⚡[No ]

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

Figure 55. Advanced Options - SNA-over-Async - for DOS (Full-Function Mode), part II

If you are going to use automatic dialing, select **DIRECT** for the Automatic Dial Facility field, and also specify the file name that will contain the dialing parameters. You will be led through a series of panels which are explained in 3.5.2, "The Automatic Dial Facility - for DOS (Full-Function Mode)" on page 81.

If you don't select the automatic dial facility, you can set up the dialing parameters later by executing the Automatic Access Utility (PCSAAU).

The last option, Automatic Dial program start by menu driven, defaults to No. This means that you have to execute the PCSDIAL program manually from the DOS prompt. It is better to set this to Yes, which means that you will be presented with a menu, from which you can make PCOMM dial (and also hang up and other things).

### 3.4.3 Configuring an SNA-over-ASYNC Connection for Windows or OS/2

To configure a connection in a Microsoft Windows 3.1 or OS/2 environment, double-click the **Start/Configure Session** icon or, if you have already started a session, click **Communication** on the menu bar, and then **Configure...** in the pull-down menu, to get to the Customize Communication panel shown below.

**Note:** All the panels shown in this section are from the OS/2 version of PCOMM.

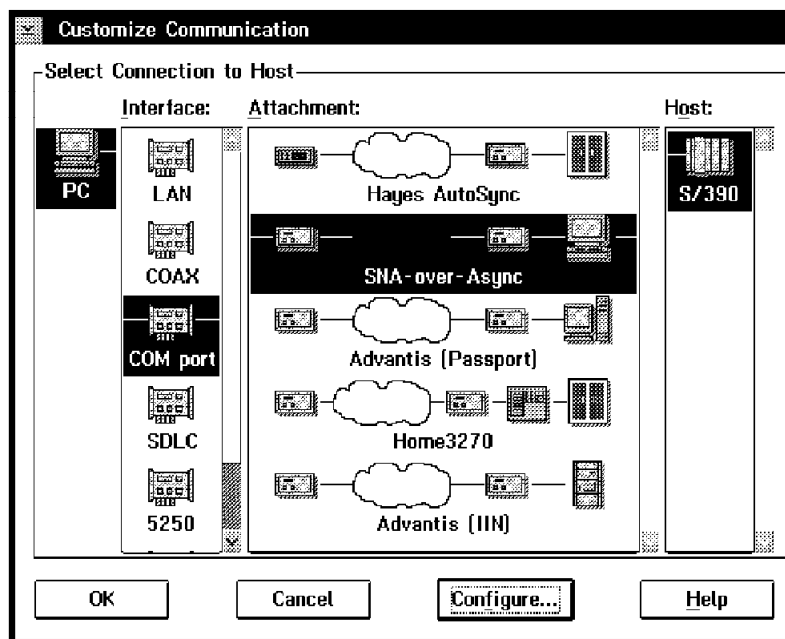


Figure 56. Customize Communication Panel - SNA-over-ASYNC

Choose the **S/390** Host, the **COM port** and the **SNA-over-Async** attachment, in that sequence. Then click **Configure...** to get to the Customize Communication - 3270 Host panel. Make any choices you want, then click **Configure Link...** to get to the SNA-over-Async Attachment panel shown in Figure 57 on page 69.

Figure 57. SNA-over-ASYNC Attachment Panel

This panel lets you customize the parameters for the link specification (upper box), the communication line (the middle box) and the Automatic-Dial functions (the lower box).

**Note:** If you are not familiar with how communications works and what the various options do, you might like to look at Appendix B, “Communications Terminology and Tutorial” on page 341.

## The Upper Box

### Link-station address

This is the address of your workstation on the SNA link. The acceptable range is from “00” to “FF”.

### PIU Size

PIU Size defines the number of bytes in the Path Information Unit that is used for link-level communication - that is, the size of a data frame.

### Block ID

This is the identification number for the type of device or program that is going to connect to the host system; it is concatenated with the physical unit ID and sent to the host via the XID (eXchange ID) command. The default is 061 but you can use whatever has been defined as the IDBLK at the host (often 017).

### Physical Unit ID

This identifies your workstation to the gateway. The value entered is concatenated with the block ID to form an exchange ID (XID), which acts as a “password” by which your workstation is allowed to connect to the gateway.

## The Middle Box

### Communication Port

This is the number of the communication port. We chose **2** to match the PCMCIA configuration.

### Line Speed (bps)

This would be better called port speed; it represents the maximum amount of data (number of bits) that can be transmitted and received per second between the COM port and the modem. The usable speed depends on the capability of the processor and the port. The maximum speed currently supported is 38400bps for OS/2 or 57600 for Windows, if you are using modems with V.32bis and V.42bis capability. If your connection fails, try a lower speed.

### Bits per Character and Parity

Bits per character and parity is the character format used for communication. Bits per character is the number of bits that make up a character; parity indicates the transmission-error-checking scheme, in which an extra bit is added to some unit of data.

- If you choose **7 Even**, a character consists of 7 bits, and 1 bit is used for even parity.
- If you choose **7 Odd**, a character consists of 7 bits, and 1 bit is used for odd parity.
- If you choose **8 None**, a character consists of 8 bits, and no bit is used for parity.

Select the format used on your system. We used the default, **8 None**.

### Line Type

This can be either:

**Non-Switched**      PCOMM will be connected to a dedicated non-switched (leased) line.

**Switched**          PCOMM will be connected to a normal telephone line, and you will dial a number to make the connection.

## SNA-over-Async Attachment - Advanced

Click **Advanced...** to get to the panel shown below.

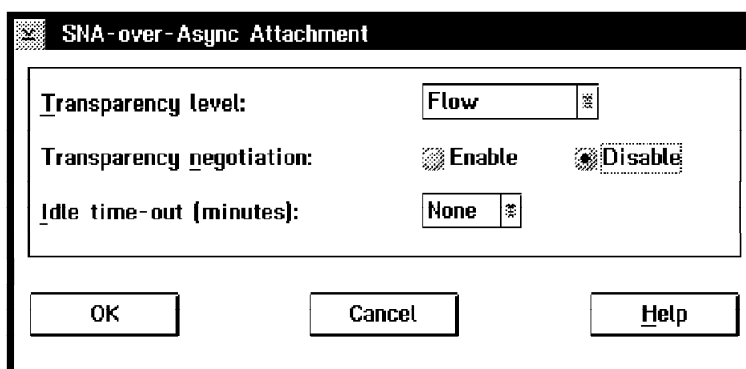


Figure 58. SNA-over-Async Attachment Panel (Advanced)

Transparency means that certain bit sequences are hidden within a frame. The SNA-over-Async attachment is a character-oriented protocol and uses a character-transparency technique which allows the protocol to work across 7-bit async data networks.



## Transparency Level

The following transparency-levels are supported:

- Basic transparency ensures that x'7E' characters that occur in the frame or frame-control sequence are not interpreted as flag characters and that x'7D' characters are interpreted correctly. The following substitutions take place:

- x'7E' is replaced by x'7D5E'
- x'7D' is replaced by x'7D5D'

Basic transparency is used in 8-bits-per-character mode (3270 session only)

- Flow transparency allows for XON/XOFF flow control to be used on a character-by-character basis. The following substitutions take place:

- x'11' is replaced by x'7D31'
- x'13' is replaced by x'7D33'
- x'7E' is replaced by x'7D5E'
- x'7D' is replaced by x'7D5D'

Flow transparency is used in 8-bits-per-character mode.

- Full transparency allows 8-bit data to be transmitted on a link that clears or otherwise corrupts the eighth (most significant) bit of each character. 8-bit data is encoded into 7-bit characters. By this means, 8-bit data can be transmitted on 7-bit networks, such as X.25 connecting from async PAD to async PAD.

- In the same way as in the 'Flow' case above, x'00' to x'1F', x'7D', x'7E' and x'7F' are converted to the x'7Dxx' format.

Full transparency is used in 7-bits-per-character mode.

**Note:** The transparency-level is dictated by the Bits-per-character/Parity value - if you choose 7 Even or Odd, you must use Full transparency; if you choose 8 None, you must use Basic (3270 session only) or Flow.

## Transparency-mode negotiation

Transparency-mode negotiation allows Personal Communications and a 3270 SNA-over-Async gateway or an AS/400 to configure dynamically the asynchronous line, the character format and the transparency level to be used. Without such negotiation, both Personal Communications and the gateway must be configured manually before communications is attempted. Choose **Enable** if you want to enable transparency-mode negotiation.

**Note:** If you choose **Enable**, the partner (gateway) must also support transparency-mode negotiation.

## Idle Time-out

PCOMM disconnects from the host if no screen or keyboard activity has taken place during the period that you specify here.

## The Lower Box

If you do not want to use Automatic Dial, click the **No** radio button. See "The Lower Box" on page 45 for more information.

You may need to look at or change items in the Configure Phone/Modem panel, which lets you customize more specific information, including telephone numbers, communication line parameters, and instructions to the modem that you will use.

Please refer to 3.5.5, "Configuring the Automatic-Dial Facility for Windows or OS/2" on page 87, which describes how to configure the Configure Phone/Modem - PCSDIAL.ADU panel.

### 3.4.4 Communications Server Gateway Configuration Process

This section describes the configuration of an SNA-A gateway provided by Communications Server for OS/2 Warp Version 4.0.

1. Start the Communications Server Installation and Setup program.



Figure 59. Communications Server Installation and Setup

2. Select **Setup** in the Communications Manager Setup panel to get to the Open Configuration panel shown below.

#### Open Configuration

We shall create SNAAGW as the configuration file for this scenario.

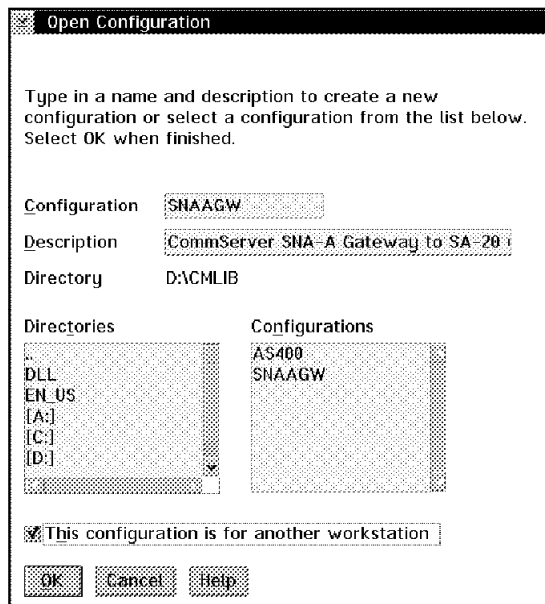


Figure 60. Open Configuration

Click **OK** to go to the Communications Manager Configuration Definition panel shown in Figure 61 on page 73.

## Configuration Definition

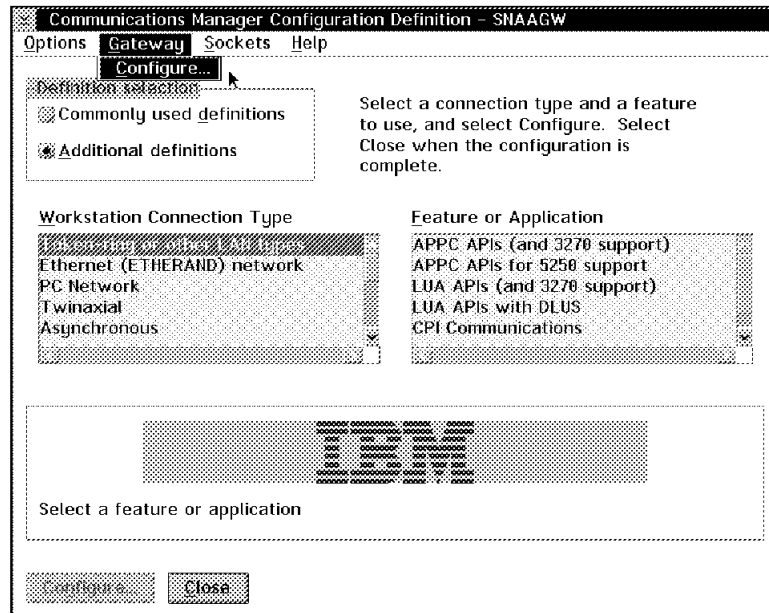


Figure 61. Communications Server Gateway Configuration

Select **Gateway** from the menu bar and click **Configure...** to go to the panel shown below.

## Communications Manager Profile List

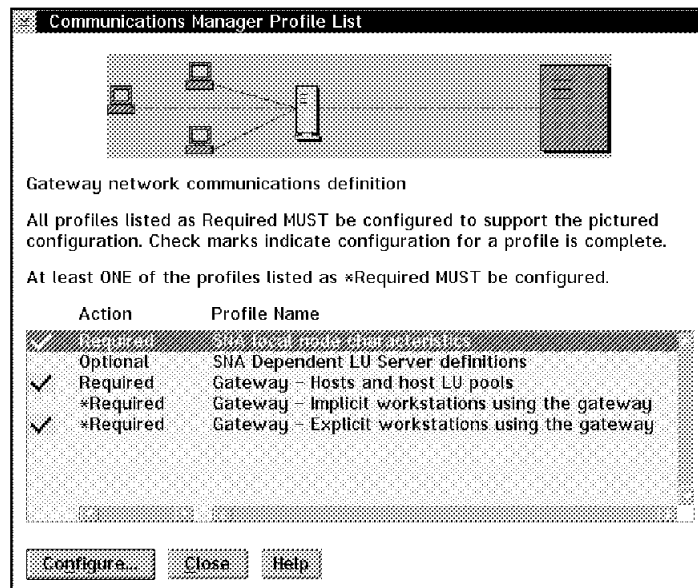


Figure 62. Communications Server Profile List

If this is the first time you have configured the gateway, all the profiles should be without a check mark on the left hand side. Select **SNA local node characteristics** and click **Configure...**, which will display the Local Node Characteristics panel.

## Local Node Characteristics

Local Node Characteristics

Network ID: USIBMRA

Local node name: WTR05132

Node type:

End node

Network node

Local node ID (hex): 05D 05132

Buttons: OK, Options..., NetWare(R), Cancel, Help

Figure 63. Local Node Characteristics

Enter the information required: Network ID, Local node name, and Node type. If you want to change any of the parameters shown in Figure 64, select **Options...**

Local Node Options

Local node alias name: wtr05132

Maximum compression level: NONE

Maximum compression tokens: 0 (0 - 3800)

Optional comment:

Activate Attach Manager at start up

Buttons: OK, Cancel, Help

Figure 64. Local Node Options

## Gateway Hosts and Host LU Pools

Gateway Hosts and Host LU Pools

To create or change gateway DLCs and host links, select Links.  
To create or change host LU pools, select an existing host link and then select Pools.

To delete a host link and its pool definitions, select an existing host link and then select Delete.

Host	Link Name	Number of Host LU Pools	Comment
WIN-2241	IP2		

Buttons: Links..., Pools..., Delete, Close, Help

Figure 65. Gateway Hosts and Host LU Pools

First, click **Links...** to go to the panel shown below. When you have finished with that panel, click **Pools...** to go to the panel shown in Figure 67 on page 75

## Link Parameters

**Token Ring or Other LAN Types DLC Adapter Parameters**

Adapter  (0 - 15)       window count

Free unused links      Send window count  (1 - 8)

Send alert for beaoning      Receive window count  (1 - 8)

Maximum activation attempts  (1 - 99)

Maximum link stations  (1 - 255)

Maximum I-field size  (265 - 16393)

Percent of incoming calls (%)  (0 - 100)

Link establishment retransmission count  (1 - 127)

Retransmission threshold  (1 - 127)

Local SAP (hex)  (04 - 9C)

C&SM LAN ID

Connection network name (optional)  .

Figure 66. DLC Adapter Parameters

In this panel, you will define the parameters for the link between the Communications Server gateway and the host.

## Gateway Host LU Pools

**Gateway Host LU Pools**

Host link name LINK2RAK

**Optional host LU pools**

Pool Name	LU Model Name	Auto Logoff	Host NAU Address Ranges
implicit	3270	None	002 - 010

Optional comment

Figure 67. Communications Server Gateway Host LU Pools

Since we are using pooled LUs, we shall define here the host pools for LINK2RAK, which is the hostlink name used in our scenario.

## Implicit Workstation Definitions

Now, in the Communications Manager Profile List panel (Figure 62 on page 73), select **Gateway - Implicit workstation using the gateway** and click **Configure...** to display the panel below.

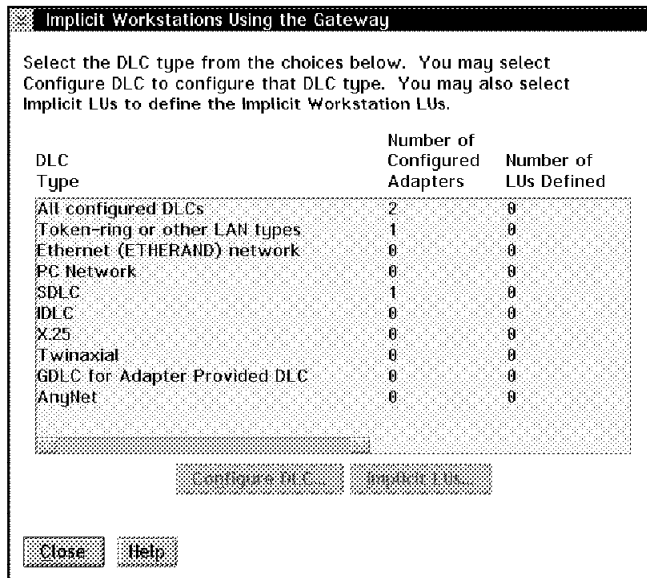


Figure 68. Implicit Workstations Using the Gateway

## Explicit Workstations Definitions

If you want to use explicit-workstation definitions, select **Gateway - Explicit workstations using the gateway** and click **Configure...** in the Communications Manager Profile List panel (Figure 62 on page 73) in order to display the panel below.

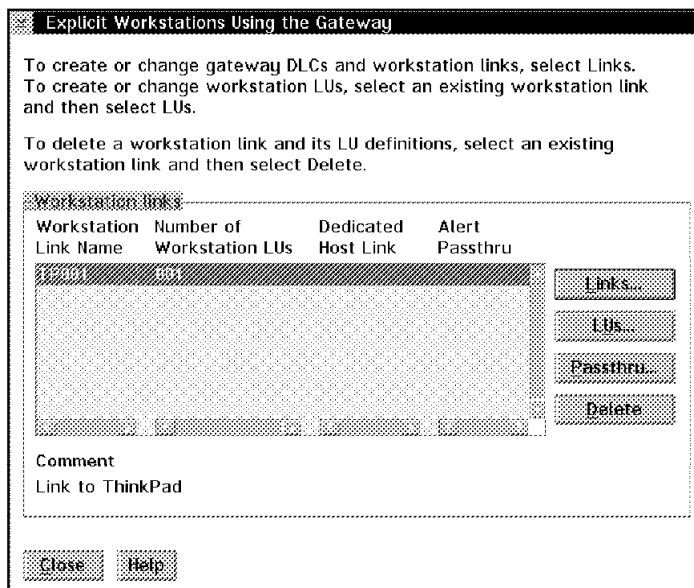


Figure 69. Explicit Workstations Using the Gateway

Select a workstation link name and click **Links...** to go to the panel shown in Figure 70 on page 77.

## Workstation Link Definition

Workstation link name TP001 Dedicated host link

LU Name	Workstation NAU Address	Host Link Name	Host NAU Address or Pool Name	LU Model Name
LU0000A1	002	LINK2RAK	implicit	

Optional comment

Close Help

Figure 70. Workstation Link Definition

Add a comment if you want to, then click **Close**.

## SDLC DLC Adapter Parameters

Adapter: 0 (0 - 127)

Link station role: Primary

User-controlled dialing:

Maximum I-field size: 1033 (265 - 4105)

SNA Phone Connection parameters:

- Accept incoming calls
- Incoming call directory entry: ANYCALL
- Secondary station address (hex): F (01 - FE)

Additional parameters:

- Link deactivation parameters
- Link initialization parameters
- Link station protocol parameters
- Resource parameters

Optional comment

OK Delete Cancel Help

Figure 71. SDLC DLC Adapter Parameters

Check **Accept incoming calls** in the SNA Phone Connection parameters box of this panel so that the gateway can accept calls from the workstation (ThinkPad).

### 3.5 Advantis (IIN) S/1 SNA Gateway Attachment

PCOMM for Full-Function DOS, Windows and OS/2 provide an asynchronous connection to the Advantis network via a Series/1 SNA gateway<sup>2</sup>. Two different types of connection are possible - one by using a switched (dial-up) telephone line directly to a Series/1, the other by using a switched connection to a public PAD on an X.25 network.

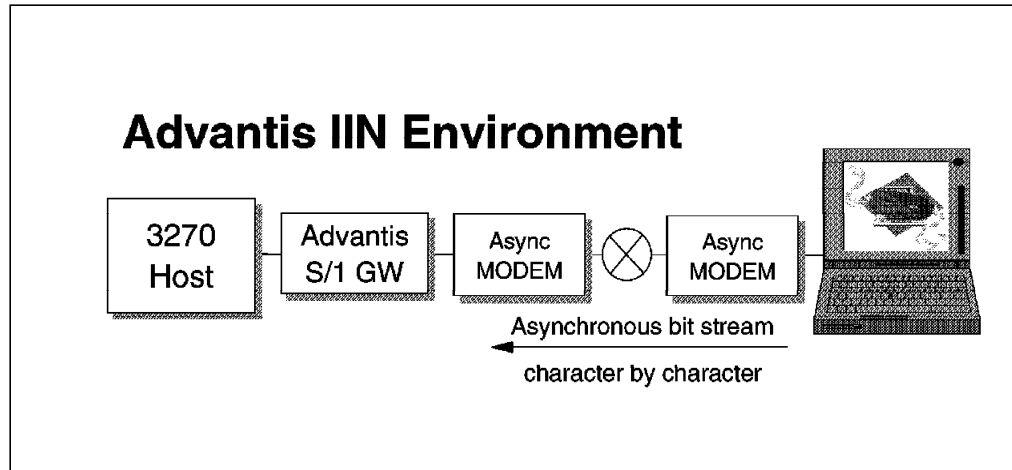


Figure 72. Personal Communications Advantis-IIN Connections

In this example, we have configured an asynchronous connection via the telephone network to a Series/1 SNA gateway in the United States.

#### 3.5.1 Configuring the asynch (IIN) Connection for DOS (Full-Function Mode)

In this section, only the panels related to the ASYNCH attachment configuration will be shown. For general installation and/or customization procedures, please refer to 2.2, "Install PC/3270 for DOS (Full-Function Mode)" on page 12.

Step through the installation (install program) or configuration (CONFIG program) until you get to the Attachment Types panel shown in Figure 73 on page 79.

<sup>2</sup> Advantis was formerly the IBM Information Network (IIN)



## Attachment Types

```
Attachment Types                                     More: -+
-----
Enter the number of sessions you want to use.

Total number of sessions for:

Distributed Function Terminal (DFT) . . . . . [0]
LAN via 802.2 protocol . . . . . [0]
LAN via NETBIOS . . . . . [0]
LAN via TCP/IP (Telnet 3270 Attachment) . . . . . [0]
LAN via IPX/SPX (NetWare-for-SAA Gateway Attachment) . . . . . [0]
3174 Peer Communication . . . . . [0]

Synchronous Data Link Control (SDLC) . . . . . [0]

Asynchronous Data Link Control (ASYNCH) for IIN . . . . . [2]
SNA-over-Async . . . . . [0]
Hayes AutoSync . . . . . [0]

CCITT X.25 Network (X.25) . . . . . [0]

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

Figure 73. Attachment Types

We have specified two sessions; the maximum number allowed for this attachment is 4.

Press F8 to go to the panel shown below.

## Advanced Options for Advantis (IIN)

```
Advanced Options for ASYNChronous Attachment, part I   More: +
-----
Enter the required information.

Total number of ASYNCH sessions . . . . . 2
Block ID . . . . . [F02]

Communications port . . . . . ↕[2]
Number of sessions for this port . . . . . [2]
Physical Unit ID . . . . . [33000]
Link-station address . . . . . [C1]

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

Figure 74. Advanced Options for Asynchronous Attachment (IIN) - Part 1 of 2

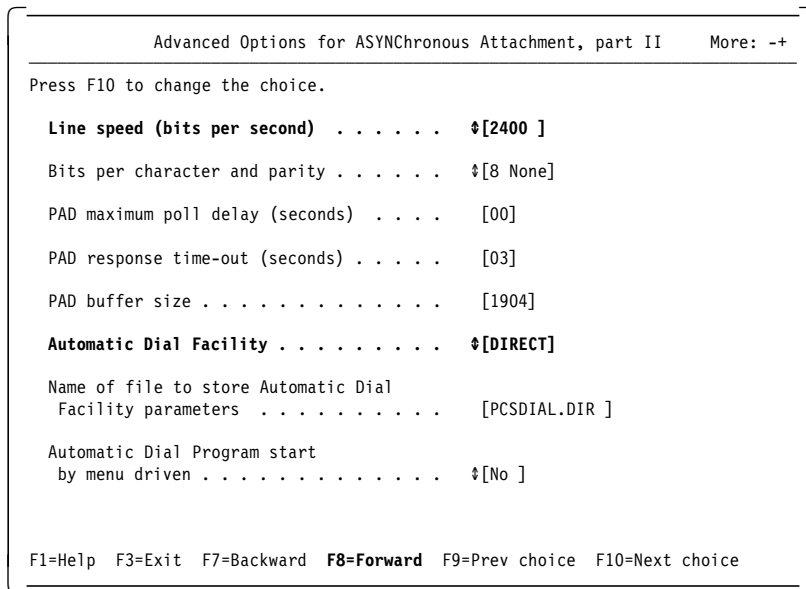


Figure 75. Advanced Options for Asynchronous Attachment (IIN) - Part 2 of 2

The values in these panels must match those set in the gateway. If you are using a port other than COM1, change the number in the Communications port field.

If you are going to use automatic dialing, select **DIRECT** or **PAD** for the Automatic Dial Facility field, and also specify the name of the file that will contain the dialing parameters. When you specify **DIRECT** or **PAD** for the Automatic Dial Facility, you get the panel shown in Figure 76, and then you are led through a series of panels which are explained in 3.5.2, “The Automatic Dial Facility - for DOS (Full-Function Mode)” on page 81.

If you don’t select the automatic dial facility, you can set up the dialing parameters later by executing the Automatic Access Utility (PCSAAU).

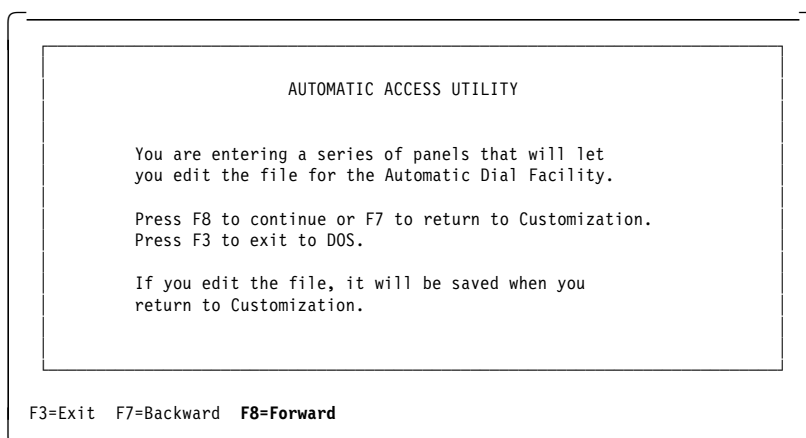


Figure 76. Automatic Access Utility - ASYNCH (IIN)

### 3.5.2 The Automatic Dial Facility - for DOS (Full-Function Mode)

In this section, the panels for automatic dialing direct to a gateway are shown. You can get these panels under two circumstances:

#### 1. Installation or Configuration

When you are installing (install program) or configuring (CONFIG program), you enter the Automatic Access Utility if you selected **DIRECT** for the Automatic Dial Facility field in the Advanced Options for ASYNChronous Attachment panel in Figure 75 on page 80.

#### 2. Automatic Access Utility

You can execute the Automatic Access Utility by entering PCSAAU from the PCOM directory at the DOS command prompt.

For more details about these panels, refer to Figure 26 on page 38 to Figure 29 on page 40 and the associated text in 3.2.2, "Configuring the Home3270 Connection for DOS (Entry-Level Mode)" on page 35, since the ASYNCH (IIN) auto-dialing customization is similar to that for Home3270.

```
Directory Setup, Dial Information                                     More: -+
-----
Fill in the field.

Entry name (optional)      Phone number      Baud  BITS  COM
-----
1 [IIN FOR LOS ANGELES ] [6177057          ] #[2400 ] #[8N] #[1]
2 [                      ] [                      ] #[2400 ] #[8N] #[1]
3 [                      ] [                      ] #[2400 ] #[8N] #[1]
4 [                      ] [                      ] #[2400 ] #[8N] #[1]
5 [                      ] [                      ] #[2400 ] #[8N] #[1]
6 [                      ] [                      ] #[2400 ] #[8N] #[1]
7 [                      ] [                      ] #[2400 ] #[8N] #[1]
8 [                      ] [                      ] #[2400 ] #[8N] #[1]

ENTRY NUMBER(S) FOR DIALING SEQUENCE . . . . . [1 ]

F1=Help F3=Exit F6=File F7=Bkwd F8=FWD F9=Prev Choice F10=Next Choice
```

Figure 77. Directory Setup, Dial Information - ASYNCH (IIN) - for DOS (Full-Function Mode)

In this example, we have entered the telephone number for the IIN Series/1 SNA gateway in Los Angeles, California. Please ask your IBM representative or the IBM IIN Helpdesk for phone numbers that are available in your area.

You can have up to eight telephone entries, and you can determine in which order they will be dialed.

**Note:** Be sure not to use the FEE 800 numbers. FEE 800 numbers will not show up as any cost on your phone bill, but your IIN account will be charged up to 15¢ per hour of connect time when you use these numbers. Be sure of the 800 number you are using!

#### Important note

The telephone numbers for the IIN Series/1 gateways that PC/3270 FF-DOS uses are different from the numbers for Home3270 (PC/3270 Entry DOS) or FTTERM. PC/3270 FF-DOS will not work if you try to use the Home3270 or FTTERM numbers.

## Modem Selection

```

Directory Setup, Modem Selection                               More: -+
-----
Press F9 or F10 to change choice.

Modem Type

1  #[[IBM 5853 (2400 BPS)                                     ]
2  #[                                                         ]
3  #[                                                         ]
4  #[                                                         ]
5  #[                                                         ]
6  #[                                                         ]
7  #[                                                         ]
8  #[                                                         ]

F1=Help  F3=Exit  F6=File  F7=Bkwd  F8=FWD  F9=Prev Choice  F10=Next Choice

```

Figure 78. Directory Setup, Modem Selection - ASYNCH (IIN)

In this example, we are using the IBM 5853 modem. If you are going to use an IBM 7855 modem, you need to use 9600ASC phone numbers, such as 1-213-253-2639.

## IIN-Unique Parameters

```

Directory Setup, IIN Unique Parameters                       More: -+
-----
Fill in the field.

Mode command text      Mode command      Mode switch      X.25 public
                      delay                delay            PAD access

1  [\255                ] [5 ]             [5 ]             [N]
2  [                    ] [ ]              [ ]              [ ]
3  [                    ] [ ]              [ ]              [ ]
4  [                    ] [ ]              [ ]              [ ]
5  [                    ] [ ]              [ ]              [ ]
6  [                    ] [ ]              [ ]              [ ]
7  [                    ] [ ]              [ ]              [ ]
8  [                    ] [ ]              [ ]              [ ]

F1=Help  F3=Exit  F6=File  F7=Bkwd  F8=FWD  F9=Prev Choice  F10=Next Choice

```

Figure 79. Directory Setup, IIN-Unique Parameters

## Modem General Parameters

```

Directory Setup, Modem General Parameters                   More: -+
-----
Fill in the field

Retries      Response Time      Keying Delay      Delay
Init Config Dial  Init Config Dial  Init Config      between calls

1  [0] [0] [1] [5 ] [2 ] [60] [10] [2 ] [20]
2  [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]
3  [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]
4  [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]
5  [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]
6  [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]
7  [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]
8  [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

F1=Help  F3=Exit  F6=File  F7=Backward  F8=FORWARD

```

Figure 80. Directory Setup, Modem General Parameters - ASYNCH (IIN)

When you have set the fields in Figure 80 on page 82 according to your modem requirements, press PF8 to go to the panel shown below.

### Modem Commands/Responses panel

```

Directory Setup, Modem Commands/Responses          More: -+
-----
Press F9 or F10 to change choice.

Dial entry number
  +[1] [IBM 5853 (2400 bps) ]

Maximize throughput          +[Off]

Initialization command      [ATZ0\r ]
Initialization response     [OK ]

Configuration command
[ATX1\r ]
Configuration response     [OK ]

Dial command
[ATDT/tn\r ]
Dial response               [CONNECT ]

Hang-up command              [+++ATH0\r ]

Auto-answer on command      [+++ATS0=1\r ]

F1=Help F3=Exit F6=FILE F7=Bkwd F8=Fwd F9=Prev choice F10=Next choice

```

Figure 81. Directory Setup, Modem Commands/Responses - ASYNCH (IIN)

In this panel, you will see the default settings for the modem you chose.

### 3.5.3 Automatic PAD Facility for DOS (Full-Function Mode)

If you selected the **PAD** option (for X.25 public-pad access) in the Automatic Dial Facility field (Figure 75 on page 80), you will see the panel shown below.

#### X.25 Logon Information

```

X.25 Logon Information          More: -+
-----
Fill in the field.

Information for each logon entry

  [Prompt from X.25 PAD] [Code] [Message displayed on PC session ]
  [Response sequence to be entered by user ]

1 [ ] [0] [ ]
  [ ]

2 [ ] [0] [ ]
  [ ]

3 [ ] [0] [ ]
  [ ]

Mode [Add entry ]

File saved
F1=Help F2=Mode F3=Exit F6=File F7=Bkwd F8=Fwd F9=Prev Choice F10=Next Choice

```

Figure 82. X.25 Logon Information Panel - ASYNCH (IIN) Connection via Series/1 SNA gateway

For further information, please refer to:

- *Personal Communications AS/400 and 3270 Version 4.1 for Full-Function DOS Up and Running*, SC31-8262
- *Personal Communications AS/400 and 3270 Version 4.1 for DOS Reference*, SC31-8265
- 3.5.6, "Configuring X.25-PAD Access" on page 89

### 3.5.4 Configuring an Advantis (IIN) Connection for Windows or OS/2

To configure an Advantis (IIN) connection in a Windows 3.x or OS/2 environment, double-click the **Start/Configure Session** icon or, if you already have a session started, click **Communication** on the menu bar and then click **Configure...** in the pull-down menu to get to the Customize Communication panel shown below.

**Note:** All the panels shown in this section are from the OS/2 version of PCOMM.

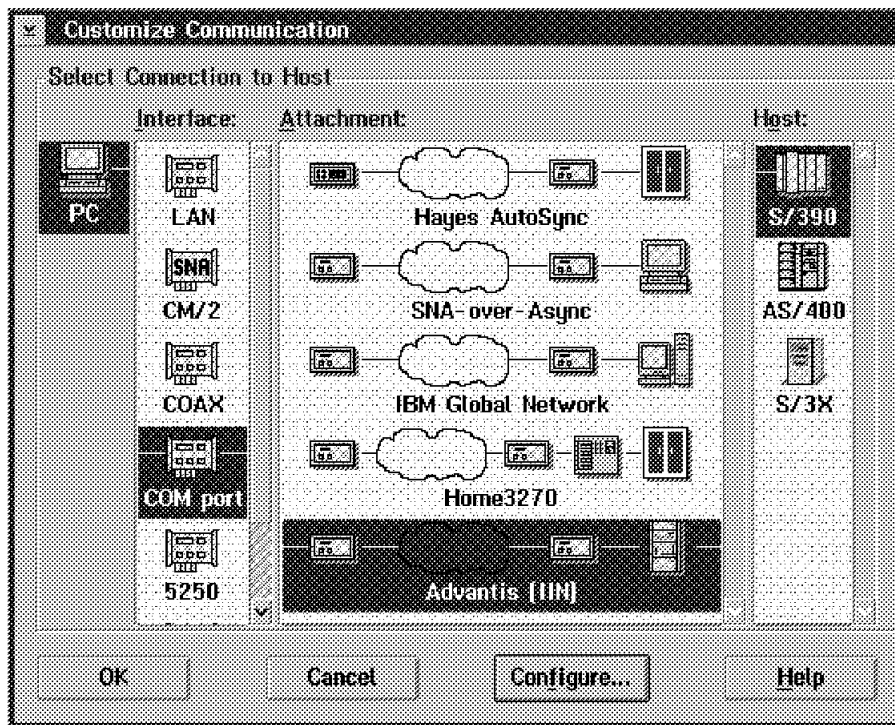


Figure 83. Customize Communication Panel - Advantis (IIN)

Choose the **S/390** host, the **COM port** Adapter or Interface, and the **Advantis (IIN)** Attachment, in that sequence. Then click **Configure...** to get to the Customize Communication-3270 Host panel. Change whatever you like on this panel, then click **Configure Link...** to get to the Advantis (IIN) panel shown below.

Advantis (INN) panel (see Figure 84 on page 85) let you customize the parameters for the communication line (in the upper box), and for the Automatic-Dial functions (in the lower box). If you click PAD, a third box appears below the others.

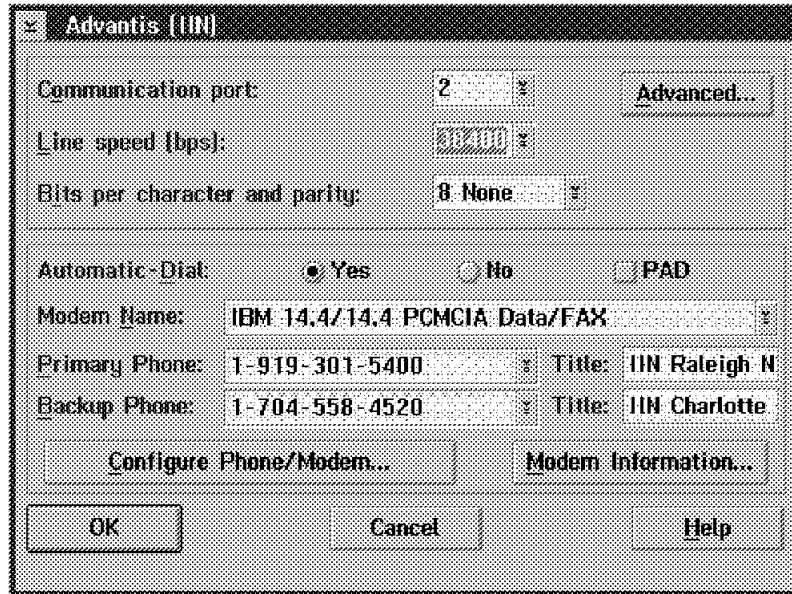


Figure 84. Advantis (IIN) Panel (OS/2) - Asynchronous Attachment Panel (Windows)

## The Upper Box

Let us start with the communication line parameters in the upper box.

**Note:** If you are not familiar with how communications works and what the various options do, you might like to look at Appendix B, “Communications Terminology and Tutorial” on page 341.

### Communication Port

Enter here the number (1, 2, 3 or 4) of the COM port that you will use.

### Line Speed (bps)

This would be better called port speed; it represents the maximum amount of data (number of bits) that can be transmitted and received per second between the COM port and the modem. The usable speed depends on the capability of the processor and the port. The maximum speed currently supported is 38400 bps, if you are using modems with V.32bis and V.42bis capability. If your connection fails, try a lower speed.

### Bits per Character and Parity

Bits per character and parity is the character format used for communication. Bits per character is the number of bits that make up a character; parity indicates the transmission-error-checking scheme, in which an extra bit is added to some unit of data.

- If you choose **7 Even**, a character consists of 7 bits, and 1 bit is used for even parity.
- If you choose **7 Odd**, a character consists of 7 bits, and 1 bit is used for odd parity.
- If you choose **8 None**, a character consists of 8 bits, and no bit is used for parity.

Select the format used on your system. We used the default, **8 None**.

## The Lower Box

Now let us look at the lower box of the panel.

If you do not want to use Automatic Dial, click on the **No** radiobutton.

The **IBM 14.4/14.4 PCMCIA Data/FAX** modem has been selected in our example; select the modem you are using. The information required to configure, initialize and use many modems is included in PCOMM. If your own modem is not in the list, select one that is similar and change the **Modem Information** as necessary; please refer to Figure 35 on page 48.

Specify the primary number to be dialed and the text that you want displayed when PCOMM makes the call; if you want to have a backup number ready, specify that too.

### Primary Phone

This is the first number that the modem dials; it can include delays for the dial tone and access codes for an outside line or for long-distance services. If you are going to use PAD access to an X.25 network, you must enter the telephone number of the PAD here.

### Backup Phone

This is a backup number that will be dialed automatically if the primary number is unobtainable; it is optional.

### Title

This is a message that displays when the number is dialed; its purpose is only to make the destination more easily recognized.

You may need to look at or change items in the Configure Phone/Modem panel, which lets you customize more specific information, including telephone numbers, communication line parameters, and instructions to the modem that you will use. Please refer to 3.5.5, "Configuring the Automatic-Dial Facility for Windows or OS/2" on page 87.

## PAD Parameters

If you want to use a PAD to connect to an X.25 network, click **PAD**; a third box appears at the foot of the panel.

### PAD maximum poll delay

PAD maximum poll delay is the maximum time, in seconds, that the network pauses before sending a poll to a terminal. **0** (null) is the default, and implies automatic tuning.

### PAD-response time-out

PAD-response time-out is the number of seconds that the network waits for a response to a poll before assuming that it has lost contact with a terminal.

### PAD-buffer size

PAD-buffer size specifies the maximum size of the data blocks that are sent to the PAD. A valid value is a decimal number, usually between 272 and 2000, though there are some gateways which restrict the maximum to 1632.



### Advantis (IIN) Attachment (Advanced)

Click **Advanced...** to get to the panel shown below, and fill in the remaining parameters (Block ID, Physical Unit ID and Link-station address).

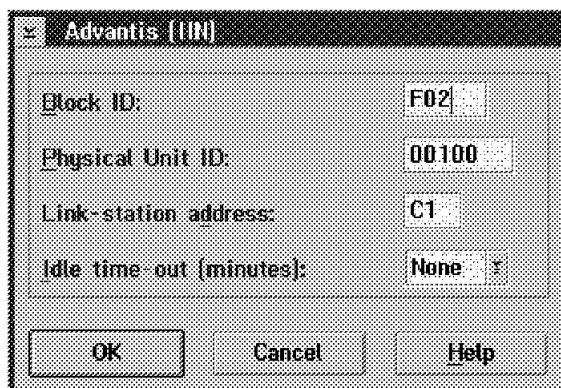


Figure 85. Advantis (IIN) Attachment Panel (Advanced)

#### Block ID

This is the identification number for the type of device or program that is going to connect to the host system; it is concatenated with the physical unit ID and sent to the host via the XID (Exchange ID) command. The default is 061, but you can use whatever has been defined as the IDBLK at the host (often 017).

#### Physical Unit ID (PUID)

This identifies your workstation to the gateway. The value entered is concatenated with the block ID to form an exchange ID, which acts as a "password" by which your workstation is allowed to connect to the gateway.

**Note:** The combination of block ID and PUID determines the number and types of session that the connection will provide. Please look in the Help for details.

#### Link-Station Address

This is the address of your workstation on the SNA link. The acceptable range is from "00" to "FF".

#### Idle Time-out

PCOMM disconnects from the host if no screen or keyboard activity has taken place during the period that you specify here.

### 3.5.5 Configuring the Automatic-Dial Facility for Windows or OS/2

If you chose **Yes** for Automatic-Dial on the Advantis (IIN) panel (Figure 84 on page 85), you can modify many of the ADF parameters by clicking the **Configure Phone/Modem...** button.

The Configure Phone/Modem - PCSDIAL.ADU panel allows you to create, save, and change information used by the Automatic-Dial Facility. The information includes telephone numbers, communication line parameters, and instructions to the modem that you will use. A dial configuration file can have up to 20 entries, and includes a single table that contains the information defining the commands sent to, and the responses expected from, a modem. There is more information in the Help.

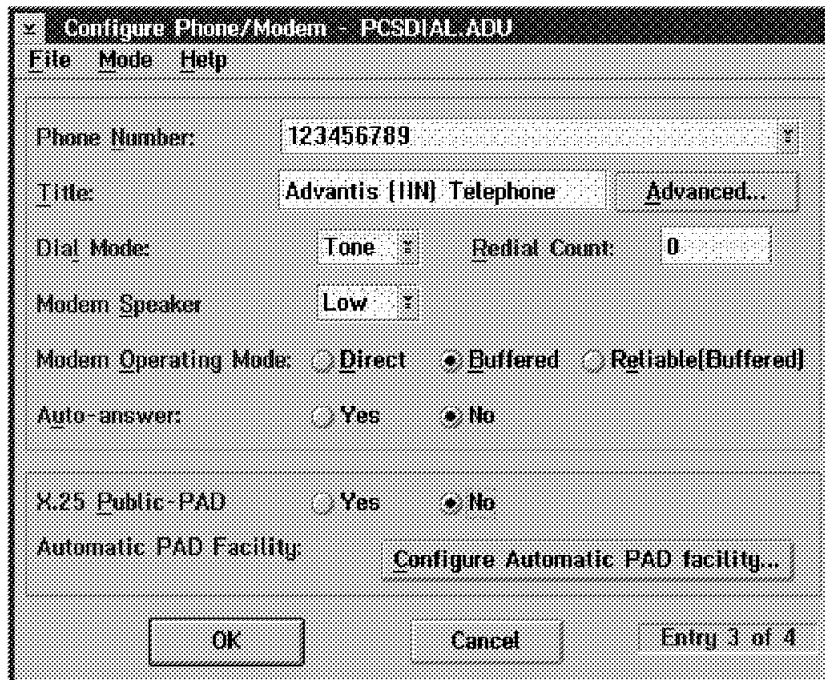


Figure 86. Configure Phone/Modem - PCSDIAL.ADU - Advantis (IIN)

If you have entered more than one telephone number, you will be presented with a list, from which you can select the one you need.

You can change the parameters discussed below. Note that you can change them separately for each number but you must save the changes for one number before you make changes for another; if you do not, the changes for the previous number will be lost.

#### Dial Mode

One of these dialing modes can be set:

**Tone** Select **Tone** for phone lines that support multi-frequency dialing.

**Pulse** Select **Pulse** for older phones, such as those with a rotary dial, which use pulse dialing.

#### Redial Count

This specifies the number of times that the ADF dials the number if it cannot establish a connection with the previous dial. If it fails to connect at all, it tries the backup number.

#### Modem Speaker Volume

Lets you control the volume of the modem's speaker. The options are low, medium, high and off.

#### Modem Operating Mode

There are three modes in which the modem can operate:

##### Direct

This mode assumes that the DCE (modem) speed is identical to the serial-port speed. The modem must establish a direct mode, or non-buffered, normal connection. If your modem does not support CTS/RTS local flow control, choose this mode.

**Buffered Mode**

In buffered mode, the connection does not use any form of modem-to-modem flow control, error correction (ECL), or compression (MNP). The modem must establish a normal-mode (speed-buffered) connection. To do so, the modem uses unidirectional CTS local flow control.

**Reliable Mode (Buffered)**

In reliable mode, the modem must establish a reliable mode (speed-buffered, error-correcting (ECL)) connection. This connection may optionally use modem data compression (MNP). Generally, ITU-T V.42bis data compression is achieved in addition to ITU-T V.42 error control. Because this standard usually provides a compression ratio of up to 4:1, the serial-port speed should be faster than modem-to-modem speed. The modem uses bidirectional CTS/RTS local flow control.

**Auto-answer**

If you choose **Yes**, the modem will answer incoming calls automatically.

**Configure Phone/Modem - Advanced**

Clicking the **Advanced...** button gives you some more options to customize. See Figure 34 on page 47.

**Redial Delay**

This is the period, in seconds (1-99), that the ADF must wait before dialing again. The delay allows time for the modem and communication circuits to reset themselves and stabilize before the next attempt.

**Response Time**

This is the period, in seconds, that the automatic-dial facility waits for the connection to be completed. If the period ends before the connection is made, the attempt fails.

**Mode-Command Delay**

This is the length of the delay, in tenths of a second (0-99), between establishing the connection and transmitting the mode command text.

**Mode-Switch Delay**

The length of the delay, in tenths of a second (0-99), between transmitting the mode command text and entering SNA mode. The receiving system configures itself to the specified mode in order to receive your transmission. If the delay is too small, the connection may not be stable when the mode command is sent, resulting in a lost command. If the delay is excessive, the network may automatically assume its default mode.

**Mode Command Text**

You can write some text that is to be sent to the receiving host system; this tells the host how to configure itself to suit the characteristics of your transmission.

### 3.5.6 Configuring X.25-PAD Access

If you are connecting to an X.25 Public PAD, the automatic-dial facility expects to find an access script, which you must specify through the Automatic PAD Facility. To do this, choose **Yes** for X.25 Public PAD Access in the lower box of the Configure Phone/Modem panel, and then click **Configure Automatic PAD Facility...**

**Note:** X.25 access is available only through a PAD.

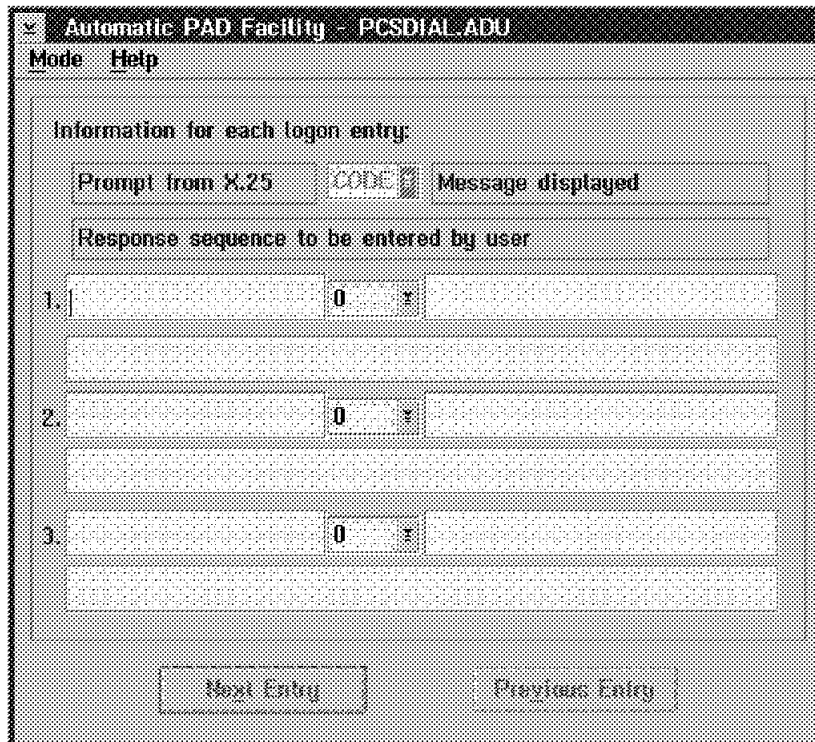


Figure 87. Automatic PAD Facility - PCSDIAL.ADU

### Prompt from X.25 PAD

This field accepts 76 characters. If all characters are blanks, the entry is automatically deleted.

### Code

The code determines the way in which the entry is executed:

- 0: Execute the entry and terminate.
- 1: Execute the entry once and flag it so that it will not be executed again.
- 2: Execute the entry each time the prompt occurs.
- 3: Send the string in the Response-Sequence field to the PAD automatically when execution begins.

### Message displayed

This field can have up to 40 characters, including blanks, which provide a trace message displayed in response to a prompt from PAD.

### Response sequence

This field can have up to 76 characters, including blanks, which are transmitted to the PAD each time the PAD prompts for a network-station response.

The characters in the fields are not checked and can be of any kind. Special characters are entered as decimal numbers preceded by a backslash character (\nnn). The decimal value is the code point of the character in the current PC code page. A special character is any that cannot be entered directly by using the current keyboard code page, as well as the \ character itself.

For further information, please refer to the *Personal Communications Reference*.

When you have finished, close the Automatic-Dial Facility panels by clicking **OK**. You will be prompted to save the changes, but you can use **File** and then **Save** beforehand if you wish.

### 3.5.7 Special Considerations for the ASYNCH (IIN) Connection

You should pay special attention to the following ASYNCH (IIN) considerations:

- Restriction on COM-Port settings.

PCOMM's asynchronous connection supports only the default settings of the communication port. If you change the Base I/O port address or Interrupt Request Line (IRQ), the program will not recognize your port or establish the connection.

- Restriction on Interrupt sharing.

PCOMM's asynchronous connections use Interrupt Level-3 (IRQ3) (COM 2) and Level-4 (IRQ4) (COM 4) for hardware control. If you share an interrupt level with another device, this will stop communications.

- Performance Enhancement if you are using a low line speed (for DOS (Full-Function Mode))

If you want faster response time, add the option **-update** to the PCSDOS statement in the PC3270.BAT file. This is not documented (and does not work if you specify EMS support). Adding this will cause PC/3270 to update the screen after each block of text is received, rather than waiting for the entire screen to be received. This will result in the screen being painted in chunks of text, thus reducing the time between pressing Enter until the first character appears on the screen. The improvement is quite dramatic at 1200 and 2400bps.

This is what the statement will look like:

```
C:\PC3270\PCSDOS 2 a=24*80 b=24*80 -update -gs -ns -f -ef %CMGR.QUIET%
```

- ASYNC communication and using the task swapper function (for DOS (Full-Function Mode))

The DOS 5.0 (DOSSWAP) or PCSSWAP task swappers in PC/3270 FF-DOS, which swap PCOMM out of base memory, require a data-link-control memory-management program. If you configure either of these, the following line will be added to your CONFIG.SYS file to maintain the communication link (/1 represents COM 1, /1 COM2, etc.).

```
DEVICE=C:\PC3270\PCSASYNC.SYS /1
```

### 3.6 IBM Global Network Attachment

The IBM Global Network (IGN) attachment, also known in the USA as the Advantis (Passport) attachment, provides dial-up access to an Intelligent Network Gateway (INGW), using the High Performance Option (HPO) protocol (which provides better performance for 3270 emulation than the Advantis (IIN) protocol). The IGN Attachment is provided for Windows and OS/2 but not for DOS.

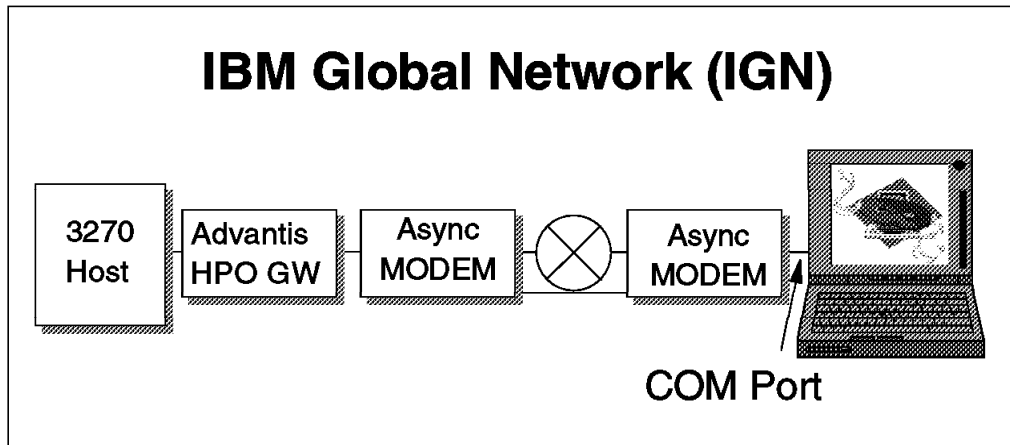


Figure 88. Personal Communications IBM Global Network Attachment

#### 3.6.1 Configuring an IGN Connection for Windows or OS/2

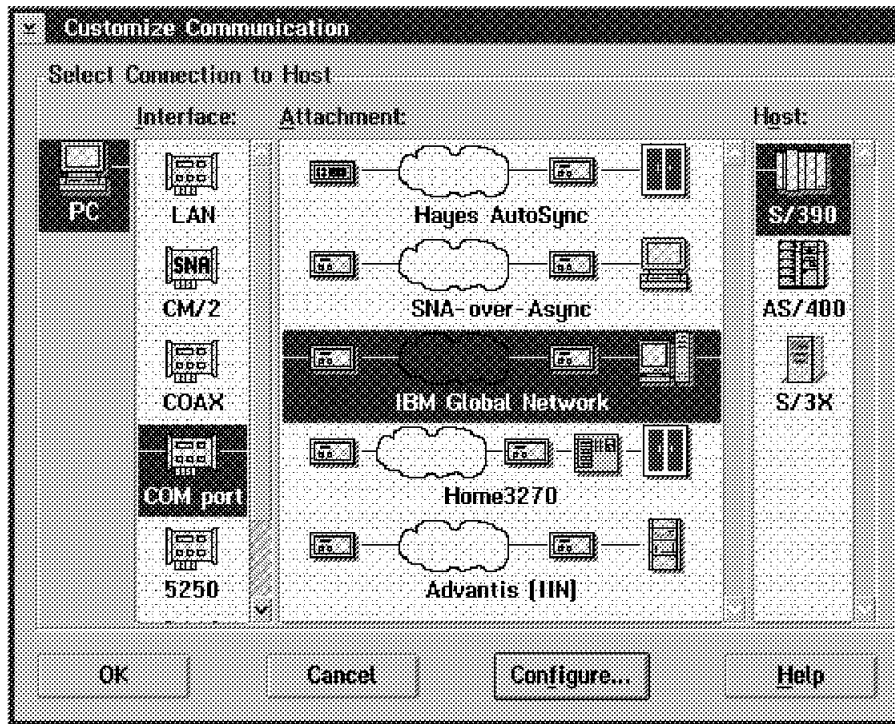


Figure 89. Customize Communication Panel - Advantis (Passport)

To configure an IBM Global Network (IGN) connection, double-click the **Start/Configure Session** icon or, if you have already started a session, click **Communication** on the menu bar, and then **Configure...**, to get to the Customize Communication panel.

Choose the **S/390** host, the **COM port** and the **IBM Global Network Attachment**, in that sequence. Then click **Configure...** to get to the Customize Communication-3270 Host panel. Make any choices you want, and then click **Configure Link...** to get to the IBM Global Network panel shown below.

**Note:** All the panels shown in this section are from the OS/2 version of PCOMM.

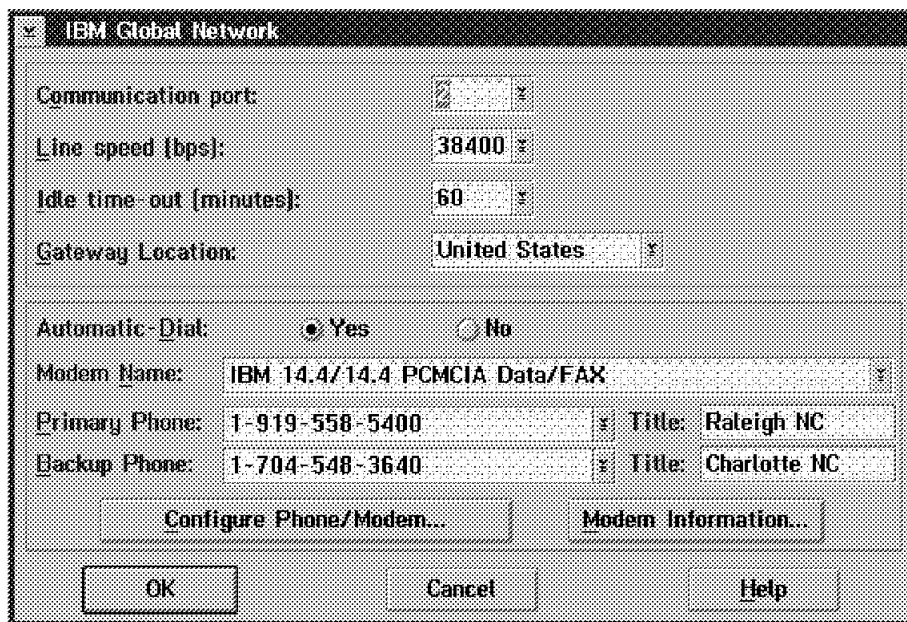


Figure 90. IBM Global Network Attachment Panel

This panel lets you customize the parameters for the communication line (upper box) and the Automatic-Dial functions (lower box).

**Note:** If you are not familiar with how communications works and what the various options do, you might like to look at Appendix B, “Communications Terminology and Tutorial” on page 341.

### The Upper Box

Enter here the number (1, 2, 3 or 4) of the COM port that you will use.

#### Line Speed (bps)

This would be better called port speed; it represents the maximum amount of data (number of bits) that can be transmitted and received per second between the COM port and the modem. The usable speed depends on the capability of the processor and the port. The maximum speed currently supported is 38400 bps, if you are using modems with V.32bis and V.42bis capability. If your connection fails, try a lower speed.

#### Idle Time-out

PCOMM disconnects from the host if no screen or keyboard activity has taken place during the period that you specify here.

### Gateway Location

Choose the location (country name) of the gateway that you will connect to. The telephone numbers for all the gateways in every country are built in and those for the country you choose will be listed when you click the arrows next to the phone-number boxes below.

### The Lower Box

If you do not want to use Automatic Dial, click on the **No** radio-button.

The IBM 14.4/14.4 PCMCIA Data/FAX modem has been selected in our example; select the modem you are using. The information required to configure, initialize and use many modems is included in PCOMM. If your own modem is not in the list, select one that is similar and change the Modem Information as necessary (please refer to Figure 35 on page 48).

Primary Phone, Backup Phone, and Title definitions can be found in "The Lower Box" on page 45. Specify the primary number to be dialed and the text that you want displayed when PCOMM makes the call; if you want to have a backup number ready, specify that too.

You may need to look at or change items in the Configure Phone/Modem panel, which lets you customize more specific information, including telephone numbers, communication line parameters, and instructions to the modem that you will use. Please refer to "Configure Phone/Modem - Advanced" on page 89.

---

## 3.7 ASYNChronous Modem Setup

This section provides guidance on how to set up the IBM 5841, 5853 and 7855 modems for asynchronous communications on 1200, 2400 and 9600 bps lines. Please refer also to the *Guide of Operations* for more detailed information about your modem:

### 1. IBM 5841 Modem for 1200 ASYNC

The IBM 5841 modem will communicate at speeds up to 1200bps. It has eight small switches on the back of the unit. Set switches 1-4 and 6-8 in the UP position and switch 5 in the DOWN position. All of the front panel switches should be off.

**Note:** You will have to change the Line speed (bps) fields in your asynchronous configurations to 1200bps. (You might have done this previously, but check that it is correct.)

### 2. IBM 5853 Modem for 2400 ASYNC

The IBM 5853 modem will communicate at speeds up to 2400bps. It has eight small switches on the back of the unit. Set switches 1-6 and 8 in the UP position and switch 7 in the DOWN position. All of the front panel switches should be off. The rest of the setup panels are as shown in this document.

**Note:** You will have to change the Line speed (bps) fields in your asynchronous configurations to 2400bps. (You might have done this previously, but check that it is correct.)

### 3. IBM 7855 Modem for 9600 ASYNC

The speed of the IBM 7855 Modem is dependent of several factors:

- The mode of operation asynchronous or synchronous.



- The actual line speed which can be up to 12,000bps.
- The data terminal equipment (DTE) speed which can be up to 19,200bps for asynchronous.
- The speed and type of the modem at the remote end of the link.

In asynchronous mode the line and DTE speeds can be different because the modem does buffering to accommodate the speed difference. If the modems on both ends of the link are configured to utilize data compression, then you could get an effective data throughput of up to 19,200bps. In synchronous mode, the line and DTE speeds are identical (synchronous dialup is not covered, but IIN does support it).

Today IIN supports up to 9600bps and does not utilize compression. We could configure ASYNC PC/3270 V4.1 to use 19,200bps and the 7855 will do the buffering. However since IIN does not support this we will just set the line speed to 9600bps.

The 7855 has a liquid crystal display (LCD) and an operator panel that has four arrow keys (up, down, left and right) that allow you to navigate through the setup menus, options and dial directory setup.

First make sure the 7855 is set to the Factory Settings. If you are not sure, use First Setup, Reset to Factory instead of asynchronous AT mode in the procedure below. Here are the details of the setup option to set to asynchronous AT mode:

```

Press:   LCD will display:
<- ->   <Exit   Enter>   (you press both arrow keys at the same time)
->      View Only
↓       First Setup
->      Synchronous
↑       ASYNC V25 bis
↑       ASYNChronous AT (This is the change you want to make)
<-      First Setup
<-      <Exit   Enter>
<-      Remain Unlocked
<-      Save Profile 0
<-      ASYN7E A 9600 a

```

Figure 91. Setting up the IBM 7855 Modem for 9600 ASYNC

What you did was to:

- Enter configuration
- Go into First Setup
- Select ASYNChronous AT mode
- Back out of the menus, saving the Profile.

This is all you need to change on the modem. The 7855 will adjust to the data path (8 bit), Parity (None) and DTE speed (9600) that PC/3270 V4.1 will use.

**Note:** You will have to change the Line speed (bps) fields in your asynchronous configurations to 9600bps. (You might have done this previously, but check that it is correct.)

**Important:** Be sure to use the 9600ASC IIN phone number when configuring for automatic dialing. It will not work without dialing the correct modem on the other end!



---

## Chapter 4. PC400 Asynchronous Connections

PC400 V4.1 provides the following asynchronous connections:

### Hayes AutoSync

This provides synchronous communication to the host, even though the modem is initially configured for async. As a result, the AS/400 must be configured for synchronous communication (SDLC).

### SNA over Async (SNA-A)

This connection lets SNA data flow over an async line, so, at some point in the link, a device is needed that can handle this. Examples of such devices are an AS/400 ASCII Workstation Controller and a Communications Server gateway. The IBM Global Network also provides SNA-A gateways.

PCOMM for Windows and OS/2 provide two types of SNA-A attachment; these are referred to as SNA-over-Async, and SNA-over-Async (Console). For Windows, there is a third, SNA-over-Async v4.0. Normally, you would use the first of these but, if you want to use Shared Folders over an SNA-A connection under Windows, you must use the v4.0 attachment; the reason is that the virtual communications driver that the normal SNA-A attachment uses is not compatible with the Shared Folders installable file system (IFS).

Because we wanted to emulate a typical mobile environment, we used an IBM ThinkPad with an IBM PCMCIA Data/Fax Modem (14.4 kbps with integrated DAA) to make the connections that are described.

---

### 4.1 Hayes AutoSync Attachment

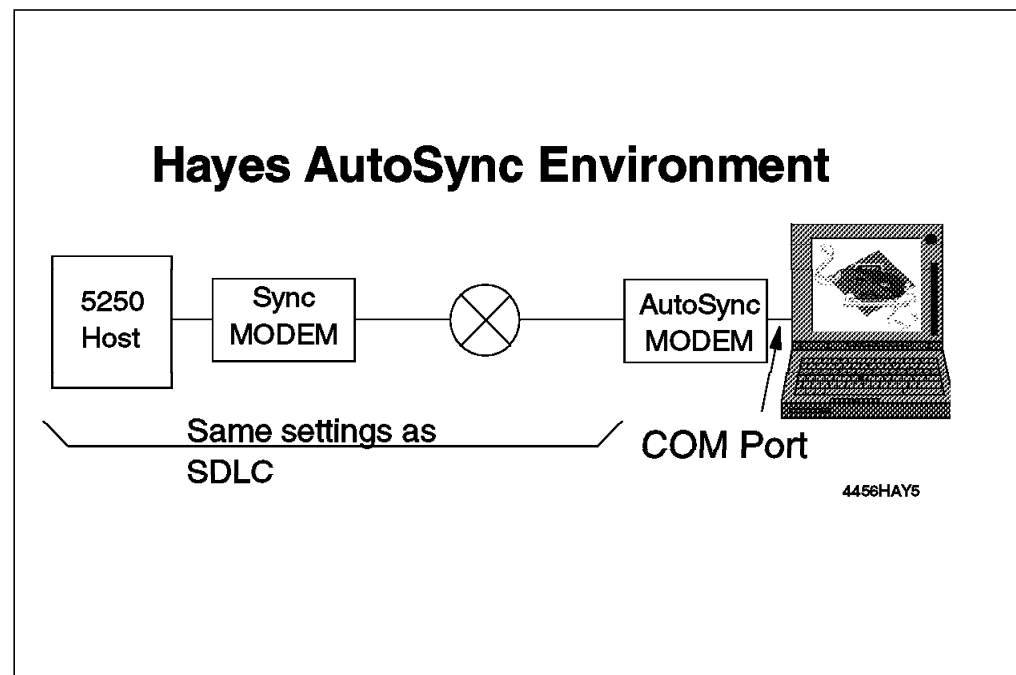


Figure 92. Personal Communications Hayes AutoSync Connections

Hayes AutoSync is a communication mode in which the modem provides synchronous communication to the host while using an asynchronous interface on the workstation. The modem calls asynchronously at first, then automatically switches to synchronous mode when the connection is established. You do not need a multiprotocol or SDLC adapter on the workstation - you use a serial (COM) port. Hayes AutoSync thus provides a simple, cost-effective way to communicate synchronously to an AS/400 over a telephone line. From the AS/400 point of view, the configuration is simple because it is a standard SDLC switched connection, which is already configured in all AS/400s.

Please refer to 3.3, "Hayes AutoSync Attachment" on page 60 for more information about the Hayes AutoSync Attachment and the four main requirements for this type of connection.

#### 4.1.1 Configuring a Hayes AutoSync Connection to an AS/400

To configure a Hayes AutoSync connection, double-click the **Start/Configure Session** icon or, if you have already started a session, click **Communication** on the menu bar, and then **Configure...**, to get to the Customize Communication panel shown below.

**Note:** The panels shown are from PCOMM for OS/2.

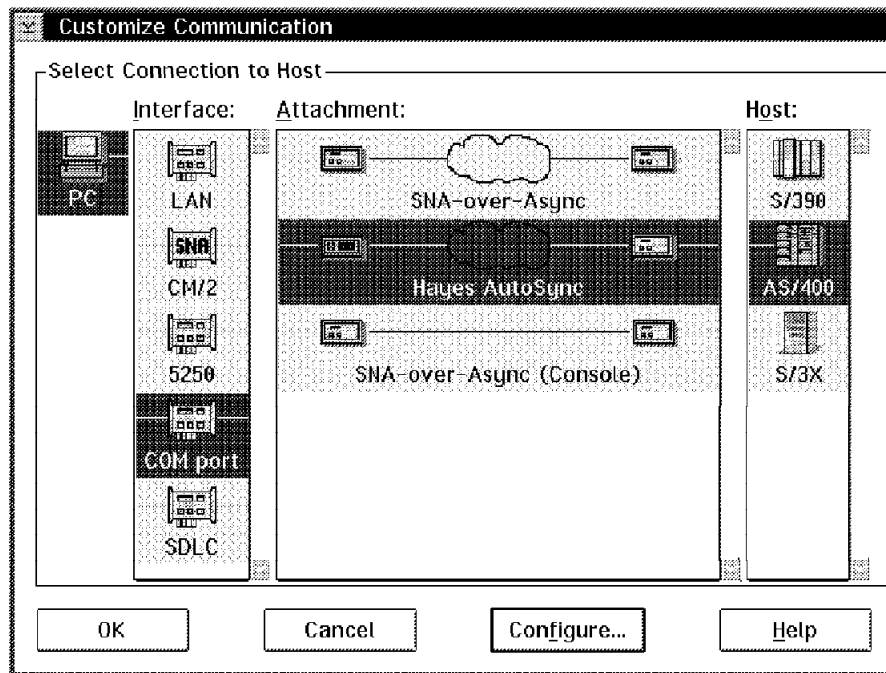


Figure 93. Customize Communication Panel - Hayes AutoSync

Choose **AS/400 Host**, **COM port** and **Hayes AutoSync**, in that sequence, as shown in Figure 93. Then click **Configure...** to get to the Customize Communication - 5250 Host panel.

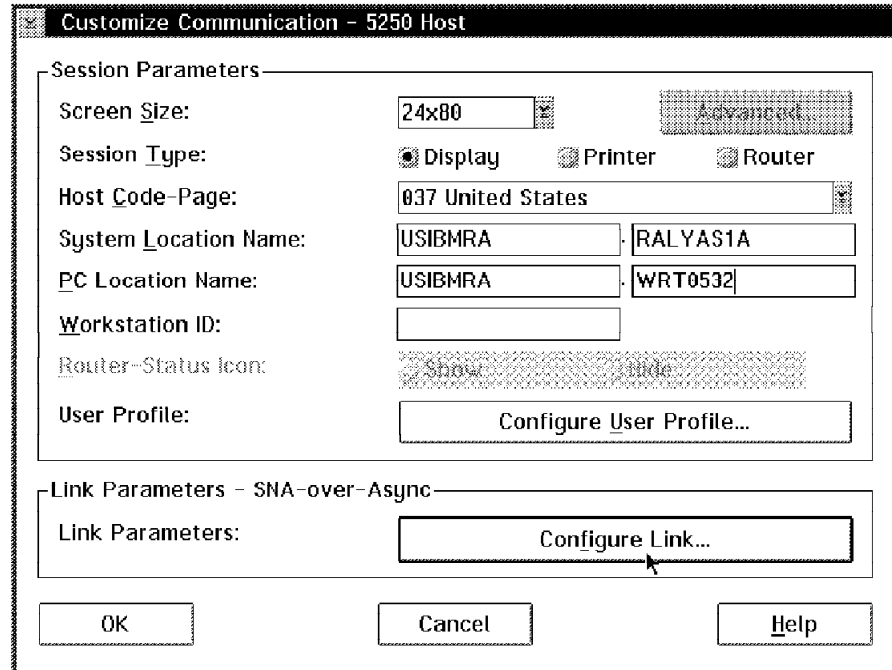


Figure 94. Customize Communication - 5250 Host

In the Session Parameters box, you can specify session characteristics such as Screen size, Session Type (Display, Printer, or Router (OS/2 only)), and Host Code-Page. You must enter the network name of the AS/400, known as the System Location Name (in our case, Network ID = USIBMRA and AS/400 CP Name = RALYAS1A) and the network name of your PC, known as the PC Location Name (in our case, NETID = USIBMRA and CP Name = WRT0532).

The System Location and PC Location Names depend on the conventions used in your SNA network; they would normally be given you by the network administrator. The combination of the Network Identifier and the Location Name is known as the Fully Qualified Network Name of the resource (the AS/400 or the PC).

You can, if you wish, enter a Workstation ID, which will be used for the session name. You can also configure a User Profile, which provides automatic logon to the session.

When you have completed this panel, want, and then click **Configure Link...** to get the Hayes AutoSync Attachment panel shown in Figure 95 on page 100.

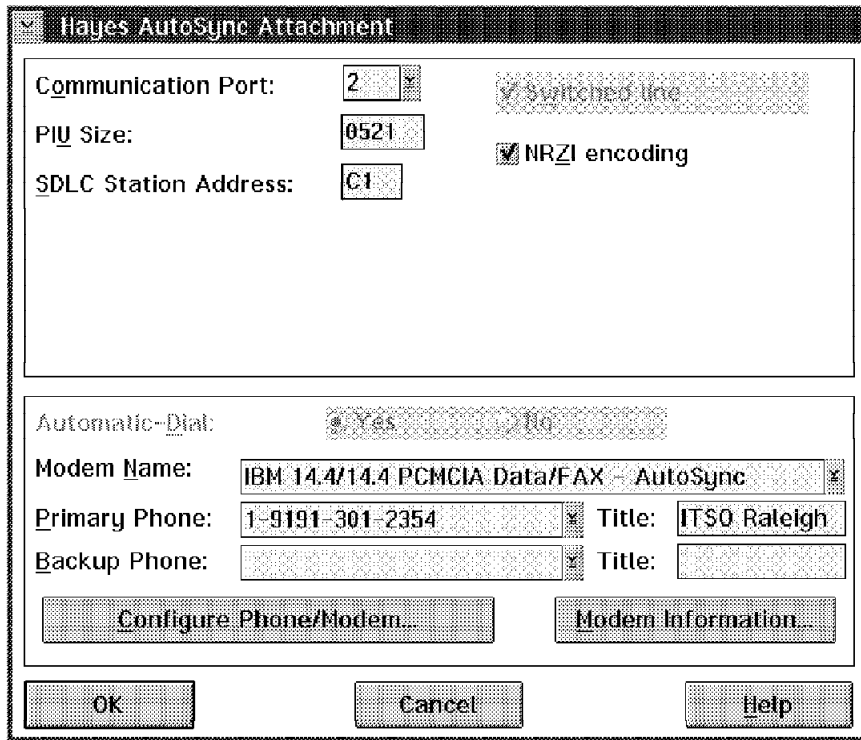


Figure 95. Hayes AutoSync Attachment Panel

This panel lets you customize the parameters for the communication line (in the upper box) and for the Automatic-Dial functions (in the lower box).

## The Upper Box

### Communication Port

This is the number of the communication port. We chose **2** to match the PCMCIA configuration.

### PIU Size

PIU Size defines the number of bytes in the Path Information Unit that is used for link-level communication. It must match the maximum frame size in the AS/400's Line Description.

### SDLC Station Address

This is the address of your workstation on the SNA link. It must match the station address in the AS/400's Line Description. The acceptable range is from "00" to "FF".

### Switched Line

The Hayes AutoSync connection supports only a switched-line connection, so you cannot change this.

### NRZI encoding

Specifies whether your connection will use Non Return to Zero Inverted encoding. The choice must match the way the line is defined in the AS/400.

### The Lower Box

You must use the Automatic-Dial Facility, so it is already chosen and you cannot disable it. Choose the modem you will use (or a similar one), and then enter a primary phone number and, optionally, a title for that and a backup phone number and title.

The IBM 14.4/14.4 PCMCIA Data/FAX modem has been selected in our example; select the modem you are using. The information required to configure, initialize and use many modems is included in PCOMM; if your own modem is not in the list, select one that is similar and change the Modem Information as necessary.

### Primary Phone

This is the first number that the modem dials; it can include delays for the dial tone and access codes for an outside line or for long-distance services.

### Backup Phone

This is a backup phone number that will be dialed automatically if the primary number is unobtainable; it is optional.

### Title

This is a message that displays when the number is dialed; its purpose is only to make the destination more easily recognized.

You may need to look at or change items in the Configure Phone/Modem panel, which lets you customize more specific information, including telephone numbers, communication line parameters, and instructions to the modem that you will use. These are discussed in the next section. The Modem-Control Information panel, which lets you customize the commands to be sent to your modem, is discussed after that.

## 4.1.2 Configuring the Automatic-Dial Facility (ADF)

You can modify many of the ADF parameters by clicking the **Configure Phone/Modem...** button.

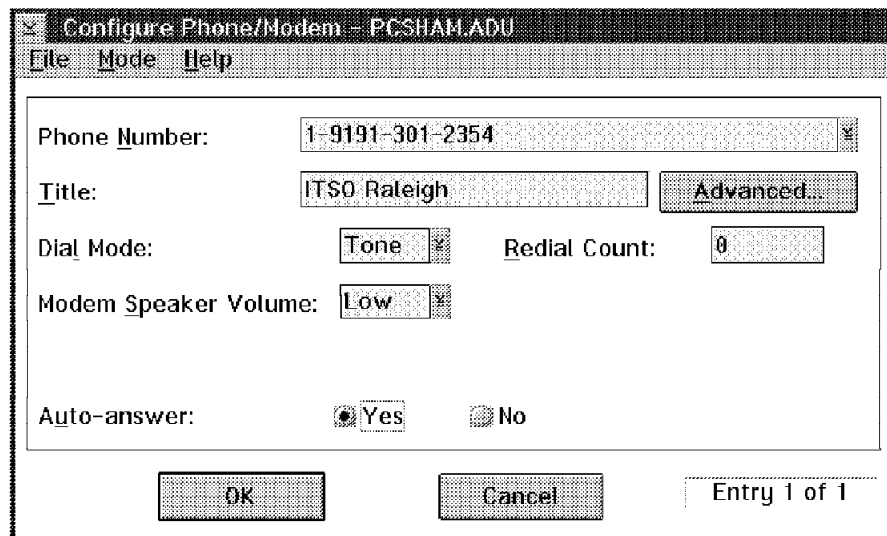


Figure 96. Configure Phone/Modem - PCSHAM.ADU - PC400 Hayes AutoSync

The Configure Phone/Modem - PCSHAM.ADU panel allows you to create, save, and change information used by the automatic-dial facility. The information includes telephone numbers, communication line parameters, and instructions to the modem that you will use. A dial configuration file can have up to 20 entries, and includes a single table that contains the information defining the commands sent to, and the responses expected from, a modem. There is more information in the Help.

If you have entered more than one telephone number, you will be presented with a list, from which you can select the one you need.

The parameters are discussed below. Note that you can change them separately for each number but you must save the changes for one number before you make changes for another; if you do not, the changes for the previous number will be lost.

#### Dial Mode

One of these dialing modes can be set:

**Tone** Select **Tone** for phone lines that support multi-frequency dialing.

**Pulse** Select **Pulse** for older phones, such as those with a rotary dial, which use pulse dialing.

#### Redial Count

This specifies the number of times that the ADF dials the number if it cannot establish a connection with the previous dial. If it fails to connect at all, it tries the backup number.

#### Modem Speaker Volume

Lets you control the volume of the modem's speaker. The options are low, medium, high and off.

#### Auto-answer

If you choose **Yes**, the modem will answer incoming calls automatically.

### Configure Phone/Modem - Advanced

Clicking the **Advanced...** button gives you some more options to customize.

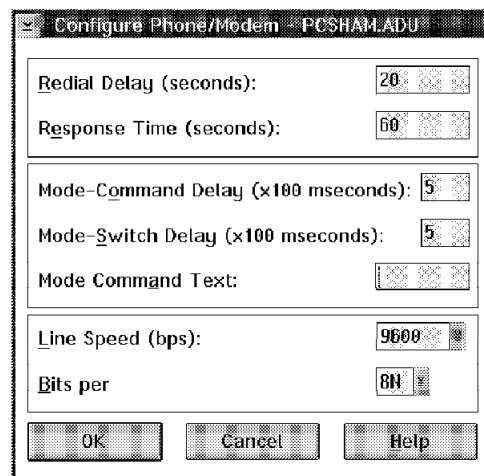


Figure 97. Configure Phone/Modem - PCSHAM.ADU (Advanced)



**Redial Delay**

This is the period, in seconds (1-99), that the ADF must wait before dialing again. The delay allows time for the modem and communication circuits to reset themselves and stabilize before the next attempt.

**Response Time**

The period, in seconds, that the automatic-dial facility waits for the connection to be completed. If the period ends before the connection is made, the attempt fails.

**Mode-Command Delay**

The length of the delay, in tenths of a second (0-99), between establishing the connection and transmitting the modem-command text.

**Mode-Switch Delay**

The length of the delay, in tenths of a second (0-99), between transmitting the mode-command text and entering SNA mode. The receiving system configures itself to the specified mode in order to receive your transmission. If the delay is too small, the connection may not be stable when the mode command is sent, resulting in a lost command. If the delay is excessive, the network may automatically assume its default mode.

**Mode Command Text**

You can write some text that is to be sent to the receiving host system; this tells the host how to configure itself to suit the characteristics of your transmission.

**Line Speed**

The drop-down list includes speeds from 300 to 38400 bps but, for Hayes AutoSync, you should choose either 9600 or 19200, depending on the capability of your modem.

**Bits per Character/Parity**

The drop-down list includes all the possible options, but only 8N is valid for Hayes AutoSync.

### 4.1.3 Modem-Control Information

If you click on **Modem Information...** in the Hayes AutoSync Attachment panel, you can change the predefined modem control information or add the information for your own modem. If your own modem is not in the list, select one that is similar and change the modem information as necessary.

To create a definition for a new modem, click on **Modem** on the menu bar and then click on **Add Modem**.

**Note:** We strongly recommend that you be familiar with the modem command set before changing anything.

### 4.1.4 Hayes AutoSync Configuration - the Last Step (Windows 3.x)

Hayes AutoSync cannot work with the virtual communications device driver that PCOMM V4.1 provides; it must use the type of attachment provided in PCOMM v4.0, which requires a DOS TSR program (PCSHAM.EXE).

When you configure this attachment, you will see a message telling you that you must start Windows with PCSWIN.BAT, not with the WIN command. The best thing is to call PCSWIN.BAT from AUTOEXEC.BAT. PCSWIN.BAT calls PCSTSR.BAT, which loads the TSR program, starts Windows, and ends the TSR program when you close Windows.

## 4.2 SNA-over-Async Attachment

The SNA-over-Async (SNA-A) attachment allows SNA traffic to flow across asynchronous (start/stop) communication lines. You can use a switched (dial-up) or a dedicated, non-switched (leased) connection. For a 5250 session, you will normally connect to the ASCII Workstation Controller of an AS/400, though you could connect to a gateway, such as those provided by the IBM Global Network.

For 5250-emulation sessions to an AS/400, there are three types of SNA-A attachment:

- SNA-over-Async - this is an APPC connection.
- SNA-over-Async (Console) - this lets you use a PC as an AS/400 console and is discussed in 4.3, "PC400 SNA-over-Async (Console) Attachment" on page 113.
- SNA-over-Async V4.0 - this applies only to Windows 3.x. It is provided specifically to let you use Shared Folders with SNA-A. Please refer to "Using Shared Folders on an SNA-over-Async connection (Windows)" on page 112.

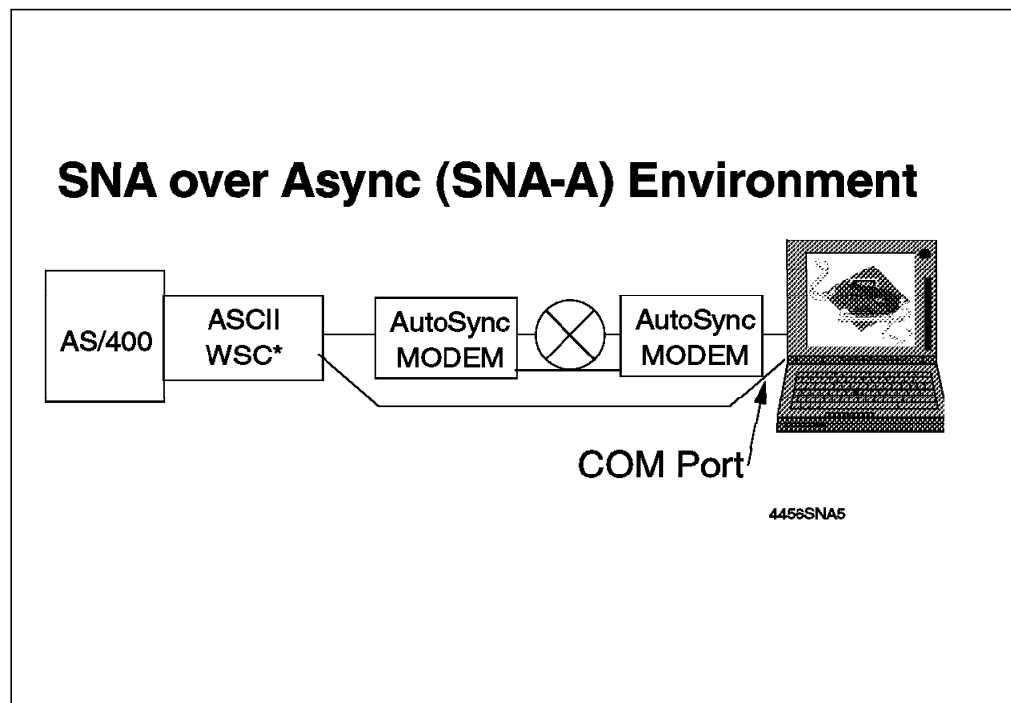


Figure 98. Personal Communications SNA-Over-Async Connections

## 4.2.1 Configuring an SNA-over-ASYNC Connection to an AS/400

To configure a connection, double-click the **Start/Configure Session** icon or, if you have already started a session, click **Communication** on the menu bar, and then **Configure...** to get to the Customize Communication panel shown below.

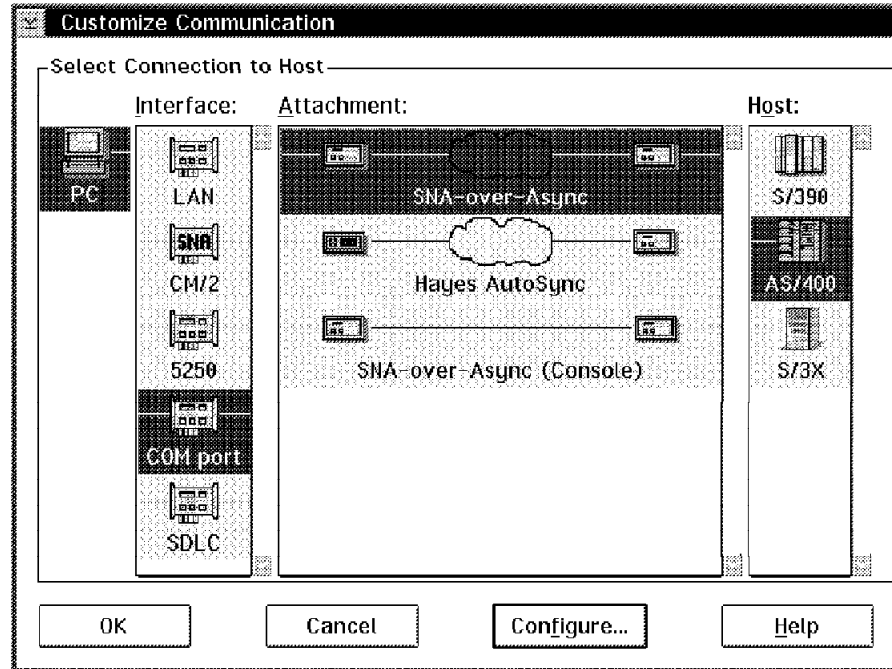


Figure 99. Customize Communication Panel - SNA-over-ASYNC

Choose **AS/400** host, **COM port** and **SNA-over-Async** in that sequence. Then click **Configure...** to get to the Customize Communication - 5250 Host panel.

In the Session Parameters box, you can specify session characteristics such as Screen size, Session Type (Display, Printer, or Router (OS/2 only)), and Host Code-Page. You must enter the network name of the AS/400, known as the System Location Name (in our case, Network ID = USIBMRA and AS/400 CP Name = RALYAS1A) and the network name of your PC, known as the PC Location Name (in our case, NETID = USIBMRA and CP Name = WRT0532.).

The system location and PC location names depend on the conventions used in your SNA network; they would normally be given you by the network administrator. The combination of the network Identifier and the location name is known as the fully qualified network name of the resource (the AS/400 or the PC).

You can, if you wish, enter a workstation ID, which will be used for the session name. You can also configure a user profile, which provides automatic logon to the session.

When you have completed this panel, click on **Configure Link...** to get the SNA-over-Async Attachment (APPC) panel shown below. This lets you customize the parameters for the link (upper box), the communication line (the middle box) and the Automatic-Dial functions (the lower box).

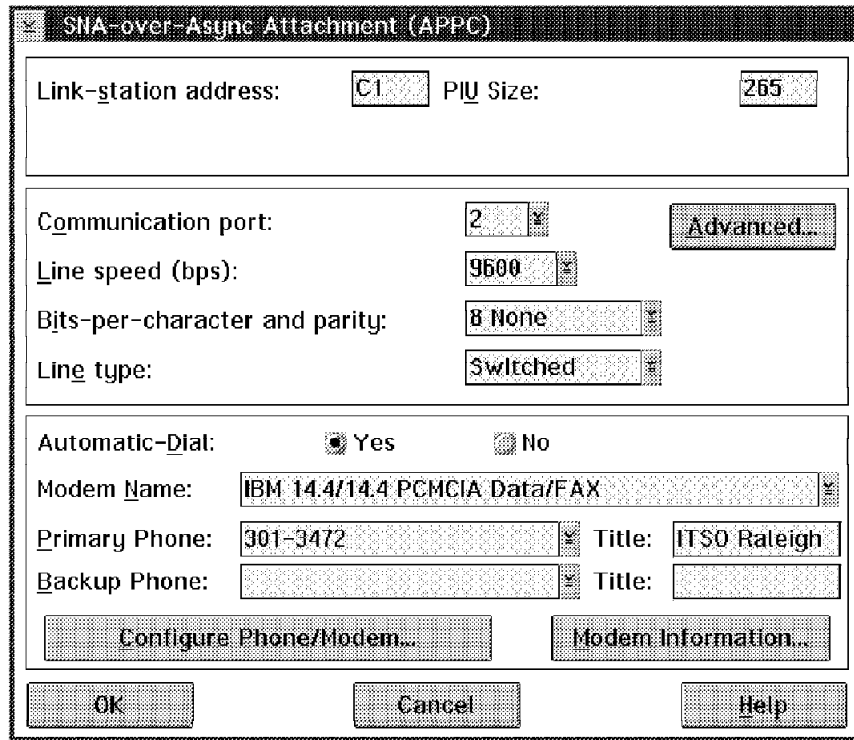


Figure 100. SNA-over-ASYNC Attachment Panel

## The Upper Box

Let us start with the SNA link specifications in the upper box.

### Link-Station Address

This is the address of your workstation on the SNA link. It must match the station address in the AS/400's line description. The acceptable range is from "00" to "FF".

### PIU Size

PIU Size defines the number of bytes in the Path Information Unit that is used for link-level communication. It must match the maximum frame size in the AS/400's line description.

## The Middle Box

Let us now deal with the communication parameters in the middle box of the panel.

### Communication Port

This is the number of the communication port. We chose 2 to match the PCMCIA configuration.

### Line Speed (bps)

This would be better called port speed; it represents the maximum amount of data (number of bits) that can be transmitted and received per second between the COM port and the modem. The usable speed depends on the capability of the processor and the port. The maximum speed currently supported is 38400bps (OS/2) or 57600bps (Windows), if you are using modems with V.32bis and V.42bis capability. If your connection fails, try a lower speed.

### Bits per Character and Parity

Bits per character and parity is the character format used for communication. Bits per character is the number of bits that make up a character; parity indicates the transmission-error-checking scheme, in which an extra bit is added to some unit of data.

- If you choose **7 Even**, a character consists of 7 bits, and 1 bit is used for even parity.
- If you choose **7 Odd**, a character consists of 7 bits, and 1 bit is used for odd parity.
- If you choose **8 None**, a character consists of 8 bits, and no bit is used for parity.

Select the format used on your system. We used the default, **8 None**.

### Line Type

This can be either:

**Non-Switched** PCOMM will be connected to a dedicated non-switched (leased) line.

**Switched** PCOMM will be connected to a normal telephone line, and you will dial a number (automatically or manually) to make the connection.

### SNA-over-Async Attachment - Advanced

Click **Advanced...** to get to the panel shown below.

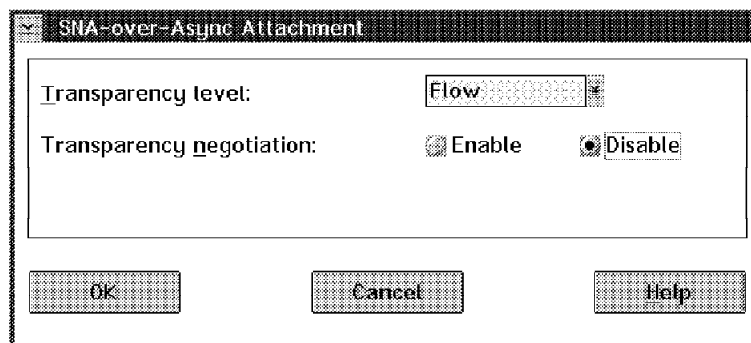


Figure 101. SNA-over-Async Attachment Panel (Advanced)

Transparency means that certain bit sequences are hidden within a frame. The SNA-over-Async attachment is a character-oriented protocol and uses a character-transparency technique which allows the protocol to work across 7-bit async data networks.

### Transparency Level

The following transparency levels are supported:

- Basic transparency ensures that x'7E' characters that occur in the frame or frame-control sequence are not interpreted as flag characters and that x'7D' characters are interpreted correctly. The following substitutions take place:
  - x'7E' is replaced by x'7D5E'
  - x'7D' is replaced by x'7D5D'

Basic Transparency is used in 8-bits-per-character mode (3270 session only).

- Flow transparency allows for XON/XOFF flow control to be used on a character-by-character basis. The following substitutions take place:
  - x'11' is replaced by x'7D31'
  - x'13' is replaced by x'7D33'
  - x'7E' is replaced by x'7D5E'
  - x'7D' is replaced by x'7D5D'

Flow transparency is used in 8-bits-per-character mode.

- Full transparency allows 8-bit data to be transmitted on a link that clears or otherwise corrupts the eighth (most significant) bit of each character. 8-bit data is encoded into 7-bit characters. By this means, 8-bit data can be transmitted on 7-bit networks, such as X.25 connecting from async PAD to async PAD.
  - In the same way as in the 'Flow' case above, x'00' to x'1F', x'7D', x'7E' and x'7F' are converted to the x'7Dxx' format.

Full transparency is used in 7-bits-per-character mode.

**Note:** The transparency level is dictated by the bits-per-character/parity value - if you choose **7 Even or Odd**, you must use Full transparency; if you choose **8 None**, you must use Flow.

#### **Transparency-mode negotiation**

Transparency-mode negotiation allows Personal Communications and a 3270 SNA-over-Async gateway or an AS/400 to configure dynamically the asynchronous line, the character format and the transparency level to be used. Without such negotiation, both Personal Communications and the gateway must be configured manually before communications is attempted. Choose **Enable** if you want to enable transparency-mode negotiation.

**Note:** If you choose **Enable**, the partner (AS/400) must also support Transparency-mode negotiation.

For a 5250 session, the AS/400 is hard-coded to be a called station in transparency negotiations. Personal Communications must participate in the transparency negotiations, so you must always choose **Enable**.

#### **Idle Time-out (Windows only)**

The host connection disconnects after the specified timeout if no screen or keyboard activity has taken place.

#### **The Lower Box**

If you do not want to use Automatic Dial, click on the **No** radio button. If you click on **No**, a nonswitched (leased-line) connection is assumed and the automatic-dial facility is not used. See "The Lower Box" on page 101 for details.

Specify the primary number to be dialed and the text that you want displayed when PCOMM makes the call; if you want to have a backup number ready, specify that too.

You may need to look at or change items in the Configure Phone/Modem panel, which lets you customize more specific information, including telephone numbers, communication line parameters, and instructions to the modem that you will use. This is explained in the next section.

## 4.2.2 Configuring the Automatic-Dial Facility

If you chose **Yes** for Automatic-Dial on the SNA-over-Async Attachment panel (Figure 100 on page 106), you can modify many of the ADF parameters by clicking the **Configure Phone/Modem...** button.

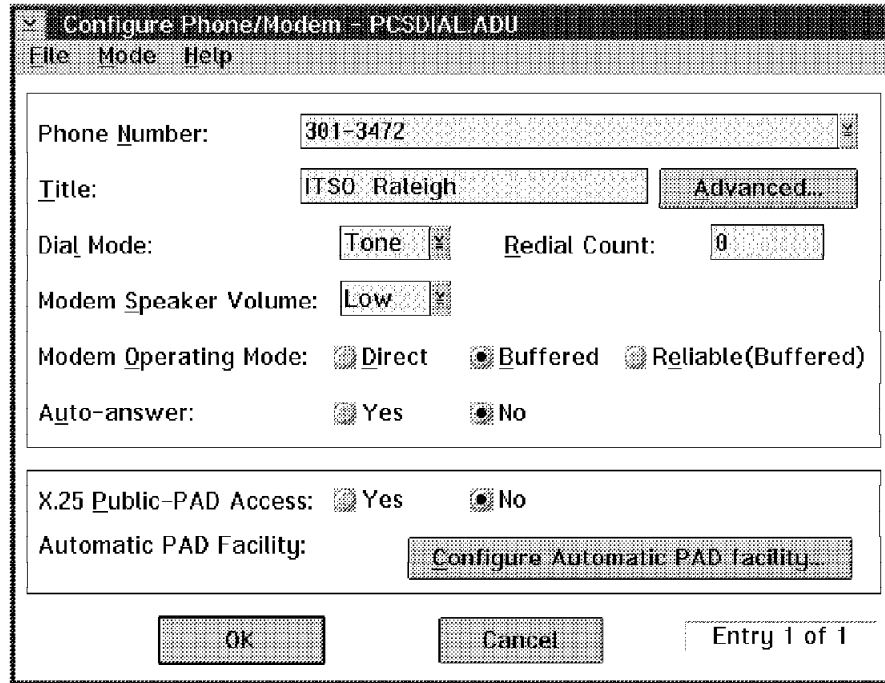


Figure 102. Configure Phone/Modem - PCSDIAL.ADU - SNA-over-Async

The Configure Phone/Modem - PCSDIAL.ADU panel allows you to create, save, and change information used by the Automatic-Dial Facility. The information includes telephone numbers, communication line parameters, and instructions to the modem that you will use. A dial configuration file can have up to 20 entries, and includes a single table that contains the information defining the commands sent to, and the responses expected from, a modem. There is more information in the Help.

If you have entered more than one telephone number, you will be presented with a list, from which you can select the one you need.

The parameters are discussed below. Note that you can change them separately for each number but you must save the changes for one number before you make changes for another; if you do not, the changes for the previous number will be lost.

### Dial Mode

One of these dialing modes can be set:

**Tone** Select **Tone** for phone lines that support multi-frequency dialing.

**Pulse** Select **Pulse** for older phones, such as those with a rotary dial, that use pulse dialing.

### Redial Count

This specifies the number of times that the ADF dials the number if it cannot establish a connection with the previous dial. If it fails to connect at all, it tries the backup number.

### Modem Speaker Volume

Lets you control the volume of the modem's speaker. The options are low, medium, high and off.

### Modem Operating Mode

There are three modes in which the modem can operate:

#### Direct

This mode assumes that the DCE (modem) speed is identical to the serial-port speed. The modem must establish a direct mode, or non-buffered, normal connection. If your modem does not support CTS/RTS local flow control, choose this mode.

#### Buffered Mode

In buffered mode, the connection does not use any form of modem-to-modem flow control, error correction (ECL), or compression (MNP). The modem must establish a normal-mode (speed-buffered) connection. To do so, the modem uses unidirectional CTS local flow control.

#### Reliable Mode (Buffered)

In reliable mode, the modem must establish a reliable-mode (speed-buffered, error-correcting (ECL)) connection. This connection may optionally use modem data compression (MNP). Generally, ITU-T V.42bis data compression is achieved in addition to ITU-T V.42 error control. Because this standard usually provides a compression ratio of up to 4:1, the serial-port speed should be faster than modem-to-modem speed. The modem uses bidirectional CTS/RTS local flow control.

#### Auto-answer

If you choose **Yes**, the modem will answer incoming calls automatically.

### Configure Phone/Modem - Advanced

Clicking the **Advanced...** button gives you some more options to customize.

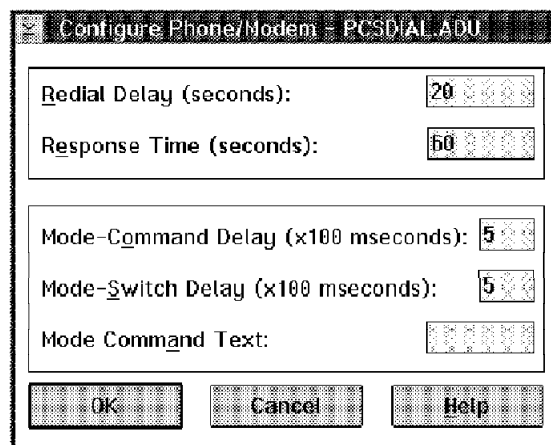


Figure 103. Configure Phone/Modem - PCSDIAL.ADU (Advanced)



### Redial Delay

This is the period, in seconds (1-99), that the ADF must wait before dialing again. The delay allows time for the modem and communication circuits to reset themselves and stabilize before the next attempt.

### Response Time

The period, in seconds, that the automatic-dial facility waits for the connection to be completed. If the period ends before the connection is made, the attempt fails.

### Mode-Command Delay

The length of the delay, in tenths of a second (0-99), between establishing the connection and transmitting the modem-command text.

### Mode-Switch Delay

The length of the delay, in tenths of a second (0-99), between transmitting the mode command text and entering SNA mode. The receiving system configures itself to the specified mode in order to receive your transmission. If the delay is too small, the connection may not be stable when the mode command is sent, resulting in a lost command. If the delay is excessive, the network may automatically assume its default mode.

### Mode Command Text

You can write some text that is to be sent to the receiving host system; this tells the host how to configure itself to suit the characteristics of your transmission.

## 4.2.3 Configuring X.25-PAD Access

Automatic PAD Facility - PCSDIAL.ADU  
Mode Help

Information for each logon entry:

Prompt from X.25 CODE Message displayed

Response sequence to be entered by user

1. [ ] 0 [ ] [ ]

[ ]

2. [ ] 0 [ ] [ ]

[ ]

3. [ ] 0 [ ] [ ]

[ ]

Next Entry Previous Entry

Figure 104. Automatic PAD Facility - PCSDIAL.ADU

If you are connecting to an X.25 Public PAD, the automatic-dial facility expects to find an X.25 access script, which you must specify through the Automatic PAD Facility. To do this, choose **Yes** for X.25 Public-PAD Access in the lower box of the Configure Phone/Modem panel, and then click **Configure Automatic PAD Facility....**

**Note:** X.25 access is available only through a PAD.

#### **Prompt from X.25 PAD**

This field accepts 76 characters. If all characters are blanks, the entry is automatically deleted.

#### **Code**

The code determines the way in which the entry is executed:

- 0:** Execute the entry and terminate.
- 1:** Execute the entry once and flag it so that it will not be executed again.
- 2:** Execute the entry each time the prompt occurs.
- 3:** Send the string in the Response-Sequence field to the PAD automatically when execution begins.

#### **Message displayed**

This field can have up to 40 characters, including blanks, which provide a trace message displayed in response to a prompt from PAD.

#### **Response sequence**

This field can have up to 76 characters, including blanks, which are transmitted to the PAD each time the PAD prompts for a network-station response.

The characters in the fields are not checked and can be of any kind. Special characters are entered as decimal numbers preceded by a backslash character (\nnn). The decimal value is the code point of the character in the current PC code page. A special character is any that cannot be entered directly by using the current keyboard code page, as well as the \ character itself.

For further information, please refer to the *Personal Communications Reference*.

When you have finished, close the Automatic-Dial Facility panels by clicking **OK**. You will be prompted to save the changes, but you can use **File** and then **Save** if you wish.

### **Using Shared Folders on an SNA-over-Async connection (Windows)**

If you want to use AS/400 Shared Folders, you must configure PCOMM for the SNA-over-Async V4.0 attachment. The Shared Folders installable file-system driver cannot work with the virtual communications device driver that the normal SNA-A attachment uses; it must use the type of attachment provided in PCOMM v4.0, which requires a DOS TSR program (PCSADLC.EXE).

When you configure this attachment, you will see a message telling you that you must start Windows with PCSWIN.BAT, not with the WIN command. The best thing is to call PCSWIN.BAT from AUTOEXEC.BAT. PCSWIN.BAT calls PCSTSR.BAT, which loads the TSR program, starts Windows, and ends the TSR program when you close Windows.

### 4.3 PC400 SNA-over-Async (Console) Attachment

The SNA-over-Async (Console) attachment enables Personal Communications to be an AS/400 system console. A special cable must be used to connect a PC's COM port to the ASCII Workstation Controller of the AS/400. This connection is supported by OS/400 Version 3 Release 1 or later.

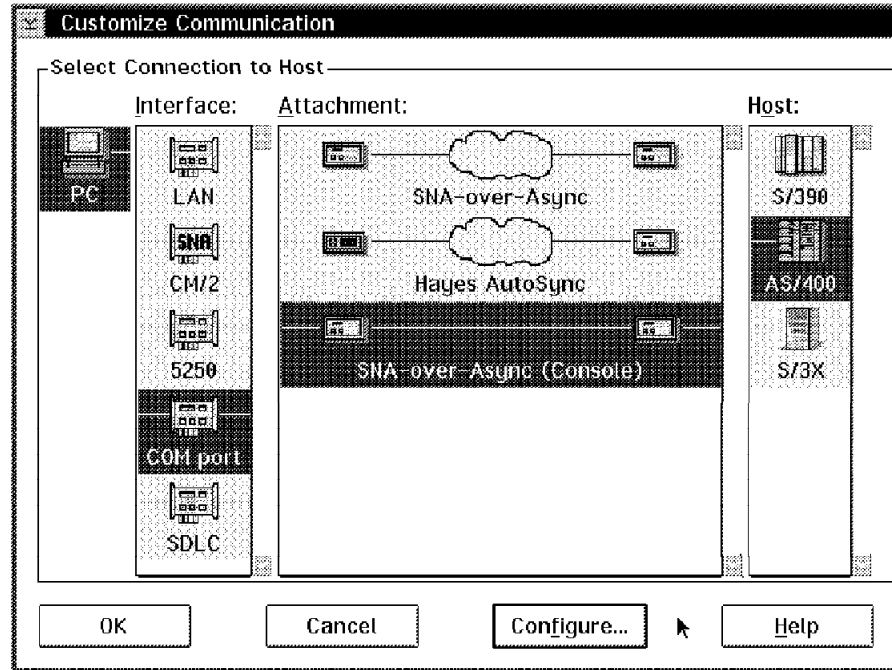


Figure 105. Customize Communication Panel - SNA-over-Async (Console)

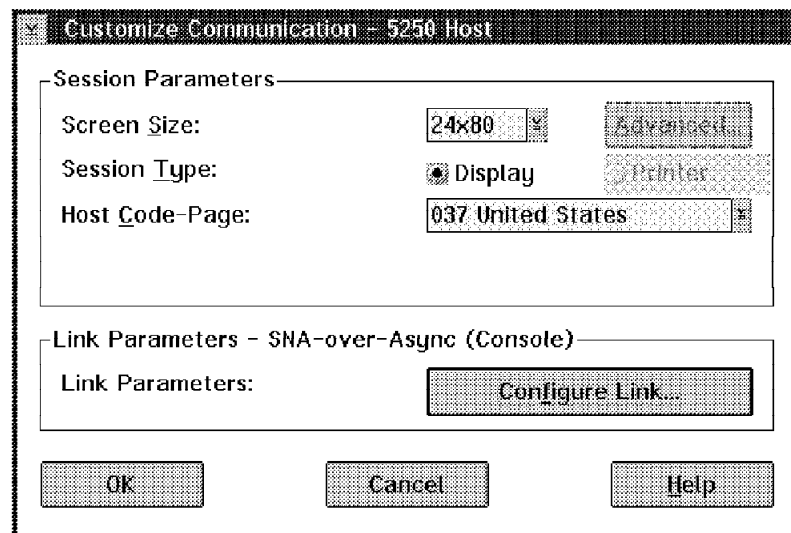


Figure 106. SNA-over-ASYNC (Console) Session Parameters Panel

You can choose only a display session.

If you select **Configure Link**, you can choose the COM port that you want to use, and you can turn the communication trace on or off.

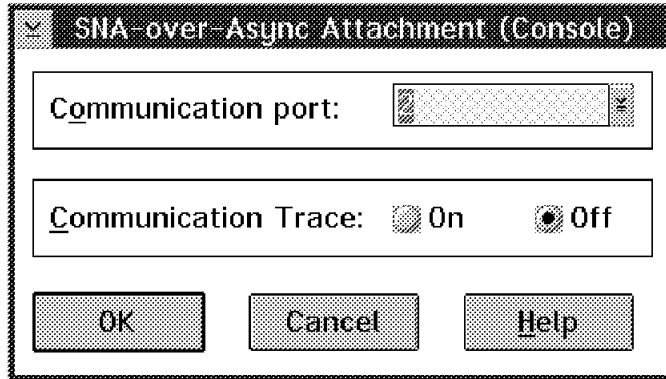


Figure 107. SNA-over-ASYNC (Console) Link Parameters Panel

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## Part 3. Non-Native Connections

The third part of this book describes some "non-native" connections that you can make by using PCOMM with other IBM products in a mobile environment.

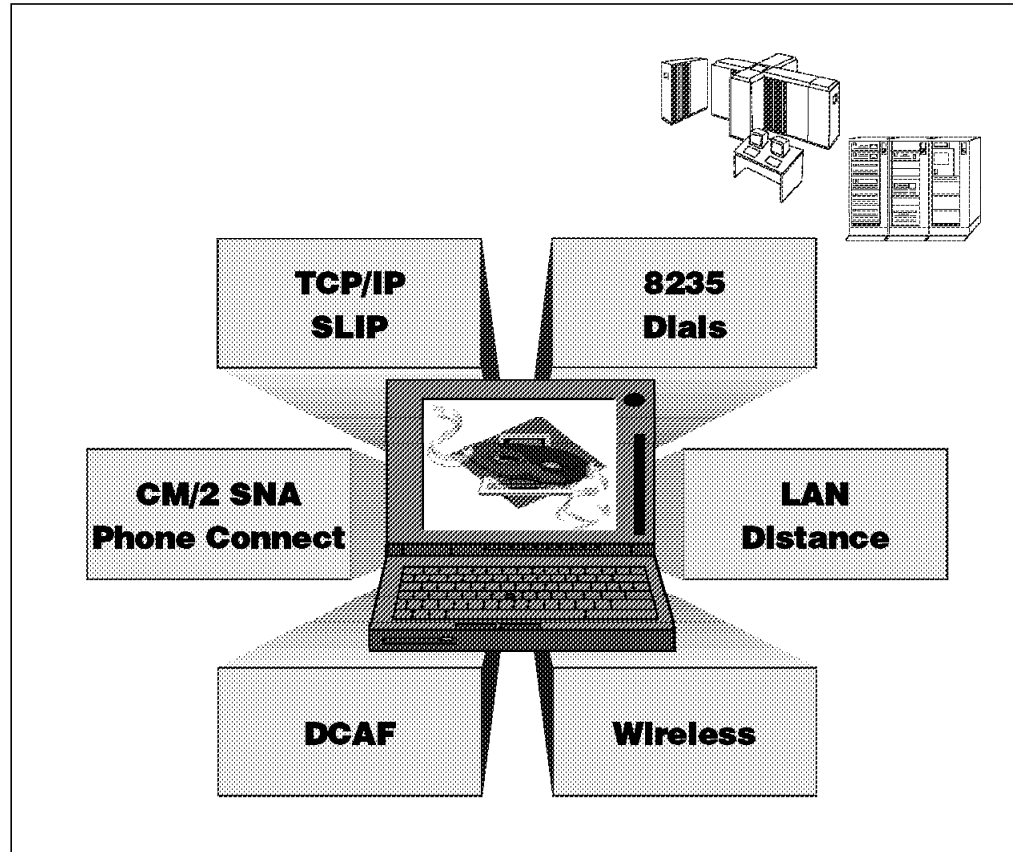


Figure 108. Personal Communications Non-Native Connections

- Chapter 5, "LAN Distance Connectivity"
- Chapter 6, "8235 Dial Connectivity"
- Chapter 7, "Wireless Connectivity"
- Chapter 8, "Communications Manager/2 Asynchronous Connectivity"
- Chapter 9, "TCP/IP Connectivity"

More and more businesses are required to provide LAN resources that are available to their staff wherever they are. Remote offices have to communicate and exchange data with the head office, as well as among themselves. Staff want to work at home, on the road, and even on planes. Many remote workers rely on LAN-based applications such as electronic mail, word processing and database access. Customers and vendors want to gain competitive advantage through the ability to access critical information anywhere and any time. All these people may need to have remote LAN access.

## **Remote LAN Access Technologies**

There are many remote-LAN-access products available today, varying widely in cost and functionality. Some use standard hardware devices and are solely software driven, while others may involve special hardware devices.

Products that involve special hardware devices may replace the LAN adapter with a customized WAN adapter in the remote workstation and provide a compatible hardware entry-point on the LAN; this varies from a specialized adapter on a LAN file server to a stand-alone multiprocessor box. The implementation of this approach varies widely in sophistication, cost, and performance.

Some products use extensions of a remote-to-remote environment to provide remote-to-remote and remote-to-LAN access capabilities, but do not support the LAN-to-remote or LAN-to-LAN environments. Many of the products currently available also do not support graphical interfaces.

Most of the remote LAN access products use one of three known approaches:

- The remote-control approach
- The remote-client approach
- The remote-node approach

### **The Remote-Control Approach**

One of the earliest and most prevalent software approaches is remote control. The remote workstation dials into, and takes control of a LAN-attached workstation, which executes programs on behalf of the remote workstation. Keyboard and screen data from the dedicated LAN-attached system is then routed back to the remote workstation. By routing only keyboard and screen data, this approach minimizes the amount of data which flows across the link, but it requires a dedicated machine on the LAN for each remote workstation that dials in.

Examples of remote control products:

- PC Anywhere
- Carbon Copy
- IBM Distributed Console Access Facility (DCAF)
- NetWare Connect

### **The Remote-Client Approach**

The remote-client approach uses a simple mechanism to extend the remote-to-remote environment in order to service the remote workstation and allow it to share data and applications located on a common WAN/LAN server. This may be accomplished by replacing the LAN device drivers in the remote workstation and LAN-attached server with customized device drivers that will allow them to send and receive LAN frames across a WAN link. This provides LAN-application transparency within the remote workstation.

The remote workstation in this approach has access only to the specific server to which it is connected.

The new device drivers use existing protocols and allow remote workstations to connect with each other to form a virtual LAN via the WAN link. In addition, the device drivers provide a mechanism for remote workstations to disconnect from one another upon conclusion of the remote transaction. Since the entire LAN frame is transported between the remote machines over the WAN link, LAN applications running in the remote workstations can support graphical interfaces in the same way as those running on LAN-attached workstations. Also, the LAN frames have much less fixed-format information, thus providing a more secure link encryption.

Examples of remote-client products:

- Lotus Notes
- cc:Mail
- Microsoft Windows NT

### **The Remote-Node Approach**

With the remote-node approach, the remote workstation installs a software driver that makes the machine think it is locally attached to the LAN. This allows the remote workstation to access anything on the LAN that it would have access to if it were locally attached, including multiple applications and servers.

This means that a remote workstation can access information and services wherever they reside on the LAN, rather than the LAN having to be redesigned with a central, dedicated server to accommodate access by the remote workstations. It also means that growth in the number of local and remote LAN-users can be easily accommodated without duplicating and maintaining data files across numerous servers.

Examples of remote-node products:

- IBM LAN Distance - software only
- IBM 8235 Dial In Access to LANs (DIALs) - hardware and software





## Chapter 5. LAN Distance Connectivity

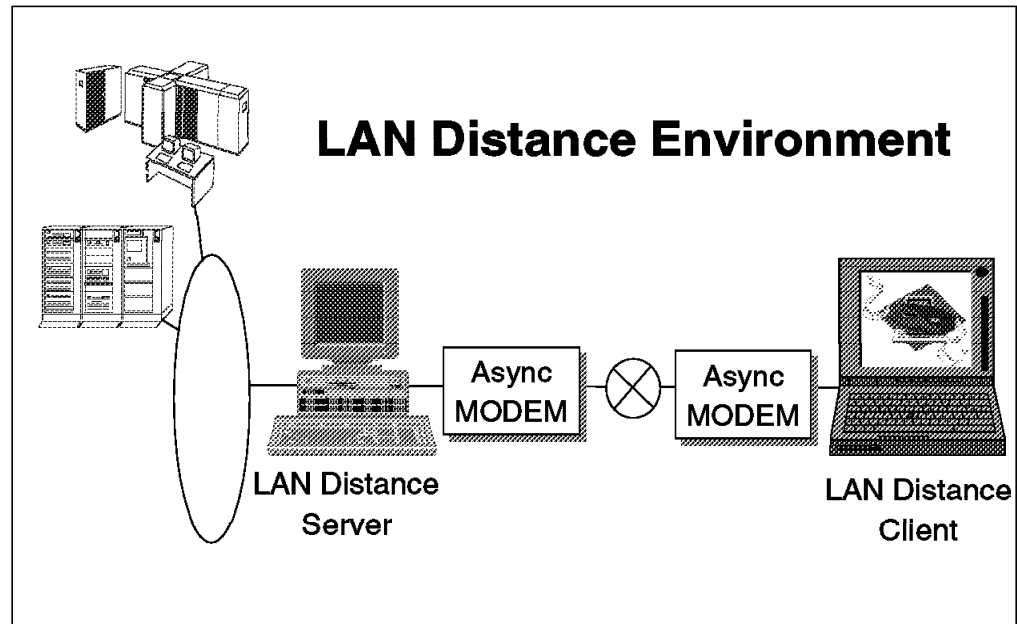


Figure 109. Personal Communications and LAN Distance Connectivity

The LAN Distance product provides all the connectivity that is needed for a mobile environment; NetBIOS, TCP/IP as well as SNA or NetWare resources are accessible using LAN Distance.

Personal Communications represents an important part of remote access needs. Therefore it is pertinent to test Personal Communications in such environments.

Once LAN Distance is installed and configured, there is no need to change configuration of the applications and products running on the mobile. All the services accessible in the LAN-attached mode become available remotely through LAN Distance without changing their configuration. Thus Personal Communications configurations need no update once LAN Distance is running.

The LAN Distance product exists for OS/2 and Windows remote stations. The test cases performed for this book are the following:

- Run Personal Communications with an 802.2 configuration via LAN Distance Remote for OS/2,
- Run Personal Communications with a TN3270 configuration via LAN Distance Remote for Windows.

The following ITSO book provides additional details on LAN Distance product: *IBM LAN Distance Configuration and Customization Guide*, GG24-4158.

At first, we will explain how LAN Distance works regarding architecture, protocols and routing. Then we will describe the LAN Distance Connection Server installation and configuration steps. Finally we will describe the LAN Distance Remote for OS/2 and LAN Distance Remote for Windows installations and configurations to respectively test the 802.2 access and the IP-based access via Personal Communications.

---

## 5.1 LAN Distance Architecture

A strong understanding of NDIS is assumed in this discussion, as no explanation of the standard NDIS environment is provided within this book.

Refer to the *NTS/2 LAN Adapter and Protocol Support* manual for an explanation of NDIS.

LAN Distance is based on an extended version of NDIS 2.0.1 called Advanced NDIS or ANDIS. The extensions defined by ANDIS provide support for communications environments and hardware outside the traditional token-ring or Ethernet LAN. ANDIS provides two basic functions beyond that of NDIS:

- Support for non-LAN networks such as asynchronous, synchronous, ISDN, X.25, and wireless connectivities.
- ANDIS provides the ability to send LAN frames across these links and thus enable devices in the wide area network (WAN) to be participating members of the LAN.

### ANDIS

ANDIS architecture has added a number of new components to NDIS. These components include:

- **Connection Manager**

In a LAN environment, the LAN-attached devices are always connected via their LAN adapters, cabling and other LAN hardware. Communication between two devices can occur at any time, and it is only necessary for one device to send data to the other.

In a non-LAN environment the physical connection doesn't exist; then the connection between two remote workstations must be established before communication could occur. ANDIS assumes this connection through its Connection Manager component.

- **Port Connection Managers**

The Port Connection Managers (PCMs) are the entities that actually manage the ports or channels directly under their control. PCMs supports specific type of connections such as asynchronous, ISDN and X25. In a dial-up asynchronous environment for example, the PCM is responsible for building the appropriate modem setup string and dial string for the modem being used, and then passing this to the modem that dials the remote system and makes the connection.

Once the connection is made, the Connection Manager monitors it.

A PCM can be stand-alone or integrated. If stand-alone, the PCM is connection specific and provides a lower-layer interface to match the ANDIS MACs. Then PCM passes connection and other management commands to the hardware via the ANDIS MACs. One stand-alone PCM can work with multiple ANDIS MACs, which means different hardware can be treated by the same PCM.

An integrated PCM subsystem contains both the PCM and the MACs required to support a specific piece of hardware. There is no formal external interface between the two. This integrated subsystem package is product specific, and should normally be shipped by OEM hardware.

- **ANDIS MACs**

Some NDIS MAC drivers provide a standard interface to LAN hardware. This interface allows high-level protocols, which build the LAN specific frames, to pass their frame and other command information to the LAN adapter. ANDIS extends the standard NDIS MAC function to encompass connection management via a stand-alone PCM. For example, a NetBIOS protocol driver builds the appropriate 802.5 frame, passes this frame to the token-ring adapter MAC driver and issues a SEND command. By replacing the token-ring adapter MAC driver with an asynchronous ANDIS MAC driver, the frame would be sent across an asynchronous communications link. The device on the other end of the async communications link would receive this frame as asynchronous data. If an ANDIS MAC driver exists at the remote port, then the 802.5 frame is received from the line and passed back up to the standard NetBIOS protocol driver. This protocol driver would have no knowledge that the frame was transmitted across an asynchronous link.

- **Virtual LAN (VLAN)**

VLAN is a new layer that sits between the standard NDIS protocol drivers and the ANDIS MACs. The VLAN emulates LAN types and routes frames between the WAN connection, protocol stacks, and the bridge (the bridge function is assumed in the LAN Distance Connection Server). The VLAN appears to the upper-layer protocol driver as a real LAN adapter. Thus, there would be a different VLAN for token-ring and Ethernet. The VLAN insulates the NDIS protocol drivers from the non-static characteristics of dynamic connections. The VLAN appears as standard MACs to the protocol drivers above and as surrogate protocol drivers to the ANDIS MACs.

- **Bridge**

The LAN Distance bridge functions as a source-routing bridge in the token-ring environment and a transparent bridge in the Ethernet environment. We will focus only on the token-ring environment when implementing LAN Distance Connection Server to achieve Personal Communications tests. The LAN Distance Connection Server routes the traffic to and from the LAN and the WAN.

- **ANDIS Protocol Manager (ProtMan)**

The NDIS Protocol Manager reads in the configuration information from the PROTOCOL.INI file and uses this to bind, or connect, the NDIS protocol stacks to the NDIS MAC drivers. Once the appropriate protocol stacks and MAC drivers are bound, the Protocol Manager is no longer used.

ANDIS adds additional function to the NDIS Protocol Manager to include the ability to bind the Connection Manager, Port Connection Managers, and ANDIS MACs together as required. Thus, there is additional configuration information required in PROTOCOL.INI to accomplish this.

## **The Token-Ring Source Routing Bridge**

Source routing is the method used in IBM Token-Ring Networks to control the route a frame travels through a multisegment LAN. Source-routing bridges put the responsibility of navigating through a multisegment LAN on the end stations. A route through a multisegment LAN is described by a sequence of ring and bridge numbers stored in the routing information field of a token-ring frame.

Each ring segment in a LAN has a ring number assigned when the bridges are configured. Bridges are also given numbers when they are configured. Together, the ring numbers and bridge numbers, known as route designators, are used to map a path through a multisegment LAN.

The routing field in a MAC frame, if present, is part of the MAC header of a token-ring frame. The presence of routing information means the end stations are aware of, and may make decisions based upon the routes available in a multisegment LAN.

In contrast, transparent bridges take the responsibility for routing frames through a multisegment LAN. This leads to more complex bridges and end stations that are unaware of whether they are bridged, and if they are, what route their frames are taking.

When a frame containing a routing information indicator is sent, all bridges on the LAN segment examine the frame. The bridge copies a broadcast frame as long as it hasn't already been on the target ring and it meets the adapters Single Route Broadcast frame criteria. If the frame is a non-broadcast frame, the bridge interprets any routing information and forwards the frame if appropriate.

The following books provide additional detail on source routing bridges:

- *IBM Multisegment LAN Design Guidelines*
- *IBM 8250 Intelligent Hub and IBM Hub Management Program/6000*

## **Segment Numbers**

The LAN Distance Connection Server bridges between two LANs. Generally, one LAN segment is a physical LAN segment (token-ring or Ethernet) and the other is the WAN, which is a virtual LAN segment. Segment numbers are used by bridges to route frames from one segment to another. All segments within a network should have a unique segment number.

It is important that when a LAN Distance Connection Server is configured, the segment numbers used for the LAN and WAN segments are valid. In a small LAN environment where there are no interconnected segments (only one physical LAN segment exists), the LAN segment number can be any valid value. If the LAN environment is large, with many interconnected segments, then the segment number for the WAN and other remote LANs must be coordinated through a network administrator. Or, you can use OS2PING or CALLBRDG to be sure you are using a unique number. See the use of OS2PING in Figure 157 on page 161.

## Hop Counts

A hop count is used by the LAN Distance Connection Server bridge and other LAN bridges to decide whether a frame should be discarded or not. The hop count limit indicates to a bridge the maximum number of bridges a broadcast frame can traverse before it is discarded by the bridge.

The two sides of the bridge, either WAN-to-LAN or LAN-to-LAN, can have different values specified for the hop count limit. The value of (7,7) means that broadcast frames arriving on both sides of the bridge could have already traversed up to six bridges and will still be allowed to traverse this bridge. The number 7 represents the maximum number of bridges that can be traversed.

In a source routing bridge environment, as each bridge in a network is crossed, the bridge adds routing data to a routing information field. The maximum length of the routing information field is 16 bytes, which allows a maximum of 7 bridges to add their routing information (2 bytes per bridge, plus 2 bytes of control information).

In a large LAN environment where there are many LAN segments and bridges between a LAN Distance Connection Server and the 3745 host gateway (for example), the hop count parameter can become critical to the effective operation of LAN Distance.

There are two trade-offs with setting the hop count on LAN Distance Connection Server:

- The hop count must be set large enough to enable the remote workstations to communicate with other devices in the network.
- A low hop count can assist with limiting the amount of unnecessary data on the slower WAN communications links.

If you set the hop count high, and there is a lot of broadcast traffic in the network, then the slow WAN link may be too busy transmitting unwanted broadcast traffic to be able to transmit information to and from the remote workstation. In this case, filtering has to be added to permit only certain adapters, NetBIOS names, or protocols to pass data over the WAN link.

If the hop count is set low, then there is less need to filter at the LAN Distance Connection Server. In fact setting the hop count low can assist or complement filtering for the purpose of reducing traffic over the WAN link. In some cases, such as with Personal Communications, it is possible to set the hop count on the LAN Distance Connection Server to 1, yet still be able to establish a connection with the host gateway.

When Personal Communications at the remote workstation first establishes a link with its gateway, it sends out an All Routes Broadcast to the gateway. As long as the bridges between the LAN Distance Connection Server and gateway have their hop count set high enough, the frame will reach the gateway. The gateway responds with a non-broadcast (direct) frame to the remote workstation. Because this frame is a non-broadcast frame, the bridges forward it through the network to the remote workstation. Even if the hop count on the LAN Distance Connection Server is set to 1, and the frame has passed over four bridges, the frame is still passed to the remote workstation by the LAN Distance Connection Server. The reason for this is that the bridge hop count only restricts broadcast frames.

## Relationship between a Remote Workstation and the Connection Server

Figure 110 shows the relationship between a remote workstation, the LAN Distance Connection Server, the LAN, and other LAN-attached devices in a token-ring environment. The diagram also shows how the different ANDIS components are used on the remote workstation and LAN Distance Connection Server. The environment shown is rather simple, as many other combinations of protocols, LANs, and applications can be supported by LAN Distance.

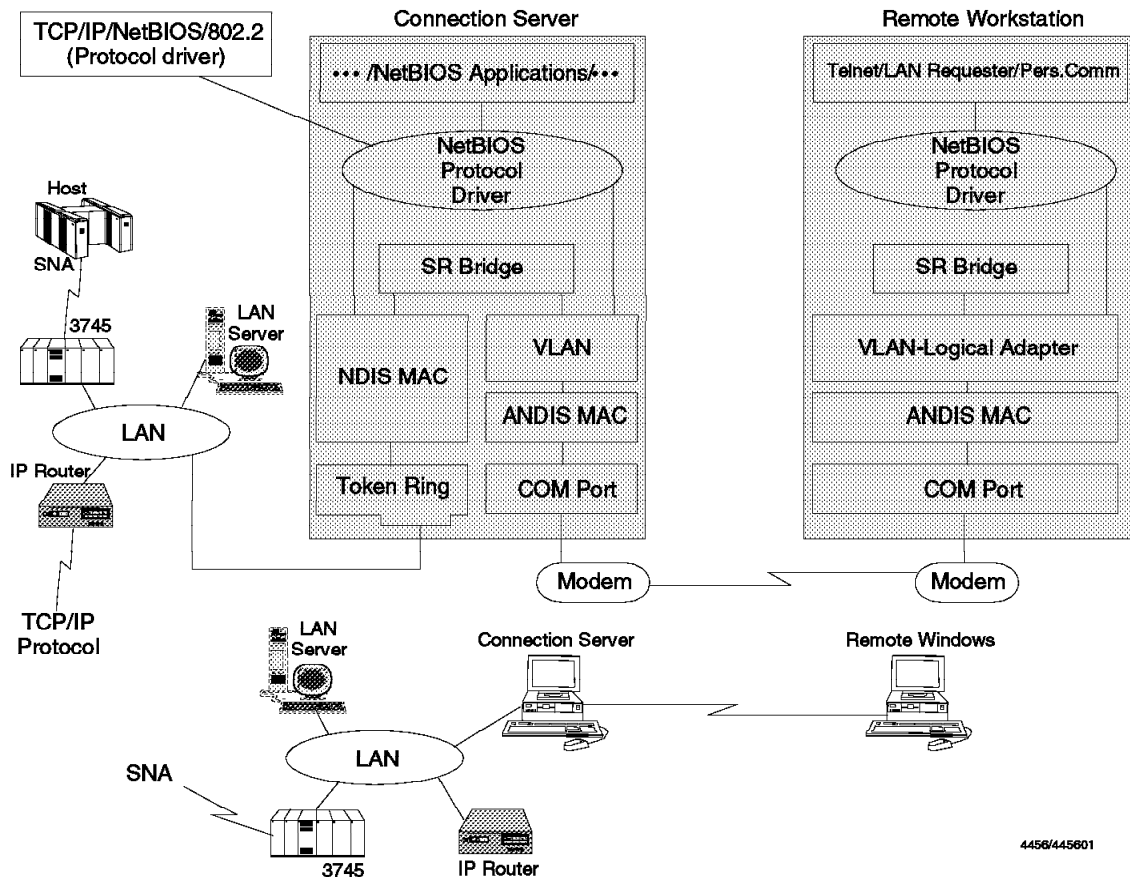


Figure 110. LAN Distance Connection Server and remote workstation Relationship - Token-Ring

In this diagram only the ANDIS components used by LAN Distance for communications (not establishing the connection) are shown. The Connection Manager and Port Connection Managers as described in "ANDIS" on page 120 are not shown.

On the remote workstation, we can suppose:

- Telnet is running using the TCPIP protocol.
- LAN Requester is running using the NetBIOS protocol.
- Personal Communications is running using the 802.2 protocol.

The NetBIOS, TCPIP and 802.2 protocols are then bound to the virtual LAN adapter or VLAN driver. After the connection between the remote workstation and the LAN Distance Connection Server has been established, the Connection Manager (not shown) allows the VLAN driver to dynamically bind to the MAC drivers.

LAN Requester requests can now flow across the link shown as if they were directly attached to the LAN, as well as TELNET can reach some IP resource and Personal Communications can start a communication with a host. The VLAN layer hides the asynchronous process so that the products or applications already configured to work properly in a LAN-attached environment still work properly on a remote workstation with no change to their configuration.

On a token-ring LAN, the LAN Distance Connection Server has a standard MAC driver loaded for the token-ring adapter, as well as the ANDIS drivers for the WAN communications. In addition, a source routing bridge module has been added. This bridge routes frames to and from the remote workstation (WAN) and the LAN. The LAN Distance bridge is key to the function of the LAN Distance Connection Server enabling LAN frames to flow between the LAN and remote workstation in the WAN.

**Note:** On the LAN Distance Connection Server, the VLAN driver must match the physical LAN to which the LAN Distance Connection Server is to be attached. In the case of token-ring, the VLAN must support token-ring frames.

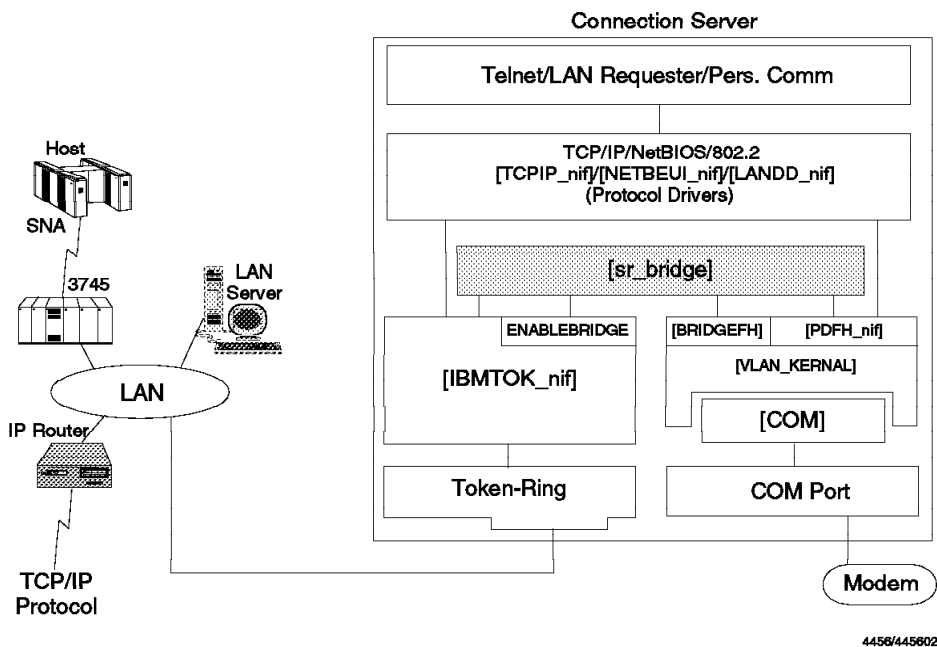


Figure 111. LAN Distance Connection Server Components

Also, the remote workstation must send the correct frames which in this case are token-ring frames.

Also shown in Figure 110 on page 124 are the NetBIOS, TCPIP and 802.2 protocol drivers on the LAN Distance Connection Server. The NetBIOS protocol stack is always required on both LAN Distance Connection Server and remote workstation even if no other NetBIOS application is used, because LAN Distance uses NetBIOS itself for internal purposes.

---

## 5.2 LAN Distance Connection Server installation and configuration

If you want to install other products, we recommend you do that before installing LAN Distance Connection Server.

The server must be configured with a supported IBM token-ring LAN adapter, COM port, and modem. In most cases, any token-ring LAN adapter can be used if an OS/2 NDIS driver is available.

**Note:**

There are a number of adapters which do not work properly. For the latest list of supported adapters, see the ADAPTERS.TXT file available on:

- CompuServe PSPAPROD forum, in the library section of LAN Distance,
- OS2BBS to access IBMLink, the REMOTE section:
  - OS/2 Software Library (select option 3)
  - OS/2 Selective Fixes (select option 1)

We recommend that you use a basic token-ring 4/16 card.

**COM-Port Recommendation**

For the LAN Distance Connection Server, we recommend a COM port with the UART chipset 16550A (FIFO) that enables buffering. Without this, your LAN Distance Connection Server may not be able to transmit data faster than 9600bps.

Required disk space for the LAN Distance Connection Server, including MPTS and FFST/2, is 7.9MB. The LAN Distance Connection Server code by itself is 5.0MB. The LAN Distance installation installs First Failure Support Technology/2 (FFST/2) and multiple Protocol Transport Services (MPTS) if the required levels of these products are not already installed. Required disk space for FFST/2 is 0.7 MB. Required disk space for MPTS is 2.2MB.

### 5.2.1 Installing the LAN Distance Connection Server Software

This procedure covers the installation of the LAN Distance Connection Server software. After the software is installed, you have to customize MPTS and the LAN Distance Connection Server asynchronous connection via a modem and COM port to a token-ring LAN.

1. Insert the LAN Distance Connection Server diskette 1 in drive A.
2. At an OS/2 command prompt run the installation program by typing:

A:\INSTALL

Press Enter. The following panel is displayed:





Figure 112. Connection Server Installation/Product Information Panel

3. Select the **OK** button to display the Welcome window.
4. Click the **OK** button on the Welcome window to display the target Drive window, select the **Quick Start** button for a list of minimal steps necessary to complete installation.
5. On the Target Drive window enter the drive you wish LAN Distance installed to, and click the **OK** button. The code is placed in the \WAL directory on that drive.
6. Follow the instructions, and insert the appropriate LAN Distance Connection Server installation diskettes as required.

After the LAN Distance Connection Server software from all three installation diskettes has been installed, you are informed that FFST/2 was installed or updated on this workstation.

7. Click the **OK** button.

Your CONFIG.SYS and PROTOCOL.INI files have been updated.



Figure 113. Connection Server Installation/Shutdown Panel

8. Click the **OK** button to exit the LAN Distance Connection Server installation.
9. Remove the last LAN Distance Connection Server installation diskette.
10. Select **Shut down** from the OS/2 desktop, shut down your system and reboot.

After rebooting the workstation you have IBM LAN Distance on your OS/2 desktop.

### Setting Up the Connection Server Using the LAN Distance Settings

Before the LAN Distance Connection Server can be used, it must first be configured. The LAN Distance Settings notebook is used to configure the LAN Distance Connection Server. The following steps must be completed to configure a basic connection server to provide access from a single remote workstation. The steps are presented in more detail in the following sections:

1. Open the LAN Distance Settings notebook.
2. Configure the WAN Ports.
3. Configure the Modems.
4. Configure the Bridge.
5. Configure the Address.
6. Configure the Answer modes.
7. Configure the Workstation.
8. Configure the PhoneBook.
9. Reconfigure MPTS.
10. Save the configuration and restart the workstation.

## Open the LAN Distance Settings Notebook

After you install the LAN Distance Connection Server, a LAN Distance program icon is displayed on the OS/2 desktop. Select this icon to start LAN Distance.

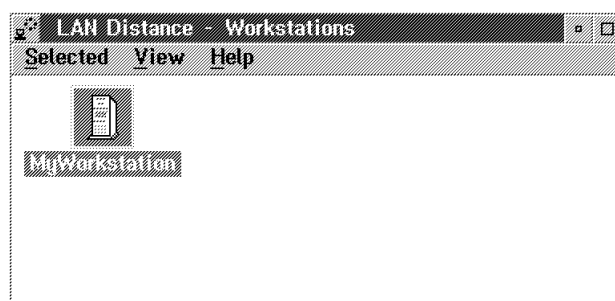


Figure 114. Workstations Window

Figure 114 shows you the LAN Distance - Workstations window after you have started the LAN Distance program. Notice that there is one icon in this window that looks like a server and is labeled MyWorkstation. This icon represents the workstation you have installed LAN Distance Connection Server on. If there are other LAN Distance Connection Servers or remote workstations on the same LAN, you also see icons representing these machines.

To open the Settings notebook for your LAN Distance Connection Server, follow these instructions:

1. Select the icon representing your LAN Distance Connection Server, with the right mouse button (see Figure 115).

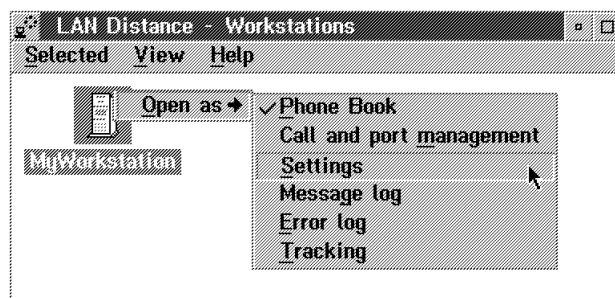


Figure 115. Open Notebook

2. Select **Selected** from the menu bar.
3. Select **Open as ->**.
4. Select **Settings**.

The LAN Distance Settings notebook is displayed, as you can see in Figure 116 on page 130.

## IBM LAN Distance Settings

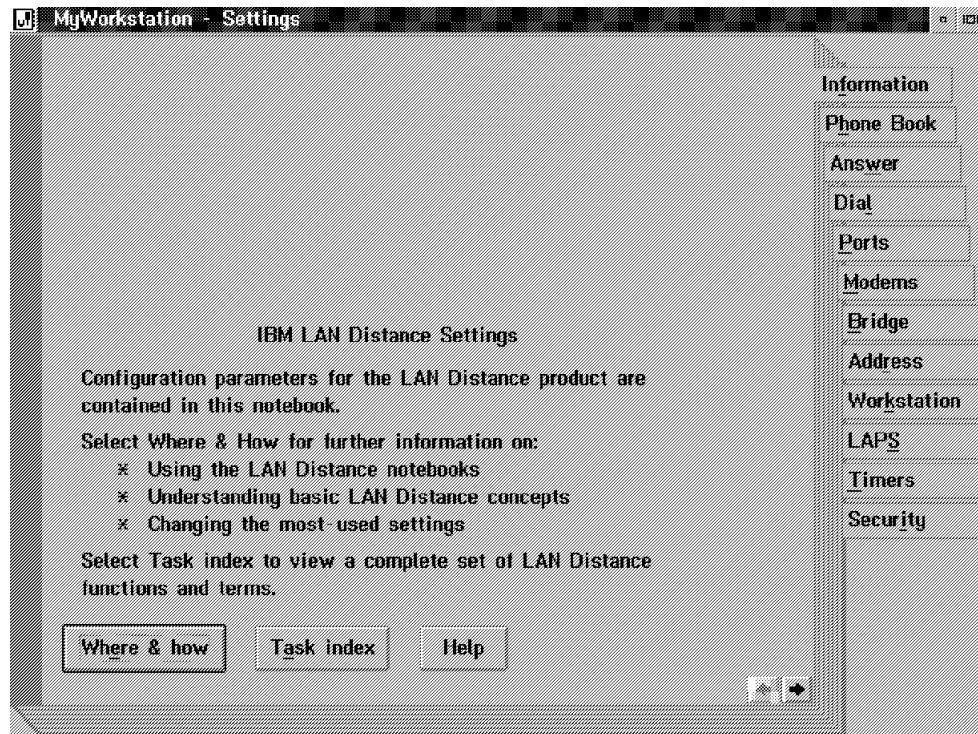


Figure 116. Settings Window

Select the **Workstation** notebook tab and then the right arrow on the bottom or maximize the window, and you can see that you have another three notebook tabs.

### Configure the WAN Port

The WAN port is the path that LAN Distance uses to communicate with other LAN Distance Connection Servers and remote workstations in the WAN. It is the access point for connections to and from your workstation. Calls are dialed and answered through these ports. Generally speaking, one port is required for every modem, internal or external, on your workstation.

Configure one LAN Distance port for every modem on your workstation. We will configure here one modem on COM1 port.

Follow these steps to configure the WAN port:

1. From the LAN Distance Settings notebook, select the **Ports** tab.

The following window is displayed:

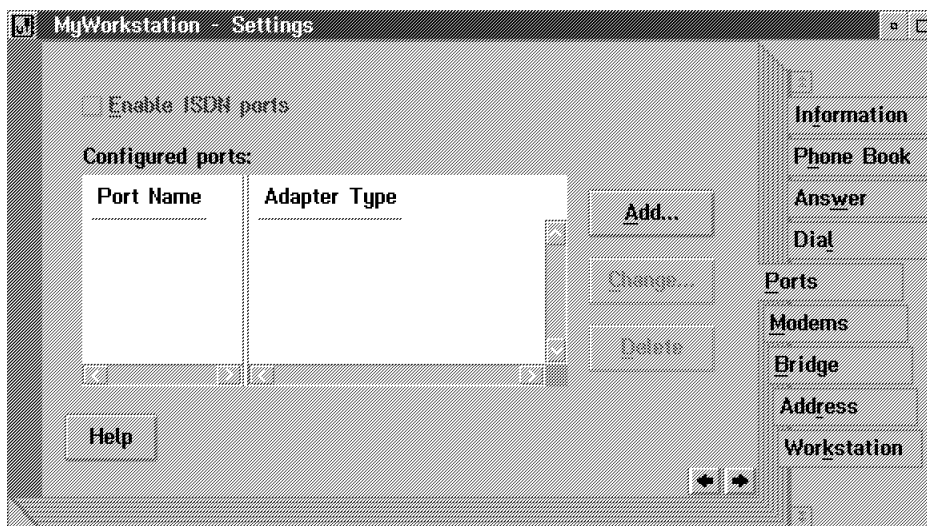


Figure 117. Settings Window - Add Port

2. From the notebook page, as shown in Figure 117, select the **Add...** button.

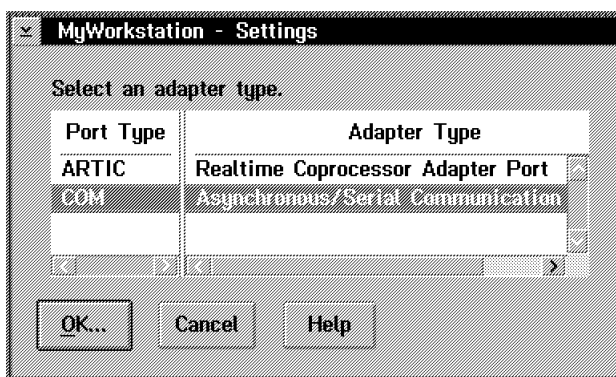


Figure 118. Settings Window - Select Port Type

3. Select the port type you are using.  
In this case we are using an asynchronous modem via a COM port.
4. Select **COM Asynchronous/Serial Communication** from the list box.
5. Select the **OK** button.

The COM Port - Settings window is displayed in Figure 119 on page 132.

## Asynchronous/Serial Communication Ports Settings

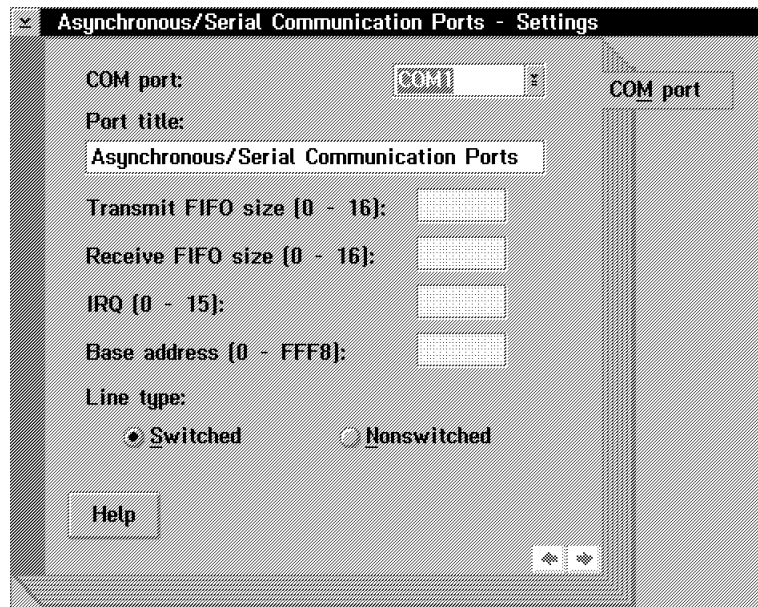


Figure 119. COM Port - Settings Window

1. All the defaults can be accepted.

The fields presented in the COM Port - Settings window do not generally need to be changed.

Because we are using an asynchronous modem, we can accept the default line type of Switched. If the remote workstation and LAN Distance Connection Server are connected via a leased line, or directly connected via their asynchronous COM ports, then Nonswitched would be selected (for example, if you are using a null modem cable).

2. Close the COM Port - Settings window.

Select the system icon at the top-left corner of the notebook, and then select **Close**.

### Configure the Modem

We must configure and attach the modem to a WAN port. Follow these steps to configure the modem.

1. Select the **Modems** tab from the Settings notebook. (See Figure 116 on page 130).

The following window is displayed:

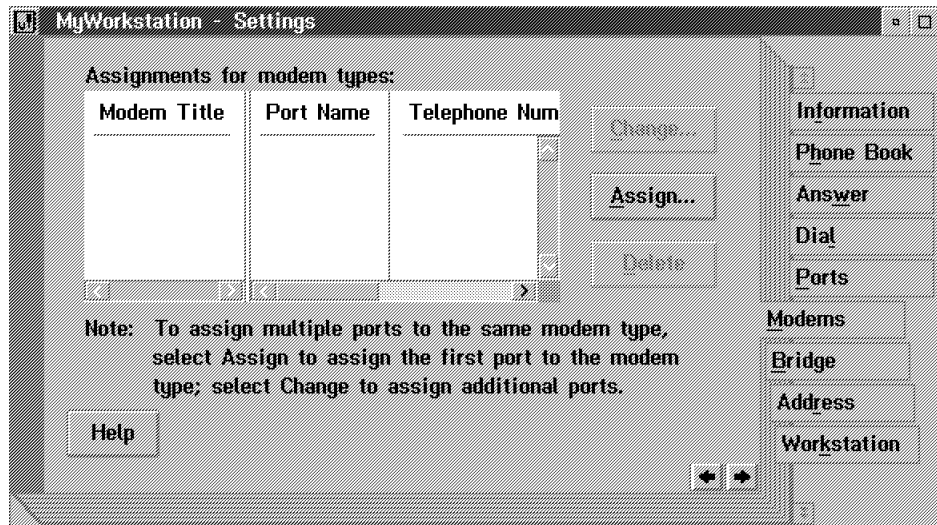


Figure 120. Settings Window - Assign Modems

2. Select the **Assign...** button.

A list of modems is displayed.

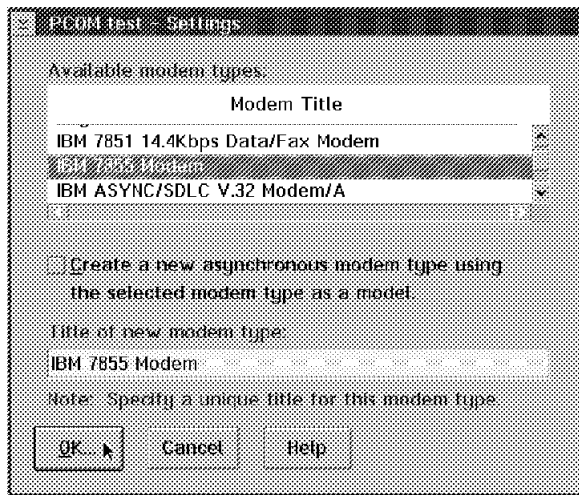


Figure 121. Settings Window - Select Modem

3. Select a modem from the Available modem types list box.

In our environment, we are using an IBM 7855 Modem.

**Note:**

If your modem is not listed in the Available modem types list box, you must configure a new modem type. To do so refer to *IBM LAN Distance Version 1.1 Configuration and Customization Guide*, GG24-4158.

4. Select the **OK...** button.

The following IBM 7855 Modem - Settings notebook is displayed.

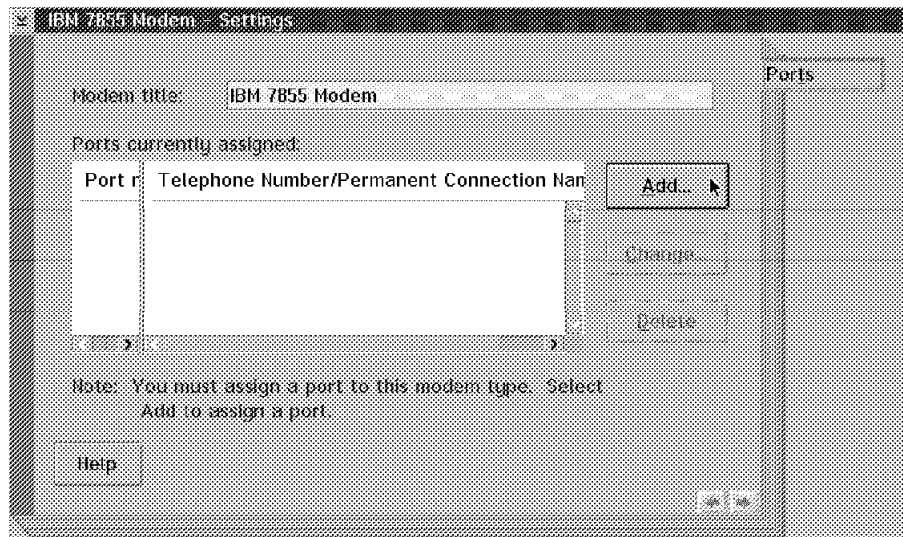


Figure 122. IBM 7855 Modem - Settings Window (Add Modem)

5. Select the **Add...** button.

The two fields that appear ask you for a phone number or a permanent connection name. We enter nothing here, so Unspecified is generated for those entries.

6. Select the **OK** button.

You must now select the port to which this modem is attached. In this window you see ports that previously have been added. If you remove a port later, the modem will be removed too.

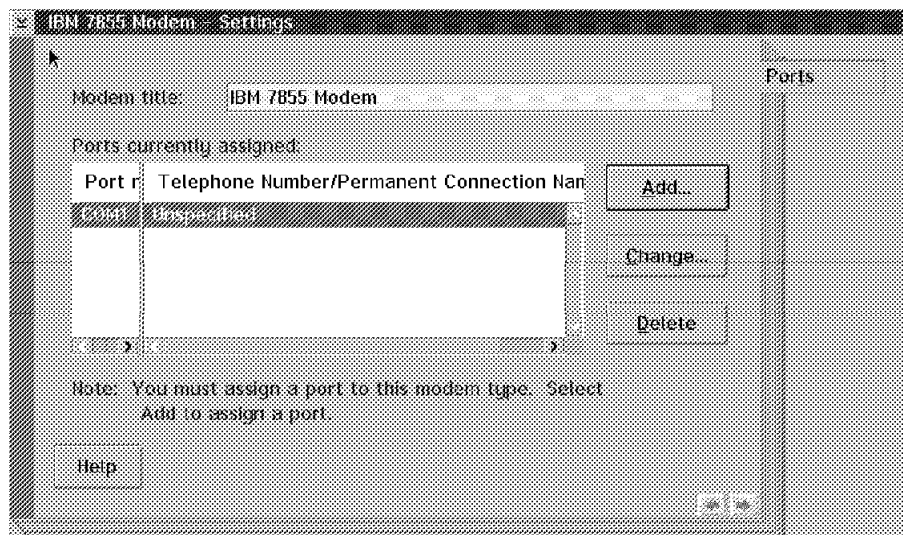


Figure 123. IBM 7855 Modem - Settings Window (Settings OK)

7. Select **COM1**.
8. Select the **OK** button.



Figure 123 on page 134 shows you the modem type and the port it is assigned to.

9. Close the window to finish the modem configuration.

**Note:** The assignment of a port to a modem type provides the association between your logical ports and your physical WAN hardware.

## Configure the Bridge

The LAN Distance bridge is located on the LAN Distance Connection Server and is used to route LAN frames between remote workstations in the WAN and the LAN.

Because the LAN Distance Connection Server bridge functions as a normal bridge, it may be configured in a similar way. Follow the steps below to configure the LAN Distance Connection Server bridge:

1. Select the **Bridge** notebook tab from the Settings notebook. (See Figure 116 on page 130).

The following window is displayed:

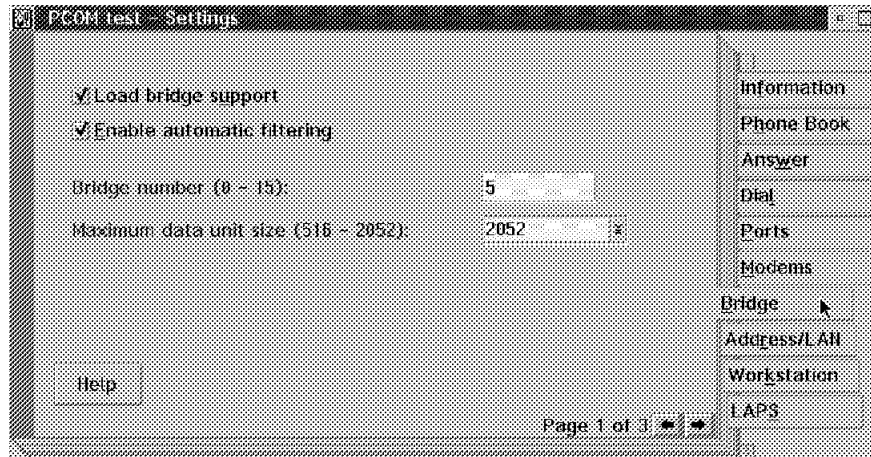


Figure 124. Settings Window (Bridge Section: Page 1 of 3)

2. Accept the defaults.

The Bridge number identifies this bridge uniquely between LAN segments. (Note that the WAN, and all devices connected into the LAN Distance Connection Server via the WAN, appear as a LAN segment to the bridge). If there are multiple bridges between the same two segments (that is, parallel bridges), then this bridge number must be unique for each bridge.

The Maximum data unit size specifies the largest size for frames that can pass through this bridge. If your LAN Distance bridge receives a data frame that exceeds this maximum size, the frame is discarded.

3. Select the next page arrow to go to Page 2 of 3.

On page 2, you can set the local LAN segment number, the maximum number of network bridge hops and active filters.

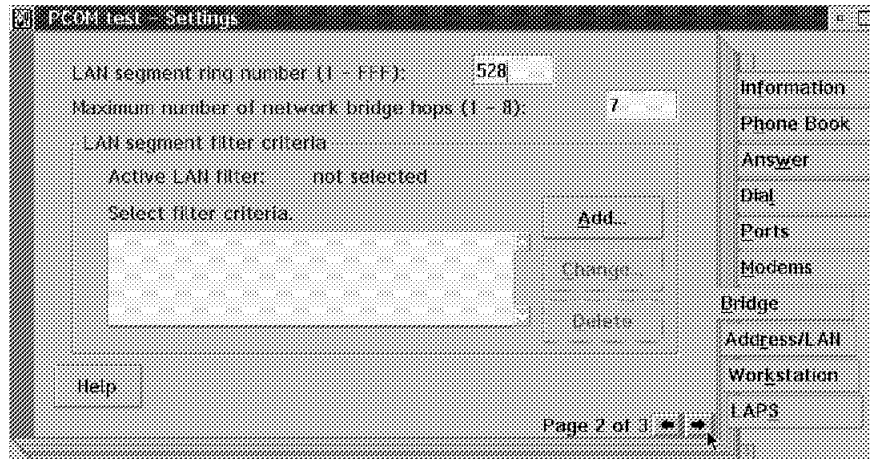


Figure 125. Settings Window (Bridge Section: Page 2 of 3)

4. Enter the LAN segment ring number.

The LAN segment ring number is the ring number of the LAN segment on which your LAN Distance Connection Server workstation resides. If your LAN segment is part of a large network, then you need to obtain this segment number from your network administrator.

For a better understanding of how the LAN Distance Connection Server bridge is implemented, see “The Token-Ring Source Routing Bridge” on page 122. A broadcast frame sent by the remote workstation must be able to reach the host gateway (3745) to enable 802.2 traffic via LAN Distance Connection Server and then Personal Communications 802.2 test. It must also reach the TN3270 server on your network to enable Personal Communications test via TN3270 mode.

5. Select the next page arrow to continue.

Here, you can set the WAN segment number, the maximum number of network bridge hops, and active filters.

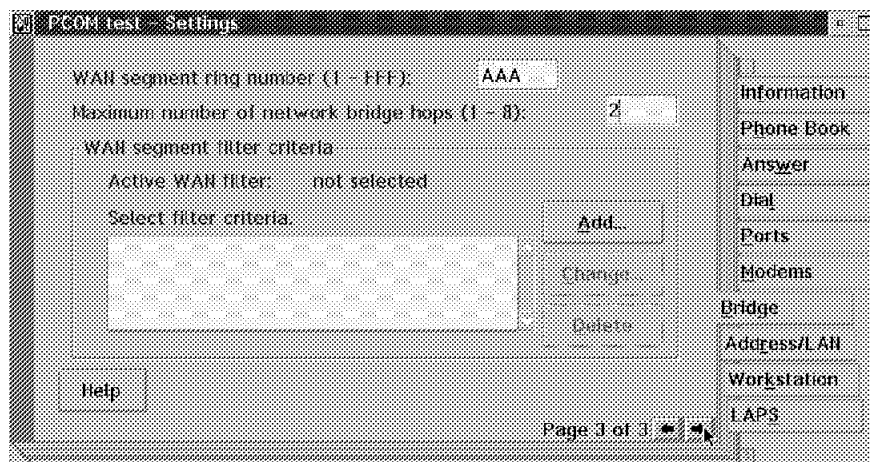


Figure 126. Settings Window (Bridge Section: Page 3 of 3)

6. Enter the WAN segment ring number.

The WAN segment ring number must be different from your LAN segment ring number. If the two segment numbers are not unique, the bridge would not be able to route frames from the WAN segment to the LAN segment. For more information, see “The Token-Ring Source Routing Bridge” on page 122.

### Configure the Network Address

The LAN Distance Connection Server acts as a bridge between two LAN segments. In order for the bridge to operate, it must route frames between the two adapters connected to each LAN segment. The WAN segment and LAN adapter connected to it are logical devices. Although the adapter is a logical device, it must still have an adapter address.

The following steps show how to set up the LAN Distance logical adapter:

1. Select the **Address** notebook tab from the Settings notebook.

The following window is displayed:

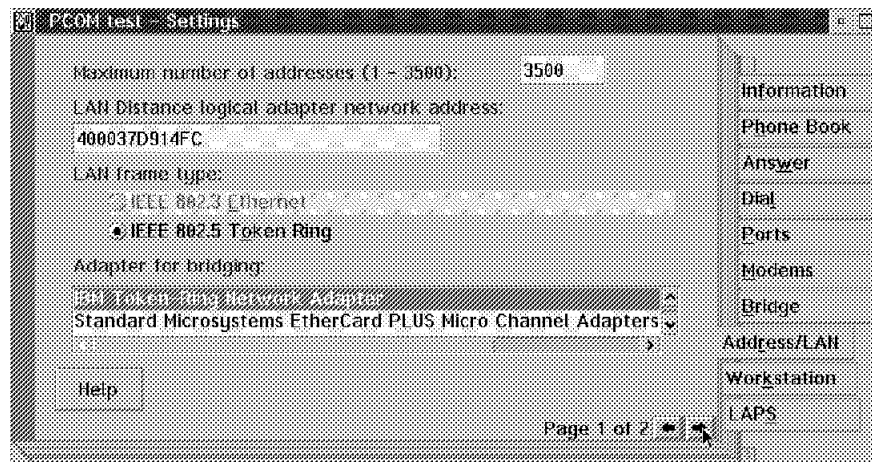


Figure 127. Settings Window (Address Section: Page 1 of 2)

2. Enter the LAN Distance logical adapter network address.

This address should be unique within the LAN/WAN network. If you are setting up a large LAN/WAN environment, then these addresses should be managed centrally and should be based on a standard convention.

The workstation is assigned a logical adapter network address so that it can be uniquely identified on a LAN Distance wide area network. During installation of LAN Distance, you can either specify a logical adapter network address or allow one to be automatically generated. Adapter network addresses generated by LAN Distance are unique. During the installation, verify that your logical adapter network address is unique across all segments of your LAN Distance wide area network. To do this, you can use the OS2PING utility.

3. Leave the other values at their defaults.

## Configure the Answer Modes

Before the LAN Distance Connection Server can be used to receive incoming calls from remote workstations, it has to be set up to answer calls. An answer mode is an answering state of a workstation based on a set of criteria that determine which incoming calls are accepted. We will configure it to accept calls over the switched line.

Follow these steps to set up the answer mode for the LAN Distance Connection Server:

1. Select the **Answer** tab from the Settings notebook. (See Figure 116 on page 130).

This displays the Answer configuration page of the Settings notebook.

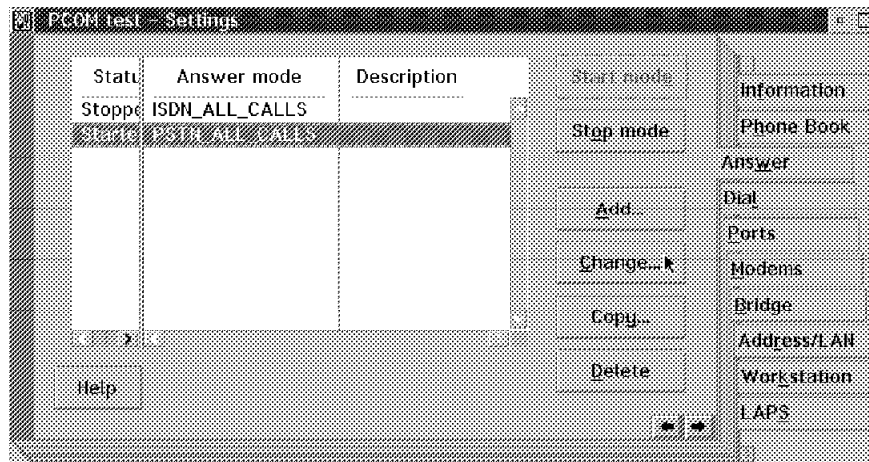


Figure 128. Settings Window (Answer Section: Change Settings)

2. Select the **Startup PSTN\_ALL\_CALLS** line on the Answer configuration page.
3. Select the **Change...** button.

This presents another notebook that allows you to set up the answer criteria for the PSTN\_ALL\_CALLS answer mode.

4. Select **Enable answer mode on startup** (be sure there is a check in the box to the left of that option). This sets up LAN Distance to automatically activate this answer mode every time LAN Distance is started. The Ports and Autostart are optional; we will not configure them here.

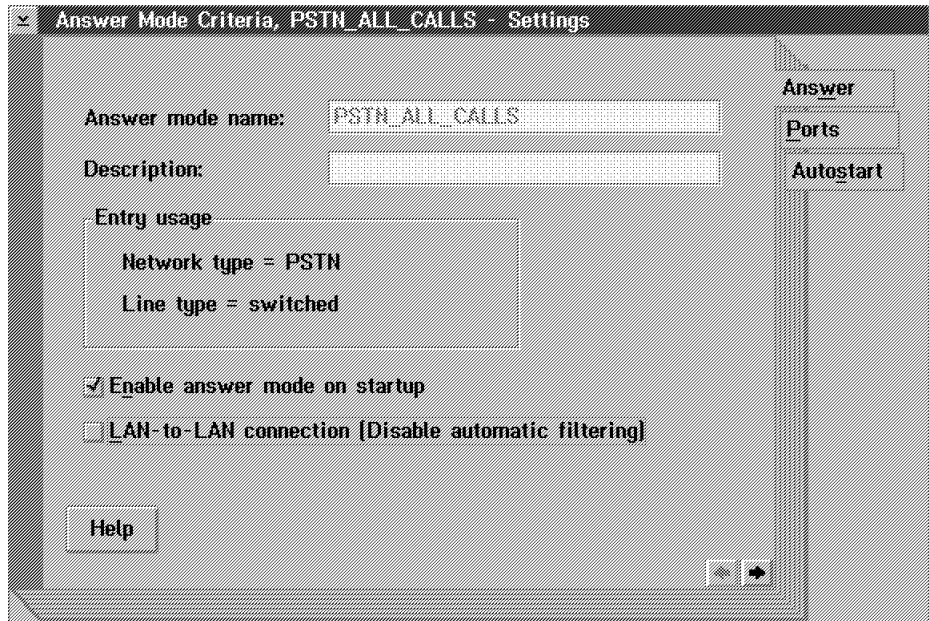


Figure 129. Answer Criteria - Settings Window (Enable Answer)

### Configure the Workstation

This enables the name and description of the LAN Distance Connection Server to be defined. Initially, after LAN Distance has been installed, the server workstation name is MyWorkstation. This name should be changed to something more meaningful as all LAN Distance workstations on the LAN can be seen from the LAN Distance - Workstations window. To change the workstation configuration, follow these steps:

1. Select the **Workstation** tab from the Settings notebook.
2. Enter the local LAN Distance workstation name.
3. Enter the local LAN Distance workstation description.

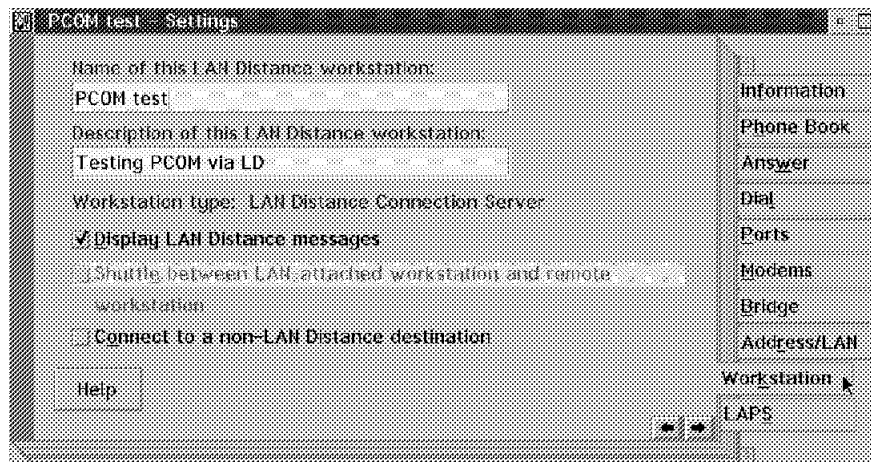


Figure 130. Settings Window (Workstation Section)

## 5.2.2 LAN Distance Connection Server Configuration Files

See below the CONFIG.SYS, PROTOCOL.INI, WCLNET.INI and LANTRAN.LOG files on our LAN Distance Connection Server.

```
...
SET AUTOSTART=TASKLIST,FOLDERS,LAUNCHPAD
LIBPATH=...;D:\WAL\DLL;
SET PATH=...;D:\WAL;
SET DPATH=...;D:\WAL;
...
SET HELP= ... D:\TCP\IP\UMAIL;D:\CMLIB;D:\CMLIB\EN_US;D:\WAL;
...
DEVICE=C:\IBMCOM\PROTOCOL\LANPDD.OS2
DEVICE=C:\IBMCOM\PROTOCOL\LANVDD.OS2
DEVICE=C:\IBMCOM\LANMSGDD.OS2 /I:C:\IBMCOM
DEVICE=C:\IBMCOM\PROTMAN.OS2 /I:C:\IBMCOM
...
...
SET ETC=C:\MPTN\ETC
CALL=C:\IBMCOM\PROTOCOL\NETBIND.EXE
RUN=C:\IBMCOM\LANMSGEX.EXE
DEVICE=C:\MPTN\PROTOCOL\SOCKETS.SYS
DEVICE=C:\MPTN\PROTOCOL\AFOS2.SYS
DEVICE=C:\MPTN\PROTOCOL\AFINET.SYS
DEVICE=C:\MPTN\PROTOCOL\IFNDIS.SYS
RUN=C:\MPTN\BIN\CNTRL.EXE
CALL=C:\OS2\CMD.EXE /Q /C C:\MPTN\BIN\MPTSTART.CMD
DEVICE=C:\IBMCOM\PROTOCOL\NETBEUI.OS2
DEVICE=D:\IBMLAN\NETPROG\RDRHELP.200
IFS=D:\IBMLAN\NETPROG\NETWKSTA.200 /I: D:\IBMLAN /N
DEVICE=C:\IBMCOM\PROTOCOL\NETBIOS.OS2
SET DLSINI=D:\IBMLAN\NETPROG\NETGUI.INI
...
SET HOSTNAME=WSEAGLE
SET TMP=d:\tcpip\tmp
DEVICE=d:\tcpip\bin\vdostcp.vdd
DEVICE=d:\tcpip\bin\vdostcp.sys
RUN=d:\tcpip\bin\VDOSCTL.EXE
...
DEVICE=C:\IBMCOM\PROTOCOL\LANDD.OS2
DEVICE=C:\IBMCOM\PROTOCOL\LANDLDD.OS2
RUN=C:\IBMCOM\PROTOCOL\LANDLL.EXE
DEVICE=D:\WAL\IBMFLTR.OS2
DEVICE=D:\WAL\WCLVPCM.OS2
DEVICE=C:\IBMCOM\MEMMAN.OS2
DEVICE=C:\IBMCOM\VLAN.OS2
RUN=C:\IBMCOM\VLANINIT.EXE
DEVICE=C:\IBMCOM\MACS\PDFH.OS2
DEVICE=C:\IBMCOM\MACS\MACFH.OS2
DEVICE=C:\IBMCOM\MACS\MACFH.OS2
DEVICE=C:\IBMCOM\MACS\WCLCPMAC.OS2
DEVICE=C:\IBMCOM\MACS\BRIDGEFH.OS2
DEVICE=C:\IBMCOM\PROTOCOL\BRIDGE.OS2
DEVICE=C:\IBMCOM\MACS\IBMTOK.OS2
```

Figure 131. CONFIG.SYS for OS/2 LAN Distance Connection Server

## PROTOCOL.INI

We can see in the PROTOCOL.INI file that NetBEUI\_nif, TCPIP\_nif and LANDD\_nif are bound to the IBMTOK\_nif and PDFH\_nif adapter. In other words that means this LAN Distance Connection Server will bridge NetBIOS, TCP/IP and 802.2 frames to and from the LAN and the WAN.

```
[PROT_MAN]
DRIVERNAME = PROTMANS          /====>  TI_TICK_G2 = 255,255
                                |          TI_TICK_G2 = 25,25
                                |          T2_TICK_G2 = 10,10
                                |          IPACKETS = 250,250

[VLAN_KERNEL]
                                UIPACKETS = 100,100
                                MIXTRANSMITS = 6,6
                                MINTRANSMITS = 2,2
DRIVERNAME = VLANKNL$         |
CFGTYPE = "Locked"            |
MODE = "LEARN_WFLOWS"         |
LANTYPE = "802.5"              |
MAXADDRESSES = 3500           |
                                ELEMENTS = 800,800

[COM1]
                                [NETBEUI_nif]
                                DriverName = netbeui$
                                Bindings = IBMTOK_nif,PDFH_nif
                                ETHERAND_TYPE = "I"
                                USEADDRREV = "YES"
                                OS2TRACEMASK = 0x0
                                SESSIONS = 130
                                NCBS = 225
                                NAMES = 27
                                SELECTORS = 15

[sr_bridge]
                                USEMAXDATAGRAM = "NO"
                                ADAPTRATE = 1000
                                WINDOWERRORS = 0
                                MAXDATARC = 4168
                                TI = 60000
                                T1 = 10000
                                T2 = 2000
                                MAXIN = 1
                                MAXOUT = 1
                                NETBIOS_TIMEOUT = 500
                                NETBIOS_RETRIES = 8
                                NAMECACHE = 0
                                RNDOPTION = 1
                                PIGGYBACKPACKETS = 1
                                DATAGRAMPACKETS = 10
                                PACKETS = 350

[BRIDGEFH]
                                NAMECACHE = 0
                                RNDOPTION = 1
                                PIGGYBACKPACKETS = 1
                                DATAGRAMPACKETS = 10
                                PACKETS = 350

[IBMLXCFG]
                                LOOPPACKETS = 8
                                PIPELINE = 5
                                MAXTRANSMITS = 6
                                MINTRANSMITS = 2
                                DLCRETRIES = 10
                                FCPRIORITY = 5
                                NETFLAGS = 0x1000

[NETBIOS]
                                [TCPIP_nif]
                                DriverName = netbios$
                                ADAPTER0 = netbeui$,0
                                ADAPTER1 = netbeui$,1
                                DriverName = TCPIP$
                                Bindings = IBMTOK_nif,PDFH_nif
                                IfType = 1,1

[LANDD_nif]
                                [IBMTOK_nif]
                                DriverName = LANDD$
                                Bindings = IBMTOK_nif,PDFH_nif
                                ETHERAND_TYPE = "I","I"
                                SYSTEM_KEY = 0x0,0x0
                                OPEN_OPTIONS = 0x2000,0x2000
                                TRACE = 0x0,0x0
                                LINKS = 12,8
                                MAX_SAPS = 4,3
                                MAX_G_SAPS = 0,0
                                USERS = 4,3
                                TI_TICK_G1 = 255,255
                                T1_TICK_G1 = 15,15
                                T2_TICK_G1 = 3,3
                                DriverName = PDFH$
                                NETADDRESS = "t4000370914fc"

----->/
```

Figure 132. PROTOCOL.INI for OS/2 LAN Distance Connection Server

## WCLNET.INI

```
sc place=inline.  
[DONOTREMOVE]  
  
KEYWORD = VALUE  
  
[REMOTELAN01]  
  
DLL = WCLVPCM  
ENTRY = StartVPCM  
AUTOSTART = YES  
PIF = IBM7855.PIF  
TITLE = IBM 7855 Modem  
PCMNAME = IBM7855  
  
[IBM7855]  
DialogType = "ATCMD.DDF"  
PortName = "COM1"  
PermConnection = "NO"  
PhoneNumber = "Unspecified"  
Synchronicity = "Asynchronous"  
ModemClass = "V.32"  
AutoBaudDetect = "Off"  
SerialPortSpeed = 38400  
FlowControl = "RTS/CTS"  
Initialization1 = "AT13\CR"  
Initialization2 = "ATE1Q0V1X4S7=60S0=2\R2\Q2\X0\N3  
  \V1&D2&S1&R0&C1&I0\CR"  
DialPrefix = "ATDT"  
DialSuffix = "\CR"  
Success = "OK\CR\LF"  
Failure = "ERROR\CR\LF"  
ConnectPrefix = "CONNECT"  
ConnectSuffix = "\CR\LF"  
Escape = "+++"  
Hangup = "ATH\CR"  
RingBack = "RING\CR\LF"  
Busy = "BUSY\CR\LF"  
NoCarrier = "NO CARRIER\CR\LF"  
NoDialtone = "NO DIALTONE\CR\LF"  
NoAnswer = "NO ANSWER\CR\LF"  
Voice = "VOICE\CR\LF"  
Ring = "RING\CR\LF"
```

Figure 133. WCLNET.INI File for OS/2 LAN Distance Connection Server



## LANTRAN.LOG

```
sc.  
LT00073: FFST/2 is installed but is not started.  
      LANTRAN.LOG is being created.  
IBM OS/2 LANMSGDD [08/25/95] 2.01 is loaded and operational.  
IBM OS/2 LAN Protocol Manager  
IBM OS/2 NETBEUI 3.00.0  
NETBEUI: Using a 32-bit data segment.  
Installing NETWKSTA.200 Version 4.0. IBM LAN Redirector (Sep 22, 1994)  
  
IBM OS/2 NETBIOS 4.0  
Adapter 0 has 155 NCBs, 96 sessions, and 12 names available to  
NETBIOS applications.  
Adapter 1 has 225 NCBs, 130 sessions, and 26 names available to  
NETBIOS applications.  
NETBIOS 4.0 is loaded and operational.  
IBM OS/2 LANDD [08/25/95] 3.00.02  
IBM OS/2 LANDLLDD 2.01  
IBM OS/2 LANDLLDD is loaded and operational.  
IBM OS/2 Virtual LAN Kernel, Version 1.00  
IBM OS/2 VLAN Protocol Driver Frame Handler V.1.00 initialized.  
IBM OS/2 VLAN MAC Driver Frame Handler V.1.00 initialized.  
IBM OS/2 VLAN MAC Driver Frame Handler V.1.00 initialized.  
IBM ANDIS Serial Communications Adapter MAC Version 94.077  
Initialized MAC COM1 for COM1.  
IBM Token-Ring Network Driver, Version V.2.6  
IBM LANVDD is loaded and operational.  
IBM OS/2 LAN Netbind  
IBM Token-Ring adapter data rate is 4 mbps.  
IBM LANDD is accessing IBM 802.5 LAN Interface.  
Adapter 0 was initialized and opened successfully.  
Adapter 0 is using node address 10005AEB2705.  
IBM LANDD was successfully bound to MAC: IBMTOK_nif->VECTOR.  
IBM LANDD is accessing IBM 802.5 LAN Interface.  
Adapter 1 was initialized and opened successfully.  
Adapter 1 is using node address 400037D914FC.  
IBM LANDD was successfully bound to MAC: PDFH_nif->VECTOR.  
Bridge was successfully bound to SCION MAC: IBMTOK_nifB  
Bridge was successfully bound to SCION MAC: BRIDGEFH  
Bridge was successfully bound to PRION MAC: IBMTOK_nif.  
Bridge was successfully bound to PRION MAC: PDFH_nif.  
Adapter 0 is using node address 10005AEB2705.  
Adapter 1 is using node address 400037D914FC.
```

Figure 134. LANTRAN.LOG File for OS/2 LAN Distance Connection Server

### 5.2.3 Creating a LAN Distance User ID

In order to access LAN Distance Connection Server from a remote workstation, we need to define a LAN Distance user ID. Follow these steps to define a user ID:

1. Select the icon representing your LAN Distance Connection Server. The following window is displayed:

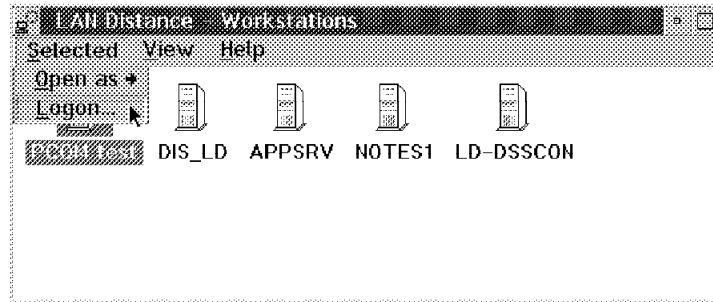


Figure 135. Logon on the LAN Distance Connection Server

2. Select **Selected** from the menu bar
3. Select **Logon...**
4. The following panel is displayed:

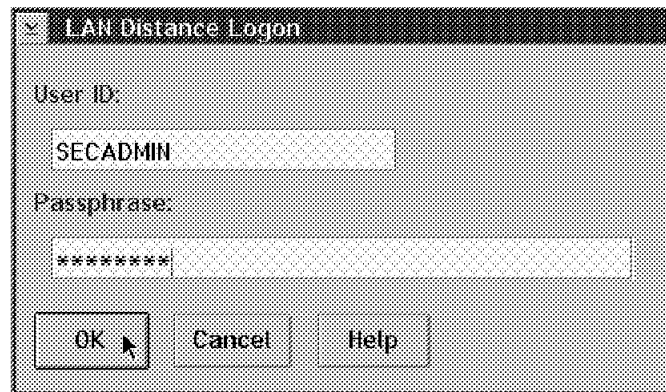


Figure 136. LAN Distance Logon

5. A default administrator user ID for LAN Distance was created when installing LAN Distance on the server. This default is SECADMIN, and the passphrase is SECADMIN too. Be aware the user IDs and passwords are case-sensitives in LAN Distance, so type SECADMIN in uppercase. Once you are logged on to the LAN Distance Connection Server with administrative privilege, you can define other user IDs.
6. Select **Selected** from the menu bar
7. Select **Open as->**
8. Select **User account management**

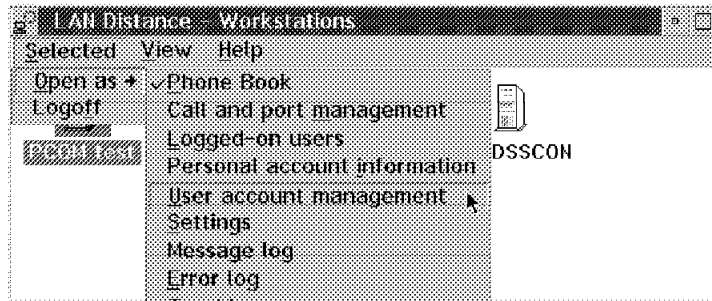


Figure 137. LAN Distance Opening Security Database

9. The following panel is displayed:

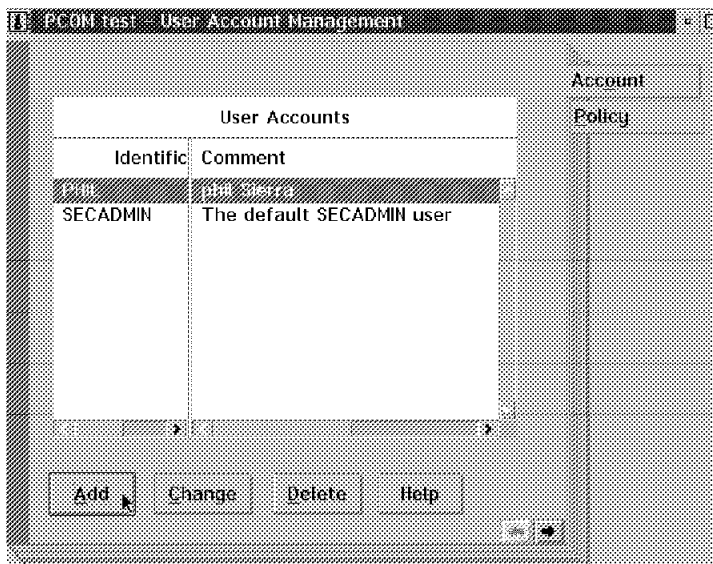


Figure 138. LAN Distance User Account Management Notebook

Select the **Add** button.

10. The following panel is displayed:

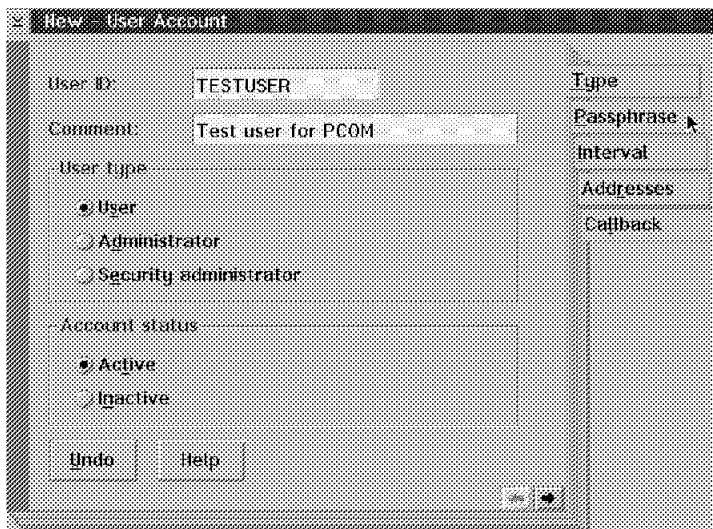


Figure 139. New User Account Notebook - User ID

- Type the user ID you want to create and select **Passphrase** tab.
11. The following panel is displayed:



Figure 140. New User Account Notebook - Passphrase

- Type twice the passphrase you want for the user.
- Note:** Passphrases are case-sensitive.
12. You can close the New - User Account notebook
- We didn't use the use callback facility for the tests. For more information on how to configure it when defining new users, refer to *IBM LAN Distance Version 1.1 Configuration and Customization Guide*, GG24-4158.

---

### 5.3 Installing and Configuring the OS/2 remote workstation

We describe here how to set up a LAN Distance Remote for OS/2 to be used for accessing a host via Personal Communications in 802.2 configuration.

First we assume Personal Communications is installed on the machine, well configured to use 802.2 protocol, and that the access to the host via Personal Communications is successful when connected to the LAN (physically). The workstation must already have OS/2 LAN Requester installed to make it a LAN Distance Remote for Windows. The installation will then be verified by dialing and connecting to the LAN Distance Connection Server on a remote LAN. The use of the Shuttle function will also be discussed.

You need at least:

- 5MB of fixed disk storage for the product files. Additional space may be required if First Failure Support Technology/2 (700KB) and LAN Adapter and Protocol Support (2.2MB) are not already installed on your workstation. The total for all three components is 7.9MB.

- A modem and/or adapter for asynchronous, synchronous or ISDN communications. Install and configure asynchronous or ISDN adapters according to the manufacturer's instructions.

### 5.3.1 Installation Steps

We recommend that you use OS/2 Warp Connect package in order to install IBM LAN Distance Client software. If you plan to do that, insert the CD-ROM of Warp Connect in your workstation, and execute the PRODINST.EXE program located in the root. Select **IBM LAN Distance Client v1.11 product** and click on the **Install** button. You can now skip to step 4 below (page 147).

If you prefer to use the product diskettes of LAN Distance, follow these steps to install LAN Distance Remote for OS/2:

1. Insert LAN Distance Remote for OS/2 diskette 1 in drive A.
2. At an OS/2 command prompt run the installation program by typing:  
A:\INSTALL  
Press Enter.
3. Select the **OK** button to display the Welcome window.
4. Click the **OK** button on the Welcome window to display the Target Drive window.
5. On the Target Drive window, enter the drive you wish LAN Distance be installed to and click the **OK** button. The code is placed in the \WAL directory on that drive.
6. Follow the instructions, and insert the appropriate LAN Distance Remote for OS/2 install diskettes as required.

LAN Distance installs First Failure Support Technology (FFST/2) if it is not already installed on the workstation. FFST/2 is used by LAN Distance for logging and displaying of errors, handling alerts and generating data dumps.

The MPTS product is also installed if the required level is not already installed.

7. When the installation of the product files is complete, the Basic Settings Selection window is displayed. Follow the steps in 5.3.2, "Configuring the OS/2 Remote Workstation Using Basic Settings" to configure the workstation.

### 5.3.2 Configuring the OS/2 Remote Workstation Using Basic Settings

After installing the remote workstation code, the Basic Settings Selection window is displayed as shown in Figure 141 on page 148.

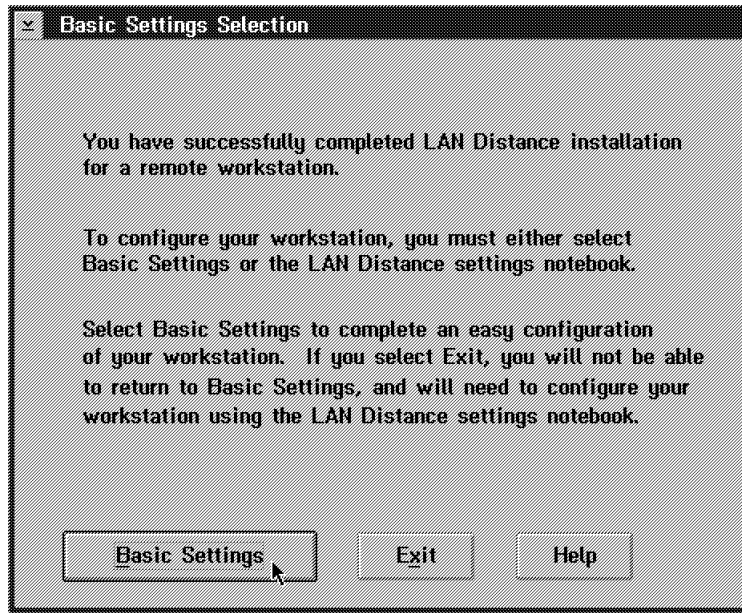


Figure 141. Basic Settings Selection Panel

The easiest way to do this is to select the Basic Settings option shown in Figure 141. You can later change this configuration Settings notebook.

The simple environment we are setting up uses switched asynchronous connections, so we continue with the Basic Settings. Follow these steps to configure the workstation:

1. In the Basic Settings Selection window, select **Basic Settings**.

The Connection type window as shown in Figure 142

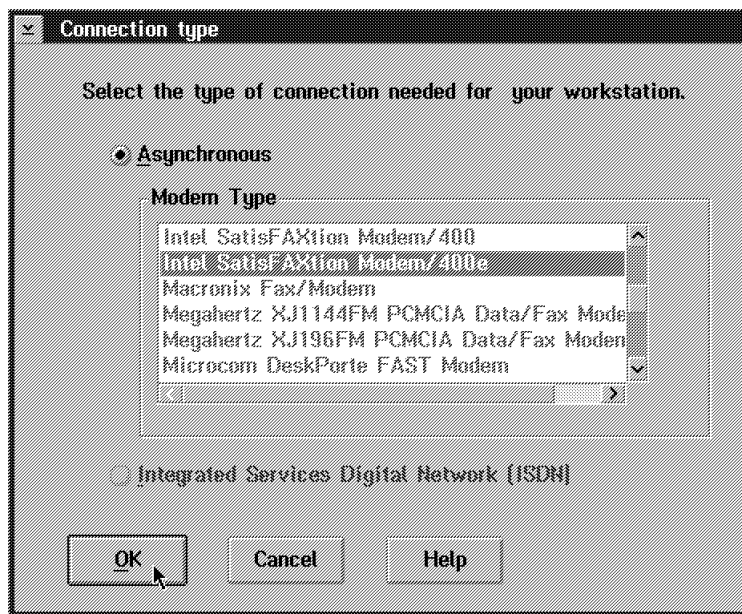


Figure 142. Basic Settings - Connection Type Selection

2. In the Modem type list box, locate and select your modem.

If you are using a PCMCIA modem you have to manually edit the PROTOCOL.INI file that resides in the \WAL directory to include the following statement in the COMx section:

PCMCIA = Yes

This tells the LAN Distance code to skip the check for the COM port until the port is needed. If you do not add this line to your PROTOCOL.INI and the adapter is not present at boot time, you will receive an error message. We will use a PCMCIA modem (IBM MC217) for the test.

3. Click the **OK** button to continue.
4. The Serial Port window is displayed. It shows a list with COM ports available on your workstation. Select the COM port your modem is connected to. Our modem is attached on COM2. Additional COM ports have to be configured with the LAN Distance Settings notebook after the Basic Settings configuration is completed and the workstation restarted.
5. Select **OK** to continue.
6. The Phone number window is displayed. Enter the phone number the LAN Distance Connection Server or remote workstation that you want this workstation to connect to. It does not matter if that phone number is unknown at this moment. You can either configure it later in the LAN Distance Settings notebook or enter it manually when a call is being made.
7. Select **OK** to continue.
8. The LAN Type window is displayed. Specify the type of LAN that the LAN Distance Connection Server will be dialing into: IEEE 802.5 Token-Ring or IEEE 802.3 Ethernet. We setup a Token-Ring for the test.

The LAN Network Address window, as shown here, is displayed:

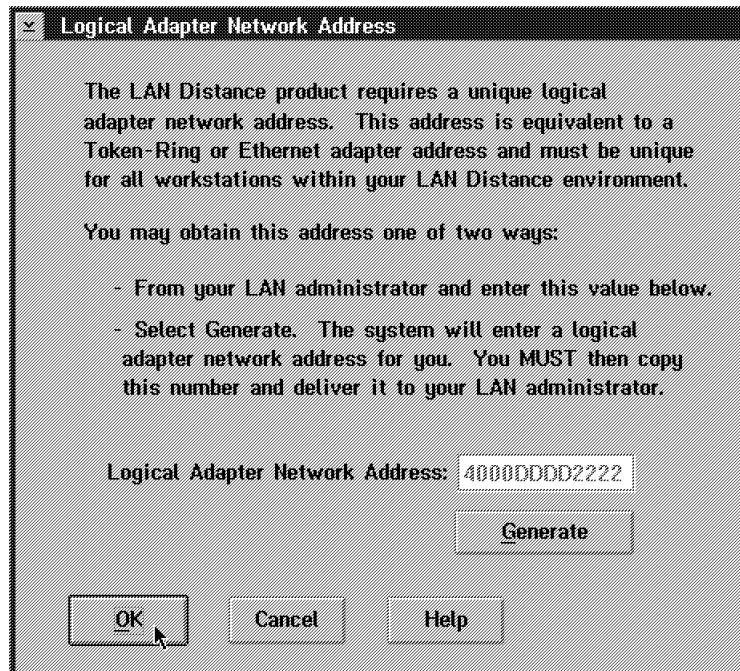


Figure 143. Basic Settings - LAN Network Address Setting

When your remote workstation connects to the LAN Distance Connection Server, LAN Distance creates a virtual LAN over the WAN link. As on any LAN, every workstation connected to the virtual LAN must have a unique address. This is the LAN Distance Logical Adapter Network Address. This address can be either assigned by you (or by the site LAN administrator) or automatically generated by LAN Distance.

If this workstation is already configured as a LAN workstation and it uses a locally administered address (as opposed to the universal hardware burned-in address) then this address (as found in the IBMCOM\PROTOCOL.INI file) will be initially displayed in the Logical Adapter Network Address field. If you are planning to use the Shuttle function to switch between being a remote workstation and a LAN-attached workstation, using the displayed information ensure you have the same address regardless of whether your workstation is set up as a LAN Distance remote workstation or as a LAN-attached workstation.

If your machine is not configured as a LAN workstation, or it does not use a locally administered address, this field will contain all zeroes (000000000000). Type in the address you want to assign to your workstation or choose the **Generate** option.

The Generate option lets you generate a random network address. If you use it be sure you write the address down and inform your LAN administrator about what address you are using.

9. Once you have filled in the Logical Adapter Network Address, select **OK** to continue.
10. If FFST/2 was installed or updated, then you are informed about that now. Select **OK** to continue.
11. If your workstation is already configured as a LAN-attached workstation, then the window in Figure 144 is displayed before you finish installing the LAN Distance product:

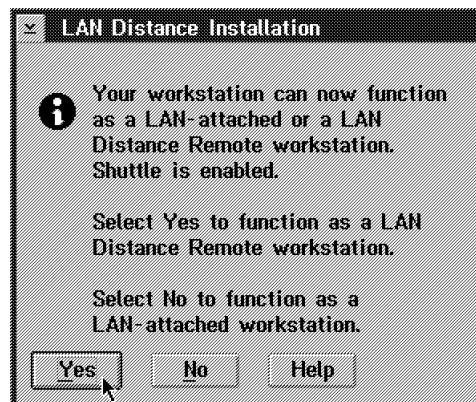


Figure 144. Basic Settings - Installation Type

12. The workstation can function as either a LAN Distance remote workstation or as a LAN-attached workstation. Select the type of setup you want to use when you restart your workstation. Select **Yes** if you want to use it as a LAN Distance remote workstation or **No** if you want to use it as a LAN-attached workstation.



**Note:** You can later change from LAN-attached to remote workstation at any time using the Shuttle function described in 5.3.5, “Shuttling between LAN-Attached and Remote Workstation” on page 156.

13. The installation and Basic Settings are now complete and the Basic Settings Complete window in Figure 145 is displayed:

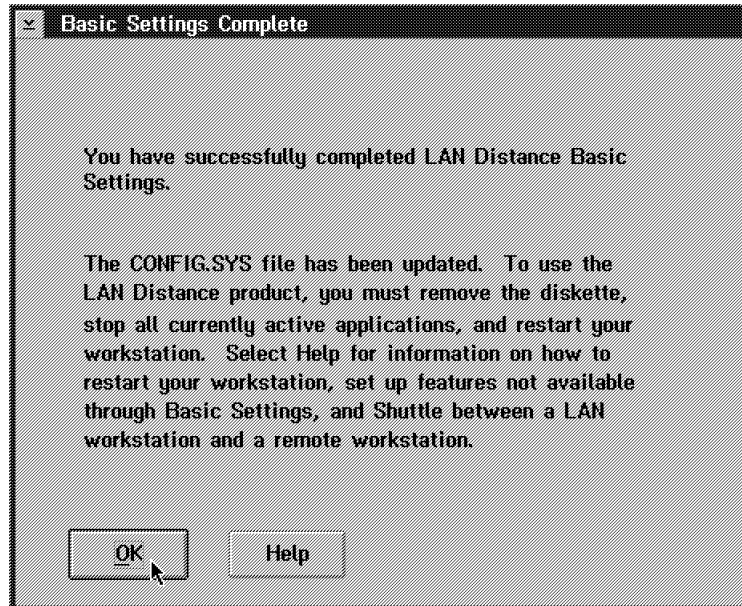


Figure 145. Installation Complete Window

14. Select **OK**, shut down and then restart (Ctrl-Alt-Del) your machine.

LAN Distance is now installed on your remote workstation. After the machine is restarted, the LAN Distance icon is displayed on the desktop. To start LAN Distance, double click on the **LAN Distance** icon. You should now be able to access a LAN Distance Connection Server.

**Note:** The LAN Distance program can only be started if the workstation is set up to operate as a remote workstation, not as a LAN workstation. To change the configuration between remote workstation and LAN-attached workstation, use the Shuttle function as described in 5.3.5, “Shuttling between LAN-Attached and Remote Workstation” on page 156.

### 5.3.3 LAPS Configuration for the OS/2 Remote Workstation

Once LAN Distance Remote for OS/2 is installed and configured, you have to configure your LAPS/MPTS.

NetBIOS is installed and configured when LAN Distance remote workstation is installed. We need to add IEEE 802.2 to enable some session under Personal Communications via this protocol. NetBIOS is required by LAN Distance for security and system management functions. It is important that the LAPS configuration for the remote workstation is set up to use the LAN Distance Logical Adapter 0, is shown in Current Configuration in Figure 146 on page 152.

1. At an OS/2 command prompt, start the LAPS configuration by typing:  
C:\IBMCOM\LAPS  
or  
C:\IBMCOM\MPTS  
depending on the level of the product you are using. Press Enter.
2. In the LAN Adapter and Protocol Support window select the **Configure** button.
3. In the Configuration window select the **Configure LAN option**.
4. Select the **Continue...** button.

The Configure Workstation window as shown in Figure 146

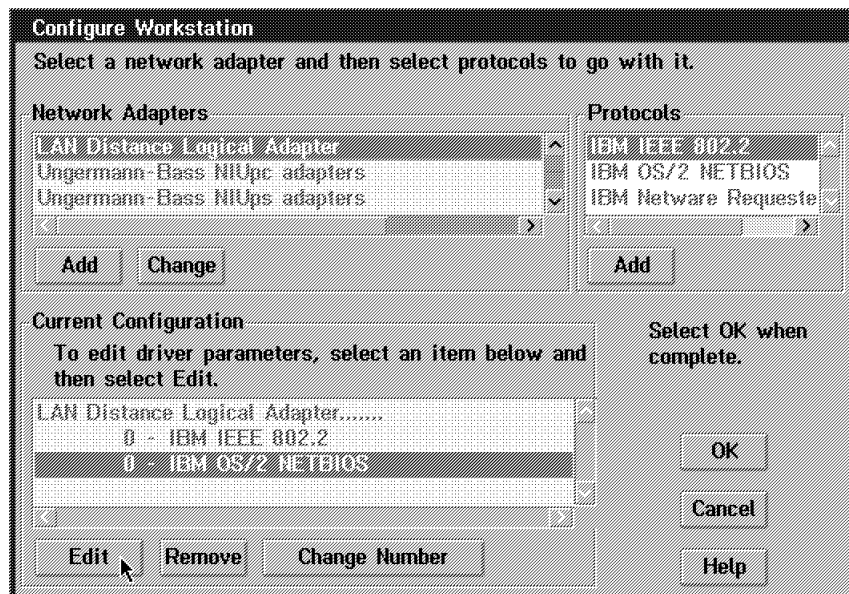


Figure 146. LAPS - Configure Workstation Window

5. Select the **Add** button to add IBM IEEE 802.2 protocol to the LAN Distance Logical Adapter.
6. Select the **OK** button to leave the LAPS - Configure Workstation window.
7. Select the **Exit** button to end the LAPS configuration.
8. Select the **Continue** button in the CONFIG.SYS Updates
9. The LAPS configuration to allow 802.2 protocol via LAN Distance is completed.

### 5.3.4 LAN Distance Remote for OS/2 Configuration Files

The CONFIG.SYS, PROTOCOL.INI, WCLNET.INI and LANTRAN.LOG files on our LAN Distance Remote for OS/2 are shown below.

#### CONFIG.SYS

```
...

SET AUTOSTART=TASKLIST,FOLDERS,LAUNCHPAD
SET RESTARTOBJECTS=STARTUPFOLDERONLY
...

LIBPATH=...;C:\WAL;
SET DPATH=...;C:\WAL;
SET HELP=...;C:\WAL;
...
DEVICE=C:\IBMCOM\PROTOCOL\LANPDD.OS2
DEVICE=C:\IBMCOM\PROTOCOL\LANVDD.OS2
DEVICE=C:\IBMCOM\LANMSGDD.OS2 /I:C:\IBMCOM
DEVICE=C:\IBMCOM\PROTMAN.OS2 /I:C:\IBMCOM
...

CALL=C:\IBMCOM\PROTOCOL\NETBIND.EXE
RUN=C:\IBMCOM\LANMSGEX.EXE
DEVICE=C:\MPTN\PROTOCOL\MPTN.SYS
DEVICE=C:\MPTN\PROTOCOL\LIPC.SYS
DEVICE=C:\MPTN\PROTOCOL\INET.SYS
DEVICE=C:\MPTN\PROTOCOL\IFNDIS.SYS
RUN=C:\MPTN\BIN\CNTRL.EXE /P mptn_os$ mptn_in$
CALL=C:\OS2\CMD.EXE /Q /C C:\MPTN\BIN\MPTSTART.CMD
DEVICE=C:\IBMCOM\PROTOCOL\NETBEUI.OS2
DEVICE=C:\IBMCOM\PROTOCOL\NETBIOS.OS2
SET ETC=C:\MPTN\ETC
RUN=C:\IBMCOM\PROTOCOL\NETBIND.EXE
DEVICE=C:\WAL\WCLVPCM.OS2
DEVICE=C:\IBMCOM\MEMMAN.OS2
DEVICE=C:\IBMCOM\VLAN.OS2
RUN=C:\IBMCOM\VLANINIT.EXE
DEVICE=C:\IBMCOM\MACS\MACFH.OS2
DEVICE=C:\IBMCOM\MACS\WCLCPMAC.OS2
DEVICE=C:\IBMCOM\MACS\PDFH.OS2 DEVICE=C:\IBMCOM\PROTOCOL\LANDD.OS2
DEVICE=C:\IBMCOM\PROTOCOL\LANDLLDD.OS2
RUN=C:\IBMCOM\PROTOCOL\LANDLL.EXE
```

Figure 147. LAN Distance Remote for OS/2 CONFIG.SYS File

## PROTOCOL.INI

In addition to 802.2 and NetBIOS protocol, we have added TCPIP to the LAN Distance Logical Adapter, you can then find the following statement in the PROTOCOL.INI file:

```
[TCPIP_nif]
  DriverName = TCPIP$
  Bindings = PDFH_nif
```

This is not mandatory for the 802.2 access via Personal Communications.

```
[PROT_MAN]
  DRIVERNAME = PROTMAN$

[VLAN_KERNEL]
  DRIVERNAME = VLANKNL$
  CFGTYPE = "Locked"
  MODE = "LEARN_WFLOWS"
  LANTYPE = "802.5"
  MAXADDRESSES = 512

[COM2]
  DriverName = WCLCPMC$
  CFGTYPE = "LOCKED"
  PCMSUPPORT = "yes"
  MACTYPE = "802.5"
  CONN_TYPE = "Switched"
  PCMCIA = "YES"
  PORTNAME = "COM2"

[IBMLXCFG]
  landd_nif = landd.nif
  netbeui_nif = netbeui.nif
  TCPIP_nif = TCPIP.NIF
  PDFH_nif = PDFH.NIF

[NETBIOS]
  DriverName = netbios$
  ADAPTER0 = netbeui$,0

[landd_nif]
  DriverName = LANDD$
  Bindings = PDFH_nif
  ETHERAND_TYPE = "I"
  SYSTEM_KEY = 0x0
  OPEN_OPTIONS = 0x2000
  TRACE = 0x0
  LINKS = 8
  MAX_SAPS = 3
  MAX_G_SAPS = 0
  USERS = 3
  T1_TICK_G1 = 255
  T1_TICK_G1 = 15
  T2_TICK_G1 = 3
  T1_TICK_G2 = 255
  T1_TICK_G2 = 25
  T2_TICK_G2 = 10
  IPACKETS = 250
  UIPACKETS = 100
  MAXTRANSMITS = 6
  MINTRANSMITS = 2
  TCBS = 64
  GDTS = 30
  ELEMENTS = 800

[netbeui_nif]
  DriverName = netbeui$
  Bindings = PDFH_nif
  ETHERAND_TYPE = "I"
  USEADDRREV = "YES"
  OS2TRACEMASK = 0x0

  SESSIONS = 48
  NCBS = 125
  NAMES = 27
  SELECTORS = 10
  USEMAXDATAGRAM = "NO"
  ADAPTRATE = 1000
  WINDOWERRORS = 0
  MAXDATARCVCV = 4168
  TI = 60000

  T1 = 10000
  T2 = 2000
  MAXIN = 1
  NETBIOS_TIMEOUT = 800
  NETBIOSRETRIES = 2
  NAMECACHE = 1000

  RNDOPTION = 0
  PIGGYBACKACKS = 1
  DATAGRAMPACKETS = 10
  PACKETS = 350

  LOOPPACKETS = 8
  PIPELINE = 5
  MAXTRANMITS = 6
  MINTRANMITS = 2
  DLCRETRIES = 10
  FCPRIORITY = 5
  NETFLAGS = 0x1000

[TCPIP_nif]
  DriverName = TCPIP$
  Bindings = PDFH_nif

[PDFH_nif]
  DriverName = PDFH$
  NETADDRESS = "t400068A61A86"
```

Figure 148. LAN Distance Remote for OS/2 PROTOCOL.INI File

## WCLNET.INI

```
sc.  
[DONOTREMOVE]  
  
KEYWORD = VALUE  
  
[REMOTELAN01]  
  
DLL = WCLVPCM  
ENTRY = StartVPCM  
AUTOSTART = YES  
PIF = OPTIMA96.PIF  
TITLE = Hayes Optima 9600 Modem  
PCNAME = OPTIMA96  
PCMCIA = YES  
  
[OPTIMA96]  
  
DialogType = "ATCMD.DDF"  
PortName = "COM2"  
PermConnection = "NO"  
PhoneNumber = "Unspecified"  
Synchronicity = "Asynchronous"  
ModemClass = "V.32"  
AutoBaudDetect = "Off"  
SerialPortSpeed = 38400  
FlowControl = "RTS/CTS"  
Initialization1 = "ATIQ\CR"  
Initialization2 = "ATE1Q0V1M1N1W2X4Y0&C1&D2&K3&Q5&R0&S1  
                    &T5S7=60S0=2S37=0\CR"  
DialPrefix = "ATDT"  
DialSuffix = "\CR"  
Success = "OK\CR\LF"  
Failure = "ERROR\CR\LF"  
ConnectPrefix = "CONNECT"  
ConnectSuffix = "\CR\LF"  
Escape = "+++"  
Hangup = "ATH\CR"  
RingBack = "RING\CR\LF"  
Busy = "BUSY\CR\LF"  
NoCarrier = "NO CARRIER\CR\LF"  
NoDialtone = "NO DIALTONE\CR\LF"  
NoAnswer = "NO ANSWER\CR\LF"  
Voice = "VOICE\CR\LF"  
Ring = "RING\CR\LF"
```

Figure 149. LAN Distance Remote for OS/2 WCLNET.INI File

## LANTRAN.LOG

```
LT00073: FFST/2 is installed but is not started. LANTRAN.LOG is being
created.
IBM OS/2 LANMSGDD [09/15/94] 2.01 is loaded and operational.
IBM OS/2 LAN Protocol Manager
IBM - OS/2 Socket/MPTS Common Transport Semantics
IBM OS/2 NETBEUI 2.20.1
NETBEUI: Using a 32-bit data segment.
IBM OS/2 NETBIOS 4.0
Adapter 0 has 125 NCBs, 48 sessions, and 27 names available to NETBIOS
applications.
NETBIOS 4.0 is loaded and operational.
IBM OS/2 Virtual LAN Kernel, Version 1.00
IBM OS/2 VLAN MAC Driver Frame Handler V.1.00 initialized.
IBM ANDIS Serial Communications Adapter MAC Version 94.077
CPM0014: Port for MAC COM2 is a PCMCIA port. Default maximum speed set
to 115200.
Initialized MAC COM2 for COM2.
IBM OS/2 VLAN Protocol Driver Frame Handler V.1.00 initialized.
IBM OS/2 LANDD [09/15/94] 2.20.12
IBM OS/2 LANDLLDD 2.01
IBM OS/2 LANDLLDD is loaded and operational.
IBM LANVDD is loaded and operational.
IBM OS/2 LAN Netbind
IBM LANDD is accessing IBM 802.5 LAN Interface.
Adapter 0 was initialized and opened successfully.
Adapter 0 is using node address 400068A61A86.
IBM LANDD was successfully bound to MAC: PDFH_nif->VECTOR.
IBM - OS/2 Socket/MPTS Local IPC Service Driver
IBM - OS/2 Socket/MPTS INET Service Driver
IBM - OS/2 Socket/MPTS IFNDIS Protocol Driver
IBM OS/2 LAN Netbind
Adapter 0 is using node address 400068A61A86.
```

Figure 150. LAN Distance Remote for OS/2 LANTRAN.LOG File

### 5.3.5 Shuttling between LAN-Attached and Remote Workstation

The Shuttle option allows you to use your workstation and its applications in the LAN-attached and the LAN Distance remote environment. To use this option, you must have a LAN adapter installed in your workstation and a working LAN-attached configuration.

Shuttling between the LAN-attached and remote environments can be accomplished by:

- Typing LDSHUTTL at an OS/2 command prompt and pressing Enter
- Starting LAN Distance when the machine is configured as a LAN workstation
- Closing the LAN Distance container on a workstation that is set up to operate as a remote workstation

Figure 151 on page 157 shows the Shuttle Option window.

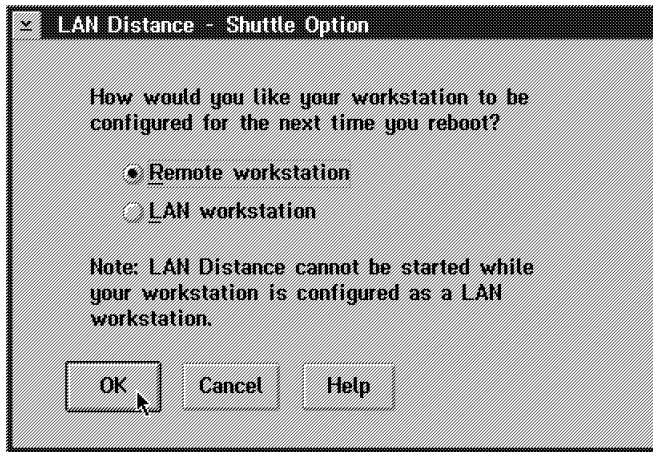


Figure 151. Shuttle Option Window

1. Select the mode you want the workstation to be configured as after the next reboot: **Remote workstation** or **LAN workstation**.
2. Select **OK**.
3. Shut down and restart (Ctrl-Alt-Del) your workstation to activate the new configuration.

The Shuttle feature provides an easy mechanism for switching the machine between the two types of workstations at any time.

**Note:** The Shuttle feature changes both your CONFIG.SYS and PROTOCOL.INI files. LAN Distance handles two different PROTOCOL.INI files, one for LAN connection and one for remote connection. One of these files is in active use, and the other one is backed up. Shuttle switches between these two files. After Shuttle changes the PROTOCOL.INI file, the CONFIG.SYS file is edited to support the device driver statements required for the current PROTOCOL.INI. This means that any changes in the LAPS configuration (stored in PROTOCOL.INI) only affect the currently active configuration.

For example, if you install an application that changes PROTOCOL.INI while your workstation is attached to the LAN, that change is not automatically made in the other PROTOCOL.INI used when the workstation is a LAN Distance Remote for OS/2. To run that application on the remote workstation, you would need to use LAPS/MPTS to update the PROTOCOL.INI with the appropriate changes.

If your remote workstation is a mobile, you can use either Personal Communications when connected to the LAN or when connected via LAN Distance. Be sure to shuttle to the right mode before (LAN or REMOTE).

## 5.4 IBM 802.2 Connection via LAN Distance Remote for OS/2

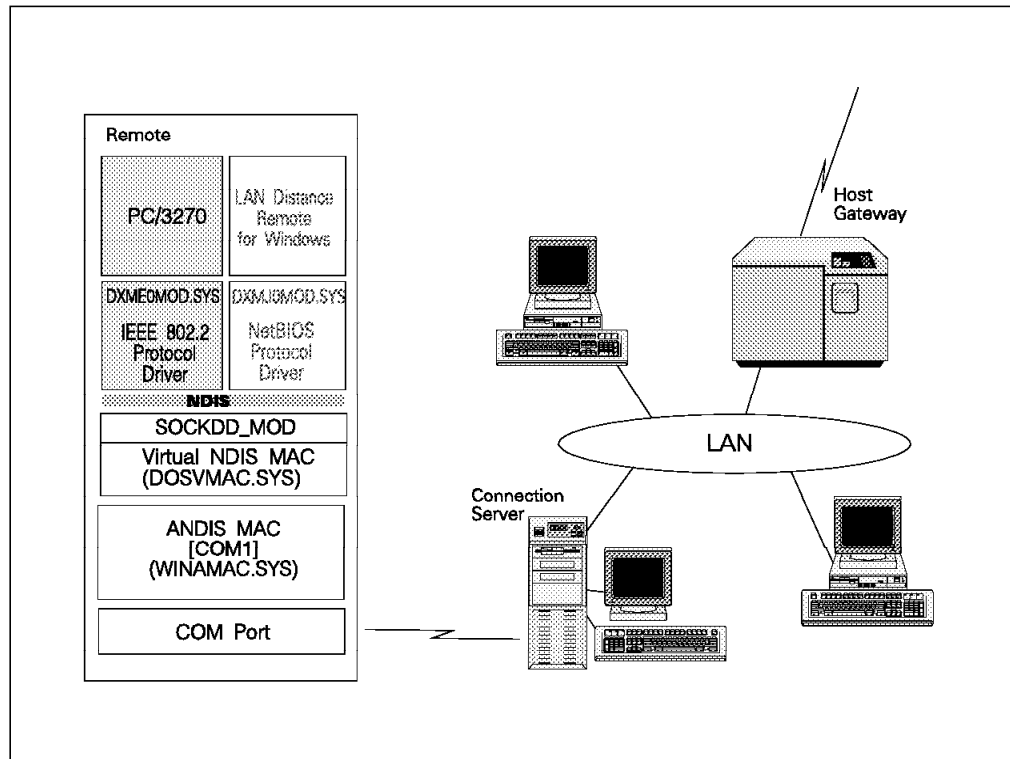


Figure 152. Personal Communications and 802.2 Configuration

To connect to your LAN Distance Connection Server do the following steps:

1. Start the LAN Distance program located in the LAN Distance folder.
2. Select **Selected** from the menu bar.
3. Select **Open as ->** .
4. Select **Phone Book**.

**Note:** In the Open as -> list, Phone Book is marked as the default option. This means that you can also open the Phone Book by double clicking on the icon representing your workstation.

The Phone Book window, as shown in Figure 153 on page 159, is now displayed.



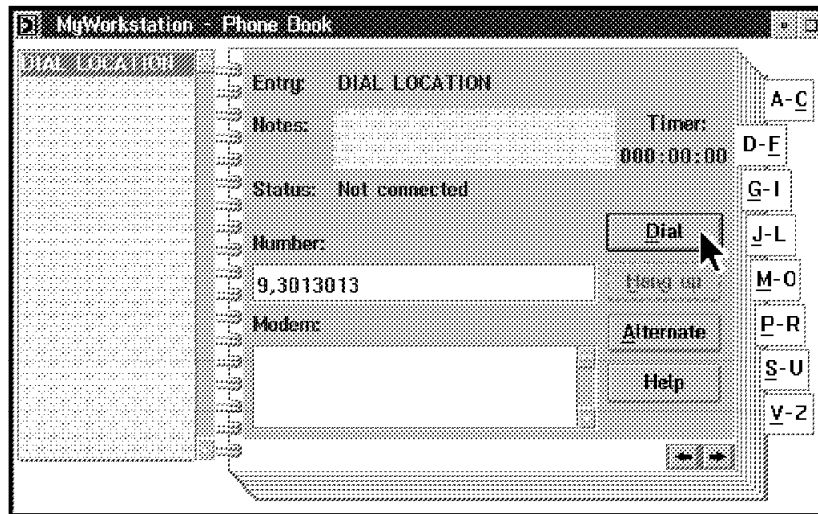


Figure 153. Phone Book Window

5. Make sure the Number field contains the phone number of the LAN Distance Connection Server to which you want to connect.
6. Select the **Dial** button.
7. The modem is now dialing the number and setting up the connection.
8. Status goes from Not connected to Connecting when the call is being made.

The Modem field of the Phone Book window displays the command LAN Distance sends to the modem and its responses.

The following panel is displayed when the connection is being established:

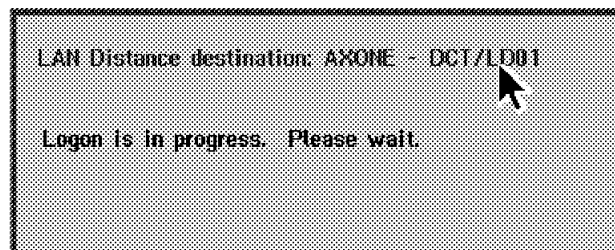


Figure 154. Connecting

The signon window for LAN Distance Connection Server is presented as shown in Figure 155 on page 160.

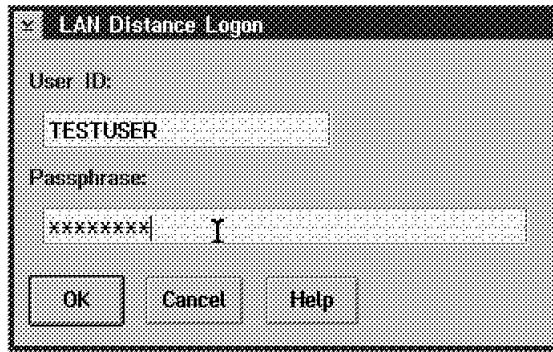


Figure 155. LAN Distance Connection Server Signon

When the connection is completed, the following panel is shown, where the status is set to Connected:

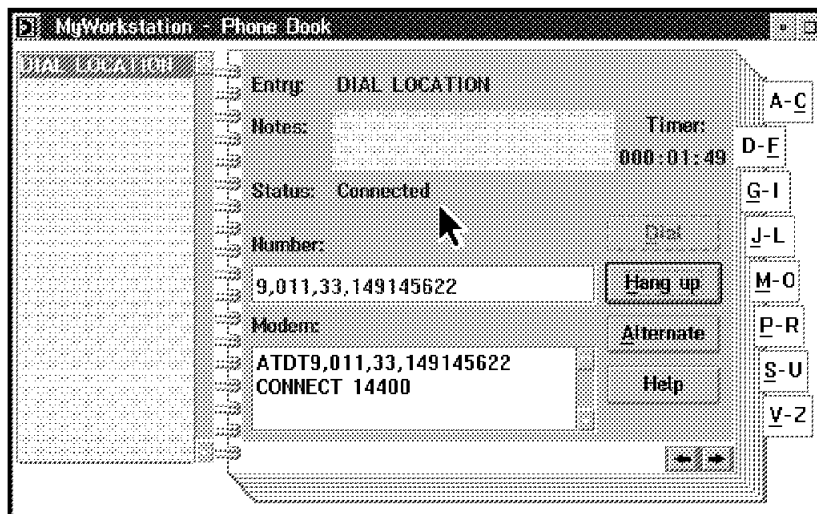


Figure 156. LAN Distance Connection Server Connected to LAN Distance Connection Server

When connected, check the LAN Distance connection.

Use a tool such as OS2PING or TRMON to PING an address on the LAN.

OS2PING is a command line tool that comes with LAN Distance. TRMON is a Presentation Manager application which is like a cut down version of LAN Network Manager. TRMON is an IBM Internal Use Only tool available from the OS2TOOLS disk.

You need to identify a workstation on the LAN and obtain its token-ring address. For an OS/2 machine, this can be done by looking at the workstation LANTRAN.LOG file.

Figure 157 on page 161 shows the results of an OS2PING from a LAN Distance Remote for OS/2 to the LAN Distance Connection Server workstation on the LAN.

```
[D:]os2ping -a=400068A61A86 -r
(C) IBM Corporation 1990,1993

OS2PING Version 0.061 - 11/11/93
OS2PING: First response received
OS2PING: Addr=400068A61A86 Route was:
(AAA)
Same segment.
OS2PING: 1 response received during 10 second wait
```

Figure 157. OS2PING from Remote Workstation to LAN Distance Connection Server Workstation

If your LAN Distance connection doesn't work, see "Impossible to Log On to the LAN Distance Connection Server."

Once connected to LAN Distance Connection Server, you can start a Personal Communications 802.2 session. If you experience some Communication error under Personal Communications see "Communication Error in 802.2 on a LAN Distance Remote for OS/2" on page 162.

At the end, to disconnect from LAN Distance, do not forget to switch to your LAN Distance address book and to click on **Hang Up** button. Otherwise, just shut down your computer will generate a wild disconnection on the side of the LAN Distance Connection Server where some troubles have then been experienced. It can take quite a long delay before the server allows you to log on if you try just after having wildly disconnected. This is because the LAN Distance Connection Server will generate a disconnection instruction on its own, and while this process is not performed the server considers you as still logged on. The server then rejects your new log on attempt, because it considers you already logged on.

#### 5.4.1 Communication Problems in an 802.2 Session

In case of communication problems with 802.2 sessions via LAN Distance, it is important to separate the possible sources of defect when you try to resolve a communication problem.

##### **Impossible to Log On to the LAN Distance Connection Server**

On the LAN Distance Connection Server, log on with the SECADMIN administrator user ID and do the following:

- Check the user ID definitions (be sure the status is active for the user ID you are using on the mobile). See 5.2.3, "Creating a LAN Distance User ID" on page 144.
- Check the settings on the LAN Distance Connection Server station. See "Setting Up the Connection Server Using the LAN Distance Settings" on page 128.
- Check your system configuration files on the LAN Distance Connection Server. See 5.2.2, "LAN Distance Connection Server Configuration Files" on page 140.
- Check your system configuration files on the LAN Distance Remote for OS/2. See 5.3.4, "LAN Distance Remote for OS/2 Configuration Files" on page 153.

## Communication Error in 802.2 on a LAN Distance Remote for OS/2

The following steps provide some useful techniques to verify that the IEEE 802.2 protocol is installed and working correctly on your LAN Distance Remote for OS/2:

1. Check your LANTRAN.LOG file.

Figure 158 shows what the LANTRAN.LOG file should look like after you have restarted your workstation.

```
LT00073: FFST/2 is installed but is not started. LANTRAN.LOG is being
created.
IBM OS/2 LANMSGDD [09/15/94] 2.01 is loaded and operational.
IBM OS/2 LAN Protocol Manager
IBM - OS/2 Socket/MPTS Common Transport Semantics
IBM OS/2 NETBEUI 2.20.1
NETBEUI: Using a 32-bit data segment.
IBM OS/2 NETBIOS 4.0
Adapter 0 has 125 NCBs, 48 sessions, and 27 names available to NETBIOS
applications.
NETBIOS 4.0 is loaded and operational.
IBM OS/2 Virtual LAN Kernel, Version 1.00
IBM OS/2 VLAN MAC Driver Frame Handler V.1.00 initialized.
IBM ANDIS Serial Communications Adapter MAC Version 94.077
CPM0014: Port for MAC COM2 is a PCMCIA port. Default maximum speed set
to 115200.
Initialized MAC COM2 for COM2.
IBM OS/2 VLAN Protocol Driver Frame Handler V.1.00 initialized.
IBM OS/2 LANDD [09/15/94] 2.20.12
IBM OS/2 LANDLLDD 2.01
IBM OS/2 LANDLLDD is loaded and operational.
IBM LANVDD is loaded and operational.
IBM OS/2 LAN Netbind
IBM LANDD is accessing IBM 802.5 LAN Interface.
Adapter 0 was initialized and opened successfully.
Adapter 0 is using node address 400068A61A86.
IBM LANDD was successfully bound to MAC: PDFH_nif->VECTOR.
IBM - OS/2 Socket/MPTS Local IPC Service Driver
IBM - OS/2 Socket/MPTS INET Service Driver
IBM - OS/2 Socket/MPTS IFNDIS Protocol Driver
IBM OS/2 LAN Netbind
Adapter 0 is using node address 400068A61A86.
```

Figure 158. LANTRAN.LOG with IEEE 802.2 Protocol

The highlighted lines show the IEEE 802.2 protocol loading and binding to the LAN Distance MAC driver.

2. Use a tool such as OS2PING or TRMON to PING an address on the LAN.

You need to identify a workstation on the LAN and obtain its token-ring address. Choose a workstation located on the segment where your LAN Distance Connection Server is located. For an OS/2 machine, this can be done by looking at the workstation LANTRAN.LOG file.

Figure 157 on page 161 shows the results of an OS2PING from a LAN Distance remote workstation to a workstation on the same LAN segment as the LAN Distance Connection Server.

```
[D:]os2ping -a=08005a49f2f8 -r
          (C) IBM Corporation 1990,1993

OS2PING  Version 0.061 - 11/11/93

OS2PING: First response received
OS2PING: Addr=08005a49f2f8  Route was:
(AAA) 1 -> (528)

OS2PING: 1 response received during 10 second wait
```

Figure 159. OS2PING from Remote Workstation to a Workstation on the LAN

If you can PING a LAN workstation, then the IEEE 802.2 protocol has been installed successfully.

**Note:** In some cases, the remote workstation may be correctly installed and configured with the IEEE 802.2 protocol driver, but you cannot PING a LAN-attached workstation. The reason for this may be that a customized filter may be activated on the LAN Distance Connection Server and the response frames coming from the LAN-attached workstation you are trying to PING are filtered out. You may need to verify that the LAN filters on the server allow frames from the LAN-attached workstation to pass. This does not occur if you are using the automatic filtering capability. To setup a correct filtering on the LAN Distance Connection Server, refer to *IBM LAN Distance Version 1.1 Configuration and Customization Guide*, GG24-4158.

3. Try now to PING the address of your SNA gateway (3745 TIC). If you can ping this address then you definitely have no problem with the 802.2 setup via LAN Distance. Go to "Communication Error in 802.2 on a LAN Distance Remote for OS/2" on page 162 to pursue the problem determination.
4. If you cannot ping the 3745 address then the problem can be related to the hop counts set up along your path. For an explanation of the role of hop counts on a network, see "Hop Counts" on page 123

If we look at the PROTOCOL.INI file on the LAN Distance Connection Server (see Figure 160 on page 164) we can isolate the values defined for the bridge function of LAN Distance. In this example the segment AAA (the WAN segment where your remote workstation resides once connected on LAN Distance) has an hop count of 2. The segment 528 (the LAN segment on which your LAN Distance Connection Server resides) has a hop count of 7. That means a frame generated on the WAN can pass through the LAN Distance server to the LAN if it has not passed more than two bridges before coming to the LAN Distance Connection Server (this is always the case in our configuration). The value 7 assigned to the 528 segment side of LAN Distance bridge means that a frame generated by a workstation on the LAN (wherever in your network) can pass the LAN Distance bridge if it has not passed more than seven bridges in your network before coming to your LAN Distance Connection Server. To determine the right values, PING the 3745 address from the LAN Distance Connection Server workstation. Look at the number of bridges crossed as shown by the result of the PING command. Set the hop count of the LAN Distance Connection Server LAN side to this result plus 1.

```
[sr_bridge]

DriverName = BRIDGE$
CfgType = "Locked"
Bridgenum = 5
Maxframe = 2052
Bindings = IBMTOK_nifB,BRIDGEFH
Prionbindings = IBMTOK_nif,PDFH_nif
Ringnum = 0x528,0xAAA
Maxhopcount = 7,2
```

Figure 160. Hop Counts Definition on LAN Distance Connection Server

If you cannot PING the SNA gateway from your LAN Distance Connection Server workstation, then there is at least one bridge between your LAN Distance Connection Server and the 3745 which has an insufficient hop count. Contact your Network support administrator to identify the bridges where hop counts have to be increased.

**Note:** The LAN Distance bridge hop count works in the same way as the IBM Token-Ring Bridge. The main difference, however, is that the hop count on the LAN Distance bridge limits both All Routes Broadcast and Single Route Broadcast frames. For more details about the All routes broadcast and Single Route Broadcast, see page 164.

5. If you still cannot PING the 3745 address from your remote workstation then the problem could be related to the use of filtering on the LAN Distance Connection Server.

Personal Communications works well with the automatic filter feature of LAN Distance. You should not have problems caused by excessive broadcast traffic on the WAN link using the automatic filter.

However, if your environment requires you to disable the automatic filtering feature you may encounter some problems. This section provides a discussion on the possible problems on a Personal Communications running in a LAN Distance environment without automatic filtering.

A source routing bridge, such as in the LAN Distance Connection Server, generally passes frames for two reasons:

- The routing information in the frame instructs the bridge to copy the frame from one segment to another.

When a frame containing a routing information indicator is sent, all bridges on the LAN segment examine the frame. If the frame is a non-broadcast frame, the bridge interprets any routing information and forwards the frame, if appropriate.

- The frame is a broadcast frame.

The broadcast indicator in the routing control field also controls the way a bridge treats the frame.

In a very active or large LAN environment, there is a lot of broadcast traffic flowing through the network. With the hop count set to 3, and no filtering, all broadcast frames, from up to three segments out from the LAN Distance remote workstation, are passed across the WAN link.

The broadcast traffic on a LAN is generally only a small percentage of the total traffic. Typically, broadcast traffic uses only a small percentage of the available bandwidth. In a WAN environment, where the link speed may only be around 14,400 bps, the broadcast traffic can be a real problem. A 4 Mbps token-ring LAN has around 270 times more capacity than a 14,400 bps WAN link. If broadcast traffic on a LAN accounts for just one percent of the total traffic, then a 14,400 bps link would be fully utilized simply trying to keep up with the broadcast traffic.

When a large amount of broadcast traffic is being passed across the WAN link, there may be no capacity left for real data. This can cause the sessions to timeout and communications to fail. In general, it does not matter how high you set the timeout timers, for IEEE 802.2 as well as for any other protocol or application, if you have excessive traffic on the WAN link, then useful data transmission is adversely affected.

The best means of minimizing the amount of traffic on the WAN link is to implement filtering at the LAN Distance Connection Server. Only the traffic required between the remote workstation and the 3745 device should be allowed on the WAN link.

If your environment allows you to use the LAN Distance automatic filtering, we recommend that you use it. Automatic filtering will set up the filters to allow only the traffic required by each remote to be forwarded to each WAN connection.

If, for some reason, you have to use a customized filter to establish a clean WAN link and allow only the 3270 traffic on the WAN, the easiest approach is to filter all addresses from the LAN except the SNA gateway by using a source address filter. By allowing frames from the gateway to pass from the LAN to the WAN, we were able to establish reliable and efficient communications. In a real world environment, other addresses would also have to be able to pass through the LAN Distance Connection Server's bridge such as LAN servers, database servers and other host devices.

Personal Communications uses an All Routes Broadcast to locate its gateway.

In general, if you have to set the hop count high (4 hops or greater) in order to reach a gateway, then you also need to implement filtering on the connection server. A network that is so large that four bridges or more must be crossed usually means that there is a considerable amount of broadcast traffic flowing through the network.

**Note:** Recommendations must be different for different environments, as the busier the LAN is, the lower the hop count must be before filtering is required. On a LAN with a little traffic, the hop count could be set higher than on one with a great deal of traffic.

Without filtering on the LAN Distance Connection Server, this broadcast traffic gets passed across the WAN link, leaving little or no bandwidth for even the PING. Thus, even though the gateway may be reachable, the load on the WAN link is such that productive communications cannot be established.

---

## 5.5 Installation and Configuration of a Window Workstation

This section covers the installation and configuration of LAN Distance Remote for Windows in order to test a Personal Communications session with TELNET3270 configuration.

First, LAN Distance will be installed on a machine where the communication software has already been tested in a LAN environment.

We will use an MVS-based TELNET server to manage TELNET3270 links. The necessary configuration to enable the TELNET Server running on TCP/IP V3.1 for MVS will then be shown.

Finally we will test the connection via TELNET3270 and via LAN Distance by dialing and connecting to the LAN Distance Connection Server and then starting a Personal Communications TELNET3270 session. The use of the Shuttle function will also be discussed.

### 5.5.1 Hardware and Software Requirements

LAN Distance Remote for Windows has several hardware and software prerequisites:

- A 386 microprocessor or higher supporting Windows 386 Enhanced mode
- DOS 5.0 or higher

**Note:** Here at the ITSO, we tested with PC DOS 7.0, IBM DOS LAN Requester, and Microsoft TCP/IP.

#### Windows 386 Enhanced Mode Required

LAN Distance Remote for Windows runs in the Windows 386 Enhanced mode. Installation installs the LDVCD.386 Windows device driver for low-level serial port code.

- 2.3MB fixed disk space
- A modem and/or adapter for asynchronous communications.

We used an IBM 7855 modem for the test.

If you plan to install applications using IEEE 802.2 (which is out of the scope of this test), you will also need the IBM LAN Support Program. This is not true for applications using NetBIOS, since a NetBIOS driver for DOS is shipped with the LAN Distance Remote for Windows product.

### 5.5.2 LAN Distance Remote for Windows Installation

The LAN Distance Remote for Windows product is included on a single diskette. Its installation is simple and fast. However, before you start the actual installation, you should review the following points.

You probably plan to set up one or more LAN applications on the LAN Distance Remote for Windows workstation.



We recommend that you install LAN Distance Remote for Windows on a fully installed LAN workstation, because testing on your remote workstation will be easier. If you already have tested that Personal Communications works properly over standard LAN protocols, then after installing LAN Distance, you can determine that any problems are most likely due to the LAN Distance setup.

Another reason is that LAN Distance will preserve your LAN configuration and offer you the possibility to switch between the LAN environment and the remote workstation environment (see 5.5.3, “Shuttling on a Windows Workstation” on page 174 for more information on this).

If you have already installed LAN Distance Remote for Windows and you want to add a new application, it is preferable to install it in a LAN configuration (rather than in a remote workstation configuration). You need to have the Shuttle function enabled for this, so you can switch between the LAN and remote workstation environments. By installing the application with the LAN configuration active, you are able to install and test your application thoroughly in a standard LAN environment. This allows you to receive full support from your software vendor if necessary. Then, once tested in the LAN environment, you have to reflect the changes in CONFIG.SYS and PROTOCOL.INI in the corresponding files for the LAN Distance configuration. In some cases, you may even reinstall LAN Distance Remote for Windows over your new LAN configuration. You should, however, back up your previous LAN Distance configuration so that you don't lose your previous work.

But let's focus on a TCP/IP-based session for Personal Communications. LAN Distance Remote for Windows installation doesn't always migrate your LAN application to the LAN Distance environment. So TCP/IP configuration is not migrated. This means that you must update your LAN Distance configuration to integrate the TCPIP configuration. Go into the Network Setup program under Windows to do that.

If you decide to reinstall the LAN Distance product, you should restore an operational LAN configuration and erase all traces of the previous installation before starting the new installation. Otherwise, you may not be able to start the installation from scratch because LAN Distance will detect its previous copy and reinstall itself with the same configuration.

The LDREMOVE utility should always be used when deinstalling LAN Distance because it:

- Removes all files from the WAL directory
- Updates the system hidden file IBMLVL.DOS in the root directory so that the next installation will restart from the beginning

**Note:** You may have problems if you do *not* use LDREMOVE but instead try to manually remove LAN Distance statements from your CONFIG.SYS (and your AUTOEXEC.BAT) while your machine is configured as a Windows Remote workstation.

Is your COM port set up correctly and fully operational? It is a good idea to use a simple ASCII terminal emulator like the Windows accessory to connect to a bulletin board service (BBS) and check that your communication hardware has no defect. Just note that LAN Distance uses a COM port set to 7 data bits. If you plan to use the COM1 port for your modem, check it is defined to IRQ4 and RAM address 03F8, as LAN Distance plans to access it in the defaults settings of this COM port.

If you are using a PCMCIA modem, you should set up and configure your modem before starting LAN Distance installation, so that the installation program detects the serial port and allows you to select it.

## Installation Steps

Follow these steps to install LAN Distance Remote for Windows:

1. Insert the diskette for LAN Distance Remote for Windows in drive A: and type:  
A:INSTALL



9.

Figure 161. IBM Logo Panel

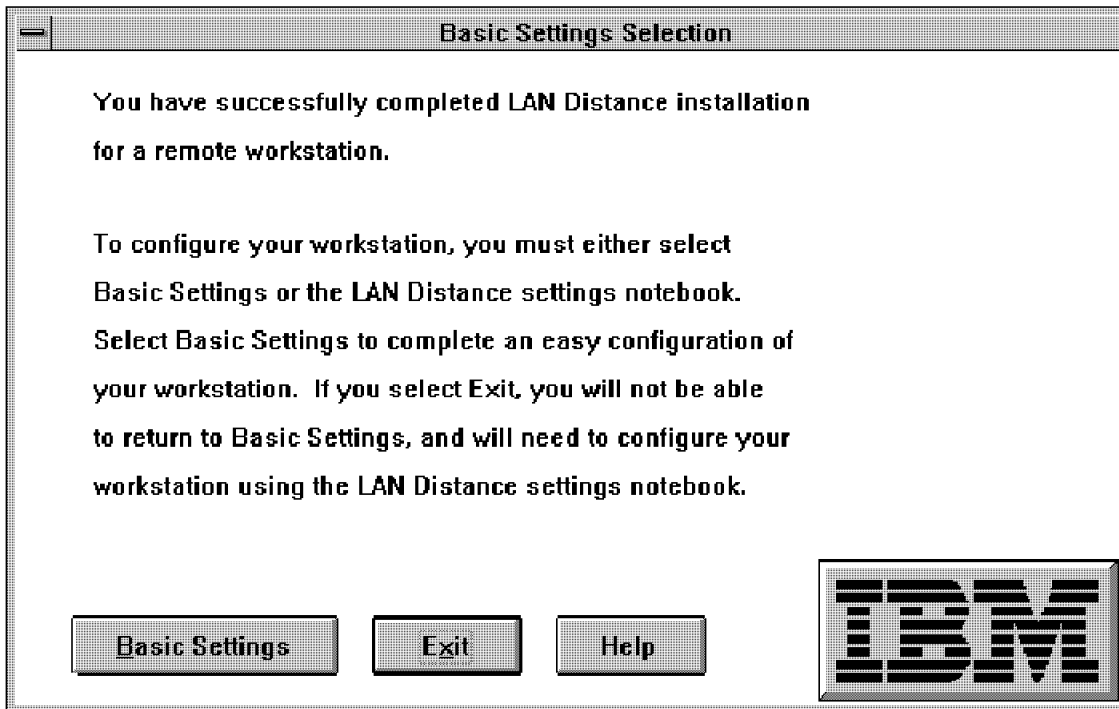
2. The Welcome screen gives you the opportunity to review the necessary steps for installing LAN Distance Remote for Windows by pressing the **Quick\_Start** push button.



9.

Figure 162. Welcome Panel. Press Quick Start to see a summary of installation steps.

3. The next panel lets you select your target drive. Select the drive, then click the **OK** button.
4. A progress indicator is now displayed while LAN Distance files are transferred to your fixed disk.
5. The following panel informs you that the installation completed successfully. We start now to configure LAN Distance Remote for Windows by pressing with the **Basic Settings** button.



9.

Figure 163. Basic Settings Panel

6. When you select **Basic\_Settings**, a window is displayed for a while explaining that the system is processing configuration files. When this is finished, the next panel lets you select your modem.

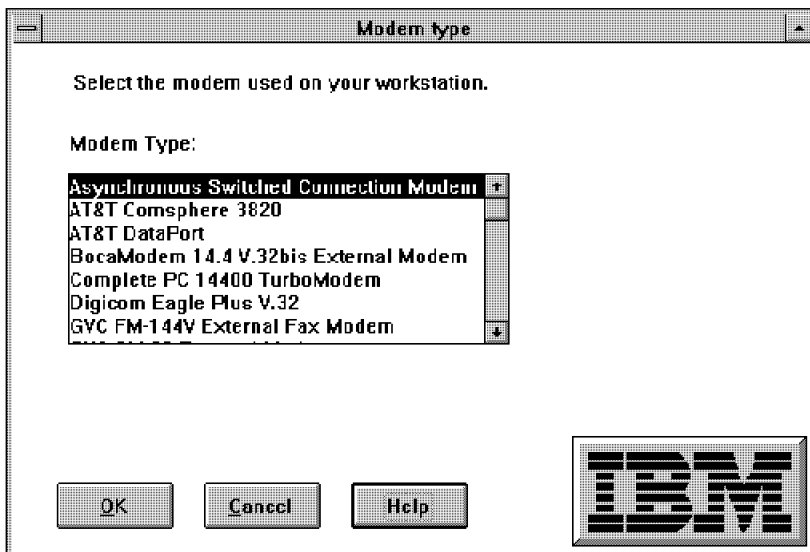


Figure 164. Modem Selection

7. We are using an IBM 7855; if your modem is not included in the Modem Type list box, select **Asynchronous Switched Connection Modem**.

**Note:** If you select an asynchronous switched connection modem, and you are using an unlisted PCMCIA modem, be sure that the statement PCMCIA = "YES" is in your PROTOCOL.INI.

8. In the next panel, you select your serial port. If your serial port name is on a PCMCIA adapter and it is not listed here, select **COM1**. You can modify your COM port selection later by using the Settings option of LAN Distance.
9. The following panel asks you to enter the phone number that you will be calling most frequently. This is the phone number of the LAN Distance Connection Server. Later, you can add many other phone numbers to your LAN Distance phone book.
10. Then select your LAN environment:

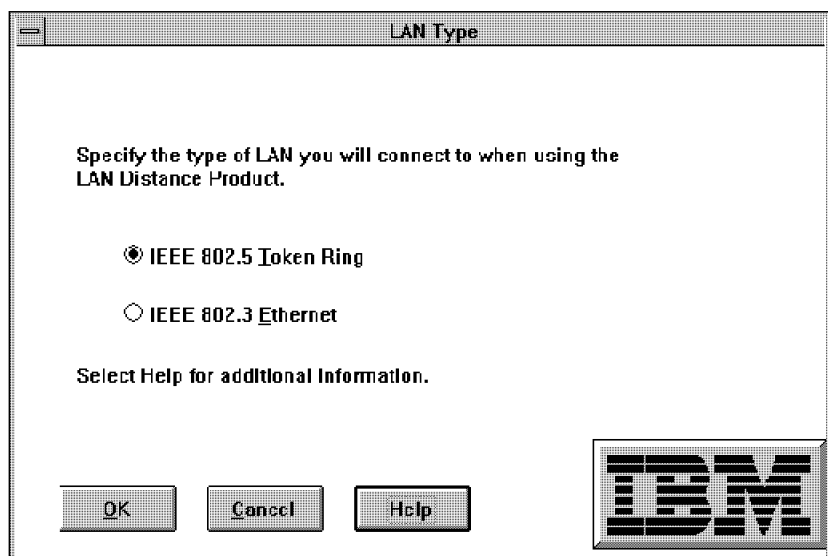
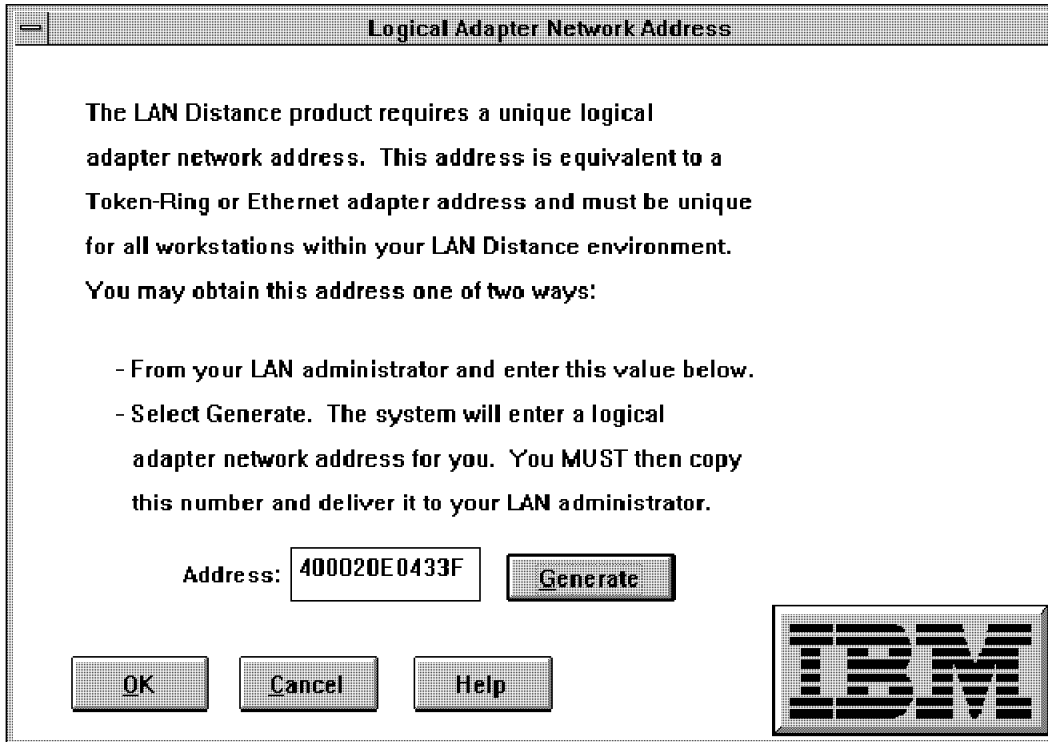


Figure 165. LAN Type

11. Now, you have to define a LAA (locally administered address) for your remote workstation. As its name suggest, this address should be given to you by your local LAN administrator, because it has to be unique on the LAN. Should two workstations have the same LAA, only the first one trying to connect would succeed. The second address would be rejected.

Another option for this field is to let LAN Distance Remote for Windows generate a random address that is likely to be unique on your network. You should, however, inform your network administrator that you are using this LAA to avoid any future address conflict.



9.

Figure 166. Logical Adapter Network Address

12. The following panels ask you to enable or disable NetWare client support. We will disable it.

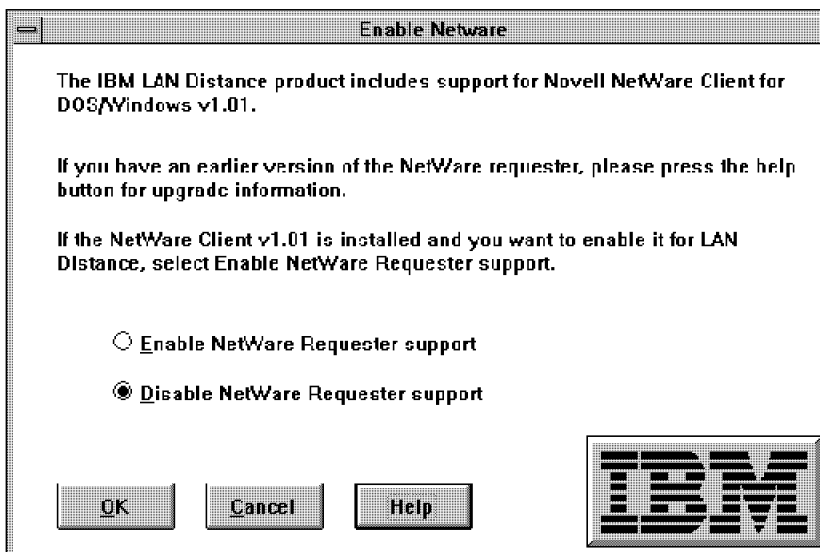


Figure 167. NetWare DOS/Windows Client Support

13. The installation program processes your configuration files and installs the Shuttle feature. See 5.5.3, "Shuttling on a Windows Workstation" on page 174 for more detail.

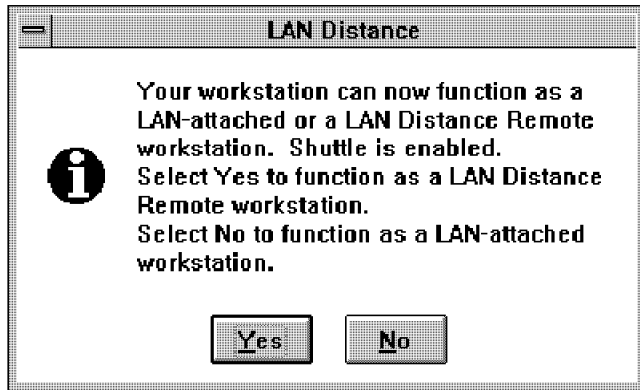


Figure 168. Shuttle Option

14. This completes LAN Distance Basic Settings and the installation of LAN Distance Remote for Windows. You can modify these settings at any later time by selecting the **Settings** option of LAN Distance notebook.

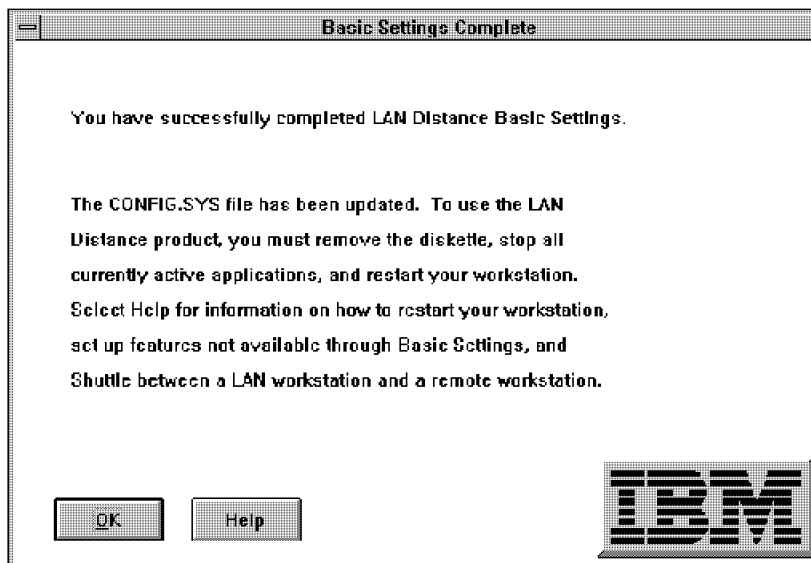
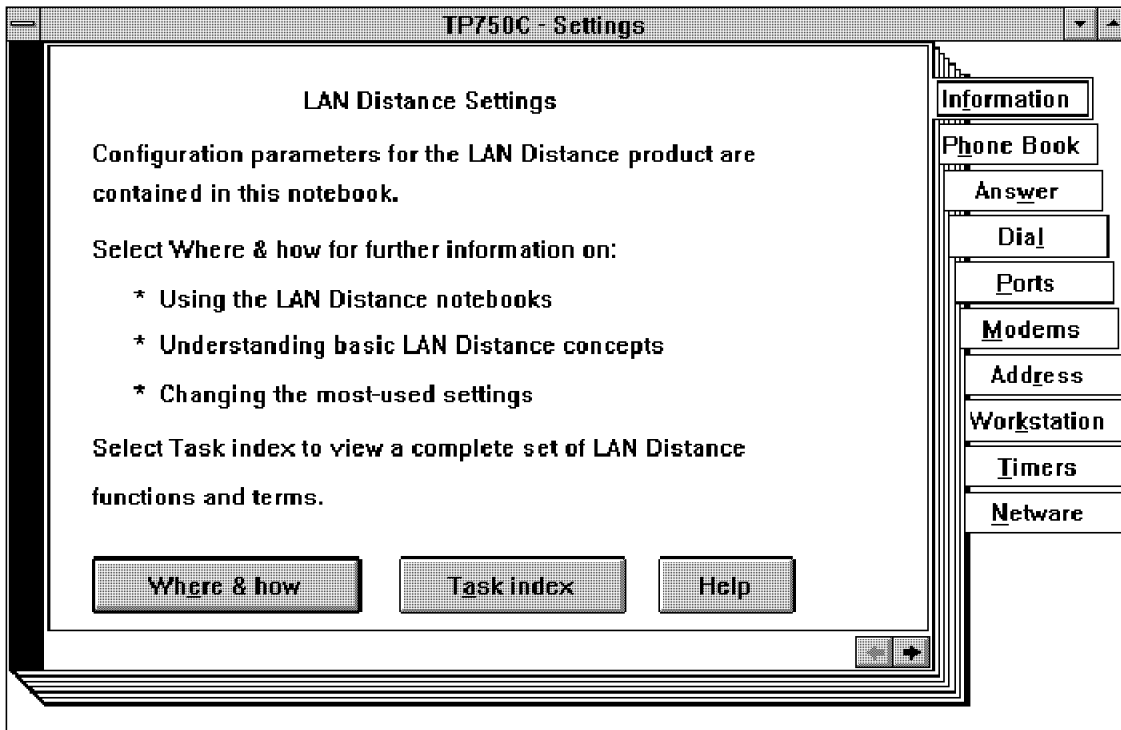


Figure 169. Basic Settings Complete

**Note**

If you need to make changes to your basic settings later, you will be able to access them via the LAN Distance Settings Notebook. To access it, open the **LAN Distance** group and double click on the **Settings** icon.



9.

Figure 170. Settings Panel

### 5.5.3 Shuttling on a Windows Workstation

Shuttling is the action of reconfiguring your workstation to work in a remote or in a LAN environment by clicking on the **Shuttle** icon.

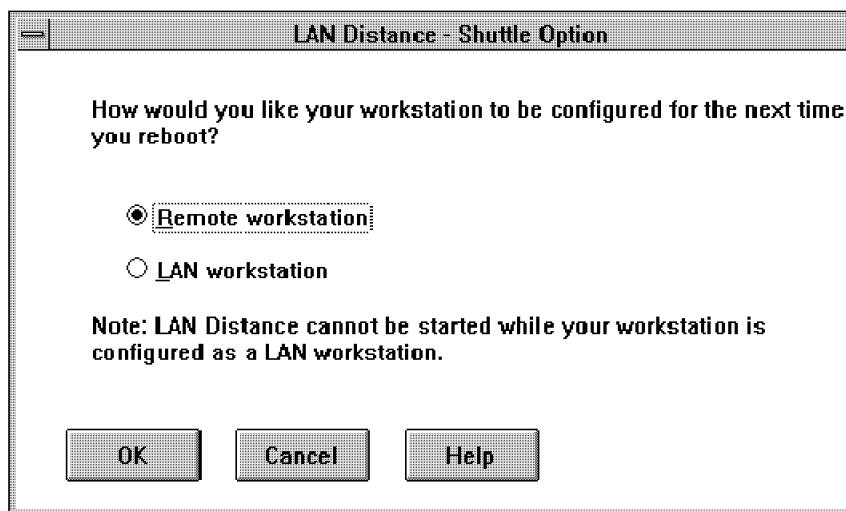


Figure 171. Shuttle Window



In order to have the Shuttle function properly you must be careful not to erase the following files:

- CONFIG.RWS and CONFIG.LAN (in the root directory)
- AUTOEXEC.RWS and AUTOEXEC.BAT (in the root directory)
- PROTOCOL.INI (in the WAL directory and in your LAN Support Program directory)

The Shuttle feature is automatically enabled if you installed LAN Distance on a fully configured LAN workstation. If you installed LAN Distance on a stand-alone workstation with no LAN software, the Shuttle option will not be available. To enable it, go to the Settings notebook, select the **Workstation** tab, and select **Enable shuttling between LAN and remote workstation**.

**Note**

Always use the Shuttle command in Windows to switch between LAN and LAN Distance configuration. Copying the files manually could cause you to accidentally erase an important file. Shuttle does this safely.

## 5.5.4 System Configuration Files

Here are the configurations files used on our LAN Distance Remote for Windows.

### CONFIG.SYS

```
FILES=50
BUFFERS=40
device=C:\DOS7\HIMEM.SYS
rem device=c:\dos7\ramboost.exe load
device=C:\DOS7\EMM386.EXE NOEMS RAM X=B200-B7FF X=C000-D3FF
dos=high,UMB
DEVICEhigh=C:\THINKPAD\IBMDSS01.SYS /D
DEVICEhigh=C:\THINKPAD\IBMDOSCS.SYS
DEVICEhigh=C:\THINKPAD\DICRMU01.SYS /MA=C800-CFFF /SH=1
DEVICEhigh=C:\THINKPAD\ICPMDOS.SYS
DEVICEhigh=C:\DOS7\SETVER.EXE
DEVICEhigh=C:\DOS7\POWER.EXE
DEVICEhigh=C:\THINKPAD\AUTODRV.SYS C:\THINKPAD\AUTODRV.INI
DEVICEhigh=C:\THINKPAD\DISKDRV.SYS
STACKS=9,256
DEVICEhigh=C:\DOS7\ANSI.SYS
DEVICE=d:\WAL\protman.dos /I:d:\WAL
DEVICEHIGH=d:\WAL\tap1f.dos
DEVICEHIGH=d:\WAL\dxmj0mod.sys
DEVICEHIGH=d:\WAL\dosvmac.sys
DEVICE=D:\TCPDOS\BIN\DOSTCP.SYS
DEVICEHIGH=d:\wal\winamac.sys
DEVICEHIGH=d:\WAL\PCMDD.SYS
```

Figure 172. CONFIG.SYS File on the LAN Distance Remote for Windows

## PROTOCOL.INI

```
[PROTOCOL_MANAGER]
  DriverName=PROTMAN$
  Bindings=SOCKDD_MOD

[NETBEUI]
  DriverName=NETBEUI$
  Bindings=SOCKDD_MOD
  NCBS=32
  Sessions=32
  Names=17
  MaxDatarcv=4168
  MaxTransmits=6
  TI=60000
  T1=10000
  T2=2000

[SOCKDD_MOD]
  DriverName=VLANMAC$
  LANType="TokenRing"
  Mode="FLOWS"
  NetAddress=T400004413D60
  MaxFrame=1080

[IBM_TCPIP_V21]
  DriverName="DOSNDIS$"
  Bindings="SOCKDD_MOD"

[COM2]
  DriverName=COM2MAC$
  MAXFRAME=1080
  PCSUPPORT="yes"
  MACTYPE="802.5"
  CONN_TYPE="Switched"
  TX_FIFO_SIZE=7
  PCMCIA="YES"
  PORTNAME="COM2"
```

Figure 173. D:\WAL\PROTOCOL.INI File on the LAN Distance Remote for Windows

Check for the PCMCIA="YES" to be present in you PROTOCOL.INI if you are using a PCMCIA modem.

## SYSTEM.INI

```
[386Enh]
.
.
.
DEVICE=d:\wa1\1dvcd.386
.
.
COM2Base=2F8
.
.
COM2IRQ=3
.
.
.
device=D:\PCOMWIN\Vpo11D.386
device=D:\PCOMWIN\VslanD.386
device=D:\PCOMWIN\VvlanD.386
device=D:\PCOMWIN\Vdosh11D.386
device=D:\PCOMWIN\VpcsrtrD.386
device=D:\PCOMWIN\Vint21hD.386
device=D:\PCOMWIN\VvprtD.386
.
.
```

Figure 174. SYSTEM.INI File on the LAN Distance Remote for Windows

## AUTOEXEC.BAT

```
D:\TCPDOS\BIN\NETBIND
d:\WAL\DOSBIND
SET ETC=D:\TCPDOS\ETC
C:\WINDOWS\SMARTDRV.EXE
ãECHO OFF
set path=c:\windows;c:\dos7;d:\WAL;d:\TCPDOS\BIN;
SET TEMP=C:\DOS7
loadhigh c:\dos7\mouse.com
loadhigh c:\dos7\doskey.com
CALL TCPSTART
```

Figure 175. AUTOEXEC.BAT File on the LAN Distance Remote for Windows

## WCLNET.INI

```
[DONOTREMOVE]
keyword=value

[REMOVELAN01]
DLL=WCLVPCM
Entry=StartVPCM
Autostart=YES
PIF=OPTIMA14.PIF
Title="Hayes Optima 14400 Modem"
PCMNAME=OPTIMA14

[OPTIMA14]
PortName=COM2
PermConnection=No
PhoneNumber="Unspecified"
DialogType="ATCMD.DDF"
Synchronicity="Asynchronous"
ModemClass="V.32bis"
AutoBaudDetect="On"
SerialPortSpeed=19200
FlowControl="RTS/CTS"
Initialization1="ATIO\CR"
Initialization2="ATE1QOV1M1N1S95=40X4Y0&C1&D2&K3&Q5&R0
&S1&T5S7=60S0=2S37=0\CR"

DialPrefix="ATDT"
DialSuffix="\CR"
Success="OK\CR\LF"
Failure="ERROR\CR\LF"
ConnectPrefix="CONNECT"
ConnectSuffix="\CR\LF"
Escape="+++
Hangup="ATH\CR"
RingBack="RING\CR\LF"
Busy="BUSY\CR\LF"
NoCarrier="NO CARRIER\CR\LF"
NoDialtone="NO DIALTONE\CR\LF"
NoAnswer="NO ANSWER\CR\LF"
Voice="VOICE\CR\LF"
Ring="RING\CR\LF"
```

Figure 176. WAL\WCLNET.INI File on the LAN Distance Remote for Windows

Check for the statement `AutoBaudDetect="ON"` to be in your configuration; this should avoid some problems regarding differences between the modems used on the remote and the server side.

## 5.5.5 Memory Considerations under DOS

This section gives some general hints on how to optimize your memory, so that you can use LAN Distance concurrently with Personal Communications. For a detailed discussion on memory management in DOS, refer to your DOS manual.

### Upper Memory Blocks (UMB)

You should add the EMM386.EXE device driver to your CONFIG.SYS and set up DOS for UMBs.

```
DEVICE=C:\DOS\EMM386.EXE NOEMS
DOS=HIGH,UMB
```

#### Note

Usually when your workstation is already configured for the LAN, you have to exclude the ROM and shared RAM address of your LAN adapter from the available memory for UMB. With LAN Distance, however, you do not need to exclude memory since you do not have a real LAN adapter. This means that LAN Distance lets you use 24KB to 32KB more than the same configuration for a LAN. You do this by removing the X=MMM-NNNN statements from the EMM386.EXE line in CONFIG.SYS.

You can try to use DEVICEHIGH and LOADHIGH to load your device drivers and terminate-and-stay-resident programs (TSRs) into upper memory. There is no general rule. Experience will tell you what device driver or what TSR can be loaded into upper memory. Here are some recommendations you may find useful:

- Avoid loading the LAN device driver into upper memory. Although most of them work in the UMB, you must carefully test this configuration.
- Load into upper memory the support program for the keyboard, mouse, DOSKEY, ANSI, or any non-communication TSR.

---

## 5.6 Configuration of the TELNET Server on TCP/IP v3.1 on MVS

Several implementations can be done to enable a TELNET Server. You can run TELNET server onto the host you plan to access at the end. But we will describe here a more flexible implementation, which enables you to access all the SNA resources on your SNA network, once connected to the TELNET server. This implementation links TELNET server and VTAM.

To enable the TELNET server service, you have to add its specific port in the PROFILE.TCPIP file, and to set up some other parameters in this file, as shown in Figure 177 on page 179.

```

;
; TELNET server configuration parameters
;
INTERNALCLIENTPARMS
  INACTIVE 36000      ; 10 hour inactive before cancel session
  TIMEMARK 3600      ; Timemarks every hour
  SCANINTERVAL 60    ; Wake up every minute to do timemarks
  SMFINIT 171        ; SMF LOGN records - subtype 171
  SMFTERM 172        ; SMF LOGF records - subtype 172
  BINARYLINEMODE     ; Allow binary linemode sessions
  DISABLESGA         ; No Go-Aheads
ENDINTERNALCLIENTPARMS
;
; Reserve port for the TELNET server
;
PORT
  23 TCP INTCLIEN      ; TELNET Server

```

Figure 177. TELNET Server Enablement

IBM TCP/IP V3R1 for MVS, GG24-3687). provides additional details on a TELNET server setup running TCP/IP for MVS:

## 5.7 TELNET3270 Connection via LAN Distance Remote for Windows

Follow these instructions to connect to your LAN Distance Connection Server and then start a TN3270 session in Personal Communications

To connect to your LAN Distance Connection Server do the following steps:

1. Start the LAN Distance program located in the LAN Distance group.
2. Select **Selected** from the menu bar.
3. Select **Open as ->** .
4. Select **Phone Book**.

**Note:** In the Open as -> list, **PhoneBook** is marked as the default option. This means that you can also open the Phone Book by double clicking on the icon representing your workstation.

The Phone Book window, as shown in Figure 178 on page 180, is now displayed.

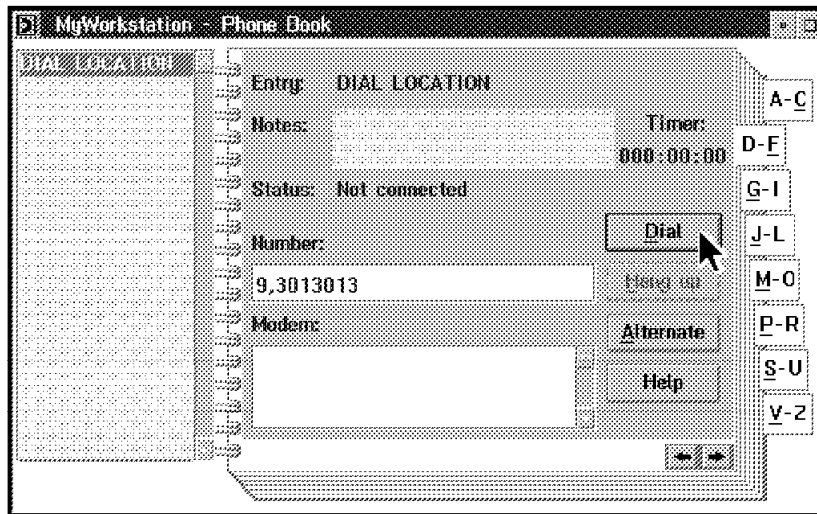


Figure 178. Phone Book Window

5. Make sure the Number field contains the phone number of the LAN Distance Connection Server to which you want to connect.
6. Select the **Dial** button.
7. The modem is now dialing the number and setting up the connection.
8. Status goes from Not connected to Connecting when the call is being made.

The Modem field of the Phone Book window displays the command LAN Distance sends to the modem and its responses.

The following panel is displayed when the connection is being established:

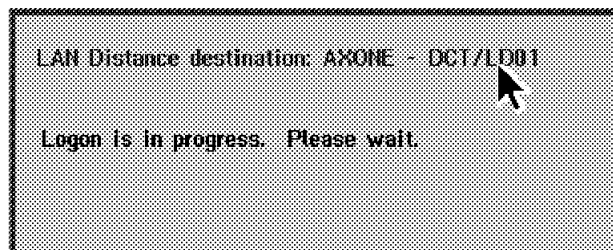


Figure 179. Connecting

The signon window for LAN Distance Connection Server is presented as shown in Figure 180 on page 181.

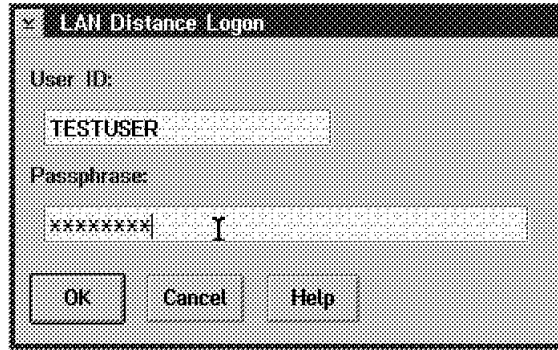


Figure 180. LAN Distance Connection Server Sign-On

When the connection is completed, the following panel is shown, where the status is set to Connected:

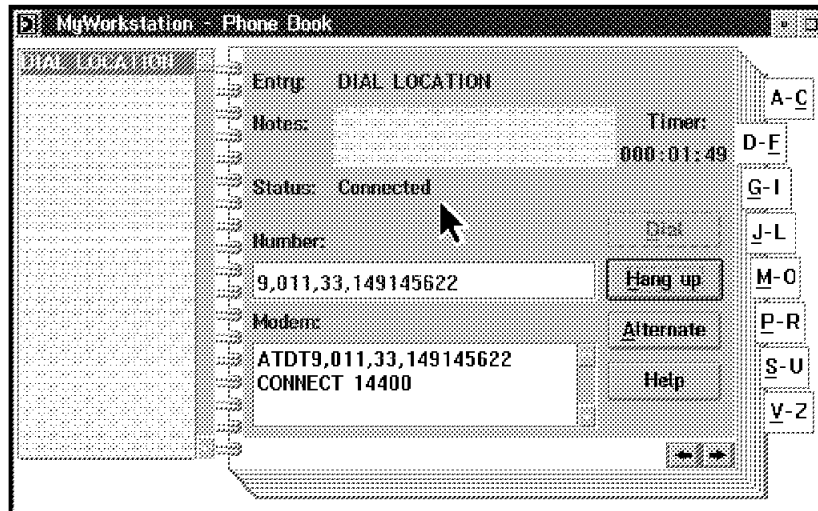


Figure 181. LAN Distance Connection Server Connected to LAN Distance Connection Server

Once connected, test your connection performing a LANPING command on the IP station which acts as the SNA gateway on your network.

Use the LANPING tools to PING the LAN Distance Connection Server address. If the PING is successful, then we can be sure that the remote workstation is connecting to the LAN Distance Connection Server.

**Note:** LANPING is the DOS equivalent of OS2PING.

To identify the token-ring address of the LAN Distance Connection Server, look at the LANTRAN.LOG file on the server.

Figure 182 on page 182 shows the results of a successful LANPING from a LAN Distance Remote for Windows workstation to the LAN Distance Connection Server.

```
C:\WAL>lanping -a=400068A61A86 -r
(C) IBM Corporation 1990

LANPING Version 0.08 - 11/22/89

LANPING: waiting on response from remote
LANPING: First response received
LANPING: Addr=400068A61A86080 Route was:
(AAA) Same segment.
LANPING: 1 response received during 10 second wait
```

*Figure 182. LANPING from a Windows Remote Workstation to the LAN Distance Connection Server*

If you can PING a LAN workstation, then the IEEE 802.2 protocol has been installed successfully.

**Note:** In some cases, the remote workstation may be correctly installed and configured with the IEEE 802.2 protocol driver, but you cannot PING a LAN-attached workstation. The reason for this may be that a customized filter is active on the connection server and the response frames coming from the LAN-attached workstation you are trying to PING are filtered out. Verify that the LAN filters on the LAN Distance Connection Server are allowing frames from the LAN-attached workstation to pass. (This scenario does not occur if you are using only the automatic filtering capability.)

Once connected to LAN Distance and Personal Communications is configured for TELNET3270, the Personal Communications session will be up when started, via LAN Distance. If not, see 5.7.1, "Communication Problems with a TELNET3270 Session" to determine the problem.

### 5.7.1 Communication Problems with a TELNET3270 Session

In case of communication problems with a TN3270 session via LAN Distance Remote for Windows, it is important to separate the possible sources of defect.

#### **Impossible to Log On to the LAN Distance Connection Server**

Refer to "Impossible to Log On to the LAN Distance Connection Server" on page 161 to identify the source of the problem.

#### **Communication Error in Personal Communications**

The following steps should help you to determine the cause:

1. Try to PING your SNA gateway IP address. If unsuccessful, then:
  - Check you can ping the SNA gateway IP address when LAN-attached. If not, start the Custom program to configure properly your TCP/IP software.



**Note:**

Custom could request more memory than available when the drivers of LAN Distance are loaded. If so reboot the workstation, press PF8 when DOS starts loading. You are then invited to answer Yes or No to execute or not each line of the CONFIG.SYS, as well as the AUTOEXEC.BAT. Do not start some drivers such as the LAN Distance ones (SERVER.EXE, POWER.EXE) in the CONFIG.SYS. Do not start NETBIND as well as DOSBIND in the AUTOEXEC.BAT. You should now have enough memory to start Custom in order to configure TCP/IP. If you have problems configuring TCP/IP on your workstation, contact your network support administrator.

- The problem could be due to the hop counts configuration on the LAN Distance Connection Server as well as on other bridges inside your network. To isolate and correct it, refer to page 163, and use the PING command to try to echo your TELNET server IP address.
  - Check your configuration files as shown in 5.5.4, "System Configuration Files" on page 175.
  - Check TCPSTART is started *before* you start Windows.
2. When you are able to ping the IP address of your TELNET server, then the problem could be related to PIU size problem.

Personal Communications uses a default PIU (Packet Information Unit) size of 265 bytes. This corresponds to the size of the SNA packets transmitted on the link. In some cases, if you increase this value you may get a COMM 682 error.

This error message means that Personal Communications cannot allocate a transmit buffer large enough to hold its packets. This happens when you configure PCOMM to use a PIU size too large for the adapter, in our case the LAN Distance COM2 MAC driver.

If you look in Figure 173 on page 176, you will see that the MaxFrame parameter in the COM2. section of the remote's PROTOCOL.INI is equal to 1080. That means that the maximum frame size this remote can handle is equal to 1080 bytes. If your Personal Communications is configured to use a PIU size of, for example, 1938, you will get this error.

To correct this problem, reduce the PIU size on the Personal Communications to a value that can be handled by the COM2 MAC driver. In our environment, it worked by using a PIU size of 1033.

**Note:** This value has to be coordinated between the Personal Communications workstation and the TELNET server or destination host system.

## 5.7.2 File Transfer Problems

Although we did not see problems with large file transfers using Personal Communications, it may happen due to the slower characteristics of the WAN link. If that happens, you may want to reduce the packet size for the file transfer.

**Reducing the File Transfer Packet Size:** In a LAN Distance environment, the communications link between the 3270 emulator and the host system appears to the upper-level protocols and applications as a LAN link. On a slow LAN Distance WAN link, large packet sizes may prevent acknowledgments from being sent back to the host system on time. If the host system's timers are set low, then the host may disconnect the session before receiving an acknowledgment from the LAN Distance Remote for Windows.

The simplest way to avoid the problem of losing sessions during file transfers is to reduce the size of the data transfer buffer. This makes Personal Communications send or receive smaller blocks of data through the WAN link and, therefore, there is less chance of an acknowledgment timeout.

There is a parameter on the SEND and RECEIVE commands that controls the size of the packets sent to or received from the host when Personal Communications is doing file transfers. It is the PKTSIZE parameter.

In an SNA environment the PKTSIZE parameter defaults to 2500 bytes whereas in a non-SNA environment the default is 7160 bytes. If you experience problems with file transfer, you may want to reduce the size of the packets exchanged with the host to reduce the likelihood of timeout errors. Specify the new value using the PKTSIZE parameter of the SEND or RECEIVE commands, as shown in Figure 183.

```
SEND C:MYFILE.EXE h:MYFILE EXE A (PKTSIZE 1000)
RECEIVE C:\MYFILE.EXE h: MYFILE EXE A (PKTSIZE 1000)
```

*Figure 183. Reducing Packet Size using VM/CMS File Transfer Commands*

The example shown above is for a VM/CMS host. If you are using a MVS/TSO host, the syntax is:

```
SEND C:MYFILE.EXE g:ds.MYFILE PKTSIZE(1000)
RECEIVE C:\MYFILE.EXE g:ds.MYFILE PKTSIZE(1000)
```

*Figure 184. Reducing Packet Size Using MVS/TSO File Transfer Commands*

**Note:** The CICS SEND and RECEIVE commands do not support packet size changing.

---

## Chapter 6. 8235 Dial Connectivity

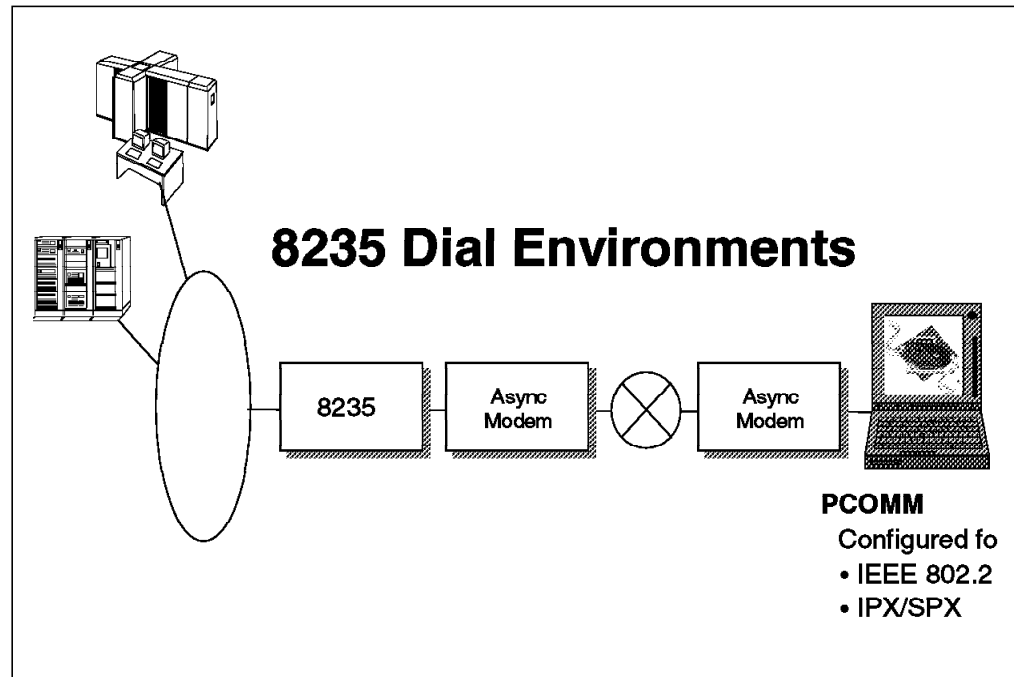


Figure 185. Personal Communications and 8235 Dial Connectivity

Like LAN Distance, 8235-based remote access is another remote node approach. As with LAN Distance, the remote workstation installs a software driver that makes the machine think it is locally attached to the LAN. This allows the remote workstation to access anything on the LAN that it would have access to if were locally attached, including multiple applications and servers. We will present in this chapter some tests for Personal Communications performed via 8235 remote attachment. Tests cases are:

- On a Windows remote workstation, 802.2 session, using a 3745 SNA gateway as well as a NetWare for SAA SNA gateway,
- On an OS/2 remote workstation IPX session, using NetWare for SAA gateway.

*An inside look at IBM Workgroup Hubs and Switches*, GG24-4158 provides additional details on 8235 installation and configuration.

*NetWare for SAA*, SG24-4527 provides additional details on NetWare for SAA server installation and configuration.

## 6.1 Configurations Overview

Below is the scheme of the tests performed:

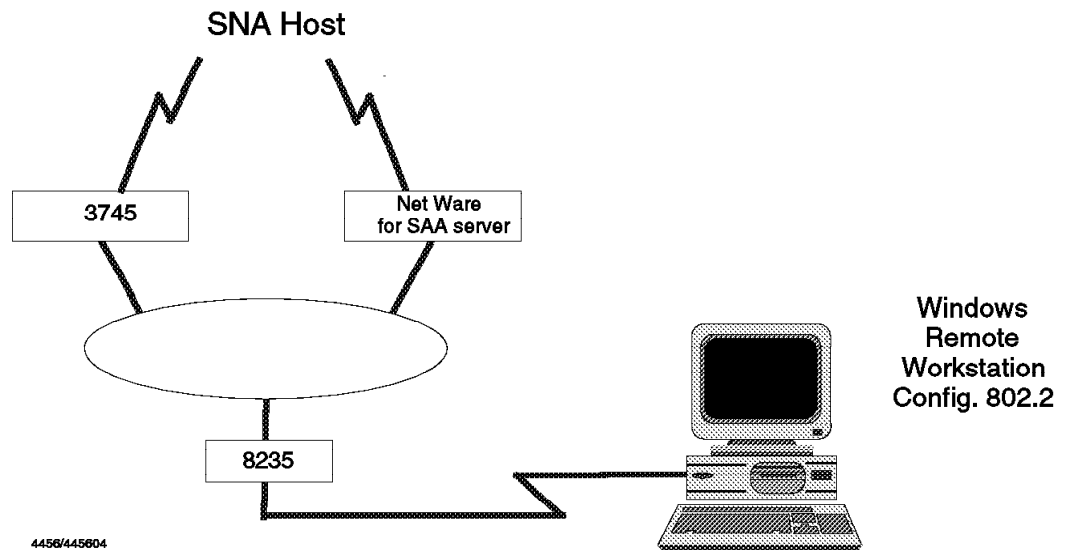


Figure 186. Test Case with Windows Mobile

Figure 186 shows that we will set up a 802.2 session under Personal Communications for Windows, and access the host via an 8235 remote access and via a 3745 SNA gateway as well as a NetWare for SAA server.

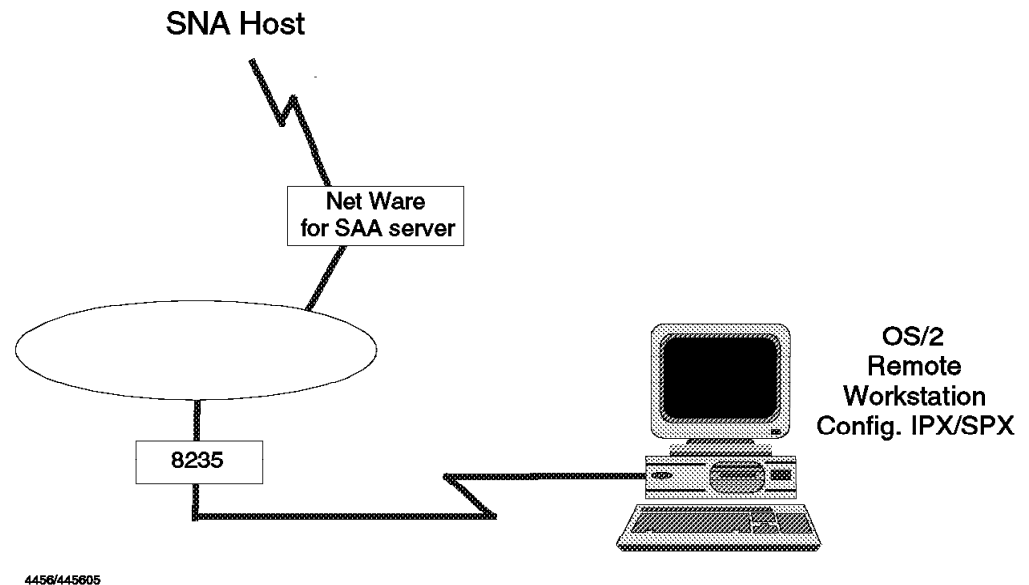


Figure 187. 8235 Test Case with OS/2 Mobile

Figure 187 shows that we will set up an IPX session under Personal Communications for OS/2, and access the host via an 8235 remote access and via a NetWare for SAA server.

---

## 6.2 8235 Installation and Configuration

The IBM 8235 Dial-In Access to LAN (DIAL) Servers for Token-Ring and Ethernet is a dedicated multiport, multiprotocol remote access hardware server.

### 6.2.1 8235 Components

The 8235 remote access system is made up of three basic components:

- The Dial-In Access to LAN Client

A software application that runs on the remote computer providing the dial in function. The DIALs Client supports DOS, Windows and OS/2.

- The 8235 Management Facility

A Windows application that allows the 8235 to be configured and managed from any LAN-attached workstation running IPX and Windows.

- The 8235

A stand-alone hardware device that attaches to either a token-ring or Ethernet LAN and the public switched telephone network. The function of the 8235 hardware and its associated software is to:

1. Provide physical attachment to the LAN and to eight modems
2. Forward data from the LAN to the remote workstations and from these workstations to the LAN, using any of the following protocols: IPX, IP, NetBEUI, AppleTalk ARA 2.0 and LLC
3. Filter and compress data so as to minimize the amount of unnecessary traffic between the LAN and the remote workstation
4. Prevent unauthorized access to the LAN

### 6.2.2 How Does It Work on the 8235 Side?

#### Management Facility

The Management Facility program is a Windows application that enables you to configure and manage the 8235 on your network, create user lists, and manage the security of your 8235. This program is provided with your 8235. The IBM 8235 Management Facility requires a workstation with Windows 3.1 or later, initially attached to the network. All 8235 models operate with the same 8235 Management Facility. You also need to load IPX on the machine running the Management Facility to communicate with the 8235.

In Figure 188 on page 188 you can see the Management Facility window.

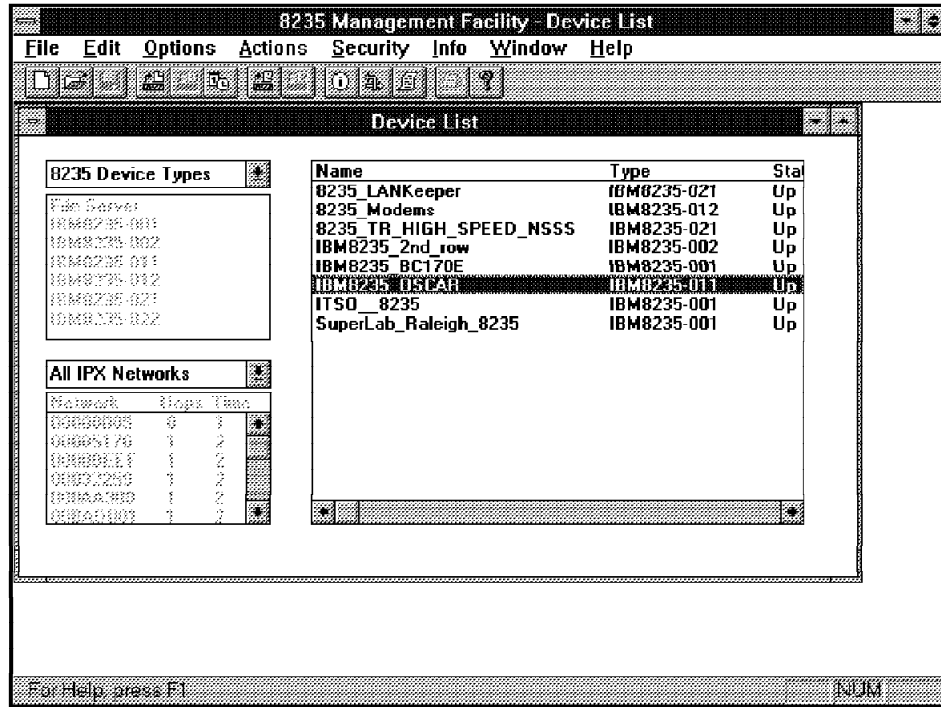


Figure 188. 8235 Management Facility Window

## 8235 Hardware

Figure 189 shows the front panel for all models of the 8235.

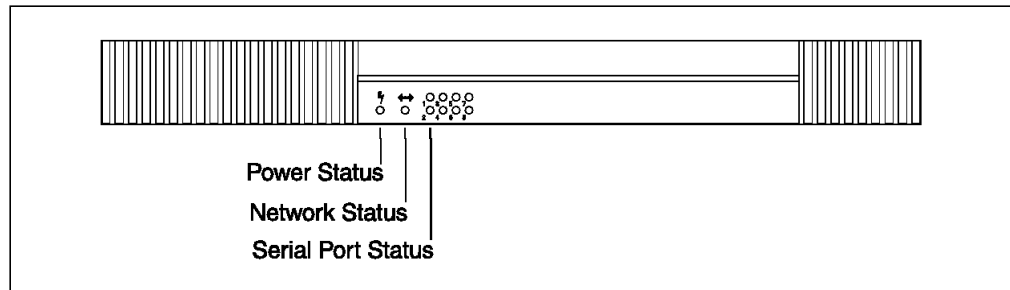


Figure 189. 8235 Front View

The front panel contains LEDs that indicate:

- Power status
- Network status
- Serial port status

## LAN Connection

8235 comes in two models:

- Model 1 contains a token-ring connection port
- Model 2 has an Ethernet connection port

We will use the token-ring attachment model. Figure 190 on page 189 shows the rear panel view.

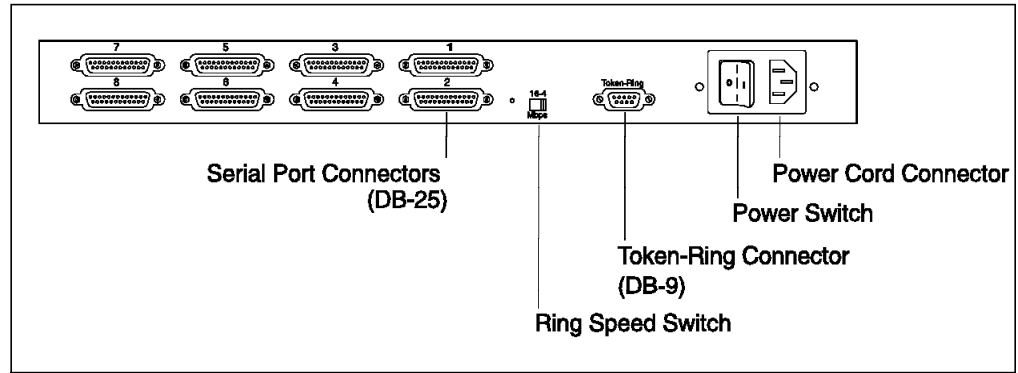


Figure 190. 8235 Model 1 Rear Panel

### Supported Protocols

The 8235 supports remote clients using any of all the following protocols:

**NetBIOS and 802.2** The 8235 software filters on LLC service access point (SAPs) and on NetBIOS names based on the filter tables contained in the server. The tables will be set up in the box, but the information can be overridden using the operating system shell. There are no external parameters available to manage filtering as there are for an IBM token-ring bridge or for LAN Distance software. LLC SAP filters allow X'02, X'04, X'05, X'08, X'E0, X'F0 and X'F4 SAP's to be bridged. These are also configurable.

Frame forwarding (that is the process of forwarding data from the client workstation to the LAN and from the LAN to the client) is accomplished differently depending on the protocol selected during the configuration of the connections.

**Bridging** The token-ring acts like an IBM token-ring bridge with NetBIOS and 802.2 protocols as shown in Figure 191.

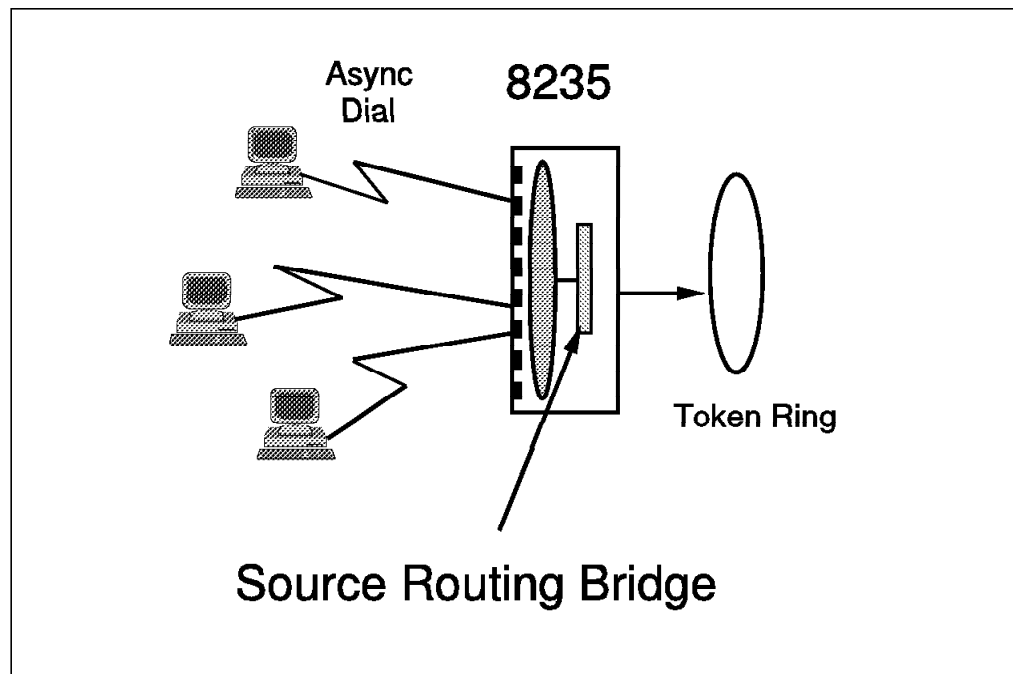


Figure 191. Source Routing Bridge

The bridged frames appear on the ring as if they came from an adapter. NetBIOS and 802.2 dial-in also support specialized filtering to protect clients from broadcast traffic on the dial-in links.

**IPX Traffic** The 8235 implements an IPX router function as defined by Novell.

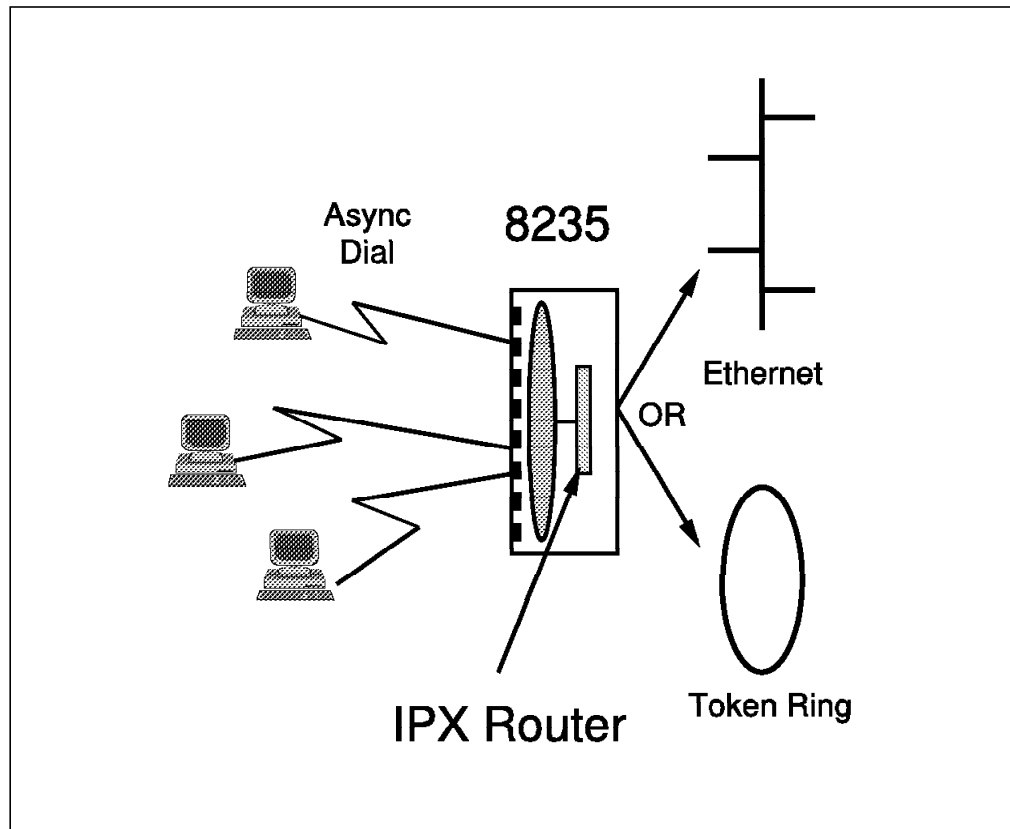


Figure 192. 8235 IPX Router

Basic IPX protocols implemented by the 8235 are:

- Internet packet exchange (IPX) providing the basic network layer transport for NetWare IPX.
- Sequenced packet exchange (SPX) for reliable byte stream protocol. This is used for NetWare diagnostics and for downloading code images over IPX.
- Routing information protocol (RIP) which provides a mechanism for IPX routers to exchange network topology information as needed to maintain routing tables. RIP uses a distance vector algorithm to calculate the best routes.
- Service advertising protocol (SAP), which provides a mechanism for end systems to locate NetWare services. The 8235 advertises its management via SAP.

The 8235 supports dial-in routing by the remote user for IPX onto the local LAN. The network number of the dial-in port can be assigned by the administrator. If the assigned number is in use on the network when a user dials in, the box can be configured to take one of three actions: use the net number anyway, use a random number, or refuse the connection.



If the dial-in client uses a non-zero node address the server will accept it. If the client uses a zero node address, the server will provide the client's address. The 8235 supports the following IPX frame types:

- Ethernet II (Ethernet)
- 802.3 (Ethernet)
- 802.2 (Ethernet)
- SNAP (Ethernet)
- SNAP (token-ring)
- 802.2 (token-ring)

## Security

The 8235 provides several security features. Passwords for both dial-in and LAN-to-LAN connections are automatically encrypted. User lists store user profiles which include user names, passwords, permissions and dial-back. If dial-back is selected in a user profile the 8235 will hang up after the dial-in or LAN-to-LAN connection is established and then call the user back at a configured (fixed dial-back) number or at a number entered by the user when the connection was established (roaming dial-back). Unauthorized access to the 8235 device configuration or user list can be prevented by assigning the 8235 an administrator password. This password is stored in the 8235 device configuration information, not in the user list.

The 8235 has a unified security architecture that allows any security server on the LAN to be used to authenticate any user regardless of the protocol being used. This allows a centralized security method to be used for all authentications. We will now detail two of the possible authentication databases:

- 8235 User List
- NetWare Bindery

The 8235 prompts separately for the user name and password for each method of authentication. Thus, more than one security method can be used simultaneously. SecurID could be used to authenticate an individual user, who then logs into a NetWare Bindery group and is granted the access privileges associated with that group. Because the user protocol does not matter, the NetWare Bindery could be used to authenticate an Apple Remote Access (ARA) Version 2.0 dial-in user.

**8235 User List:** Using the 8235 Management Facility a user list can be created, edited, and then saved to a file or loaded into the 8235. The 8235 user list stores the names, passwords, and permissions of users authorized to dial into or out of the network or to connect to another network. User lists are stored in battery-backed up RAM in the 8235. Each 8235 can have a different user list or one user list can be downloaded to multiple 8235s. The NetWare Bindery or SecurID is recommended if there are more than 500 users.

**Using the NetWare Bindery:** The NetWare Bindery is a database that resides on a NetWare server. This database contains profiles of network users that define each user's NetWare name, password, dial-back number, and the permissions to use one or more 8235 functions such as dial-in, dial-out or LAN-to-LAN.

When bindery authentication is enabled, it replaces the 8235 user list authentication.

With bindery security enabled the bindery services utility can be used to create bindery groups for dial-in, dial-out, and LAN-to-LAN users. The group names are 8235\_DIALIN, 8235\_DIALOUT, and 8235\_LAN-to-LAN. The bindery dial-in user groups are used when a user dials into the network using a NetWare name and password. The 8235 logs into the NetWare server with this user name and password and then logs out. If the 8235 logon to the server was successful, the 8235 allows the user to access the network through the 8235.

### **The Activity Logger**

The activity logger runs under Microsoft Windows and DOS. It provides information about 8235s and their dial-in activity on the network.

The logger carries out the following tasks:

- It records the dial-in activity of the 8235 on the network.
- It notifies the network administrator of 8235 activity according to a set of priorities and classes selected by the administrator.

The 8235 logs its activity to another station using a mechanism of SNMP called a trap. Each time the 8235 logs an event, it sends a trap message to its trap host.

The trap host can be one of the following:

- A workstation running the 8235 Activity Logger
- An IP host with an SNMP manager

There can only be one trap host associated with an 8235 at any given time. This trap host is configured in the 8235 Management Facility on the SNMP configuration window. There are two host types to choose from; None and IP.

If you select IP, then you can also specify the IP address of the trap host. This IP host must be an SNMP manager and have some facility for displaying SNMP trap messages if it is to be used as the activity logger. For example, this could be a NetView for AIX management station.

If you select None, then the trap host address cannot be specified via the 8235 Management Facility. Instead, once the 8235 activity logger (which runs on top of IPX) selects an 8235 as a device to be logged to that workstation, the selected 8235 sends all of its trap messages to that workstation. If an 8235 is selected on one activity logger workstation while another activity logger workstation is the current trap host, the new workstation becomes the new trap host. This provides flexibility in case a trap host goes down because it is easy to switch over to a backup host.

## **6.2.3 Configuration**

The 8235 can be configured using any of the following methods:

- The Command Shell
- Using BOOTP Server
- The Management Facility

## The Command Shell

The 8235 has a built-in command shell. You can use this command shell to configure, monitor, and perform actions on other devices. The shell can be disabled in the 8235's configuration by using the Management Facility or the BOOTP configuration file. It is possible to set all the parameters in the box via the operating system shell, which is accessible through any of the serial ports via an RS-232 terminal (or dial-up). This interface is not recommended for the user, but is useful in remote debug of problems and in cases where the device must be preconfigured before it is attached to the LAN. The shell is also accessible through TELNET if the 8235 has been configured to support TCP/IP.

For more information on this topic refer to *8235 Dial-In Access to LAN Servers for Token Ring and Ethernet Administrator's Guide*, SC30-3629.

## Using BOOTP Server

You are able to boot and configure the 8235 from a boot protocol (BOOTP) server on the IP network. A BOOTP server is typically a UNIX host running the BOOTP server and the trivial file transfer protocol (TFTP) server. Management Facility diskette 3 contains the image files needed to boot the 8235 using BOOTP. For more information on this topic refer to *8253 Dial-In Access to LAN Servers for Token Ring and Ethernet Administrator's Guide*, SC30-3629.

## Configuring with the Management Facility

The Management Facility is an application that helps you to configure the 8235. Here is a brief description of the installation procedure of the Management Facility.

The 8235 uses the IPX protocol to communicate with the Management Facility. IPX is an easily available protocol because all of the non-adapter-specific files that you need ship with Windows 3.1. The use of IPX for communications does not mean that it is necessary to have NetWare running anywhere in the network.

There are four steps to setting up a workstation and Management Facility to communicate with 8235s:

1. Install the ODI device driver.

This is an adapter-specific device driver that allows IPX protocols to run on an adapter. It usually ships with the LAN adapter. If you do not have an ODI device driver with your LAN adapter, contact the adapter manufacturer for assistance.

2. Set up a batch file to invoke the necessary IPX files. The order in which they should be invoked is:
  - a. NetWare link support layer (LSL)
  - b. TOKEN (TOKEN is the ODI device driver for the IBM Token-Ring 16/4 adapters; you will use the one appropriate for your adapter)
  - c. IPXODI

These drivers are included in the NWCLIENT subdirectory of MF diskette 2 and they need to be manually copied to the hard drive.

3. Configure Windows to support IPX.

To do this from the Main panel, select **Windows Setup**, and then select **Options, Change System Settings**. Under the Network option, select **Novell NetWare (shell versions 3.2 and above)**. Then, select **OK** and close the window. The first time you log on to Windows, it may give you an error message saying that the NetWare shell was not loaded (which means that you are running IPX but not using the NetWare shell). You can check the box that disables that warning.

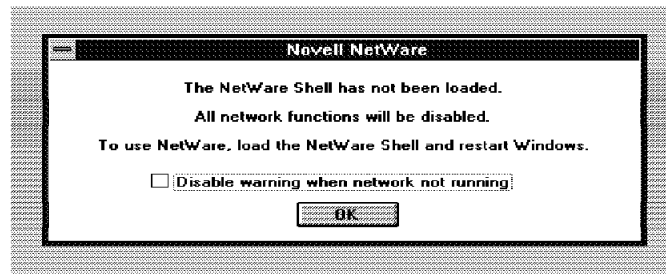


Figure 193. Error Message When You Start Windows

4. Install the Management Facility code using the automated installation facility. To install the Management Facility you just need to run the SETUP.EXE program from Windows. This program is contained on one of the diskettes shipped with the 8235.

**Note:**

When the 8235 comes up for the first time and has not been configured with a NetWare network number, it will attempt to derive the network number by looking at the IPX traffic on the network. It is highly recommended that you configure the correct network number as soon as possible to prevent the 8235 from picking up an ambiguous network number. If the 8235 cannot determine a network number, it will pick one at random.

If you have followed these steps for installation and the Management Facility cannot see the 8235, it may be picking up a wrong network number from the network. You may need to isolate the 8235 on its own segment or ring (the same segment or ring with the Management Facility) in order to configure the network number.

The configuration of the 8235 is accomplished via several windows within the IBM 8235 Management Facility.

In Figure 194 on page 195 you can see the options available to configure the 8235.

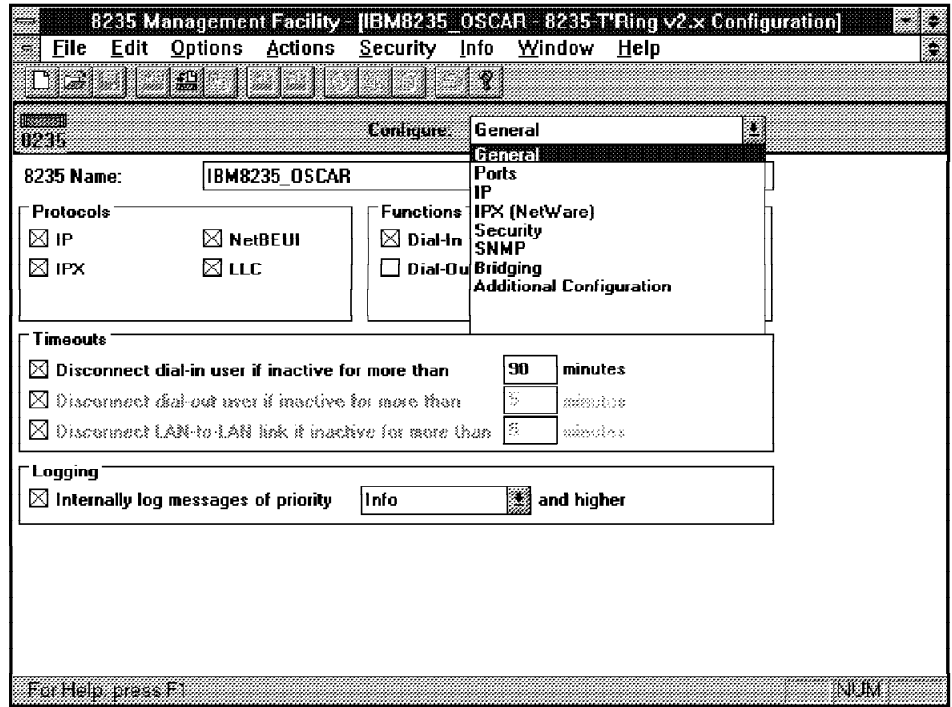


Figure 194. 8235 Management Facility Option Windows

Here is a list of the available configuration windows of the Management Facility and some of the parameters that you may want to change:

**General**

- Defines a device name of up to 48 characters for the 8235
- Selects the protocols to be supported by the IBM 8235
- Sets the amount of time a connection will be maintained without any activity over the line
- Selects the priority of each logging item

**Note:**

If you disable the IPX protocol on this screen, you will no longer be able to configure the 8235 using the Management Facility.

**Ports**

- For each of the eight ports you can define the port name, IP address (if applicable) and modem type.

## ***IP***

- Sets the IP address of the IBM 8235
- Sets IP Network Mask
- Sets IP Broadcast Address
- Sets the IP address of the default router (optional)
- Sets the IP address of the name server (optional)
- Sets the IP address of the time server (optional)
- Specifies whether or not the IBM 8235 is to retrieve its image and configuration files from a BOOTP server

## ***NetWare***

- Specify the framing types used on the network. The IBM 8235 can be instructed to default to the first framing type it detects.
- Establishes the default network number.
- Enables bi-directional Novell NetBIOS.
- Enables Bindery security.

## ***SNMP***

- Sets the name and location of the administrator in the contact field
- Sets trap host type address
- Sets trusted host type and address
- Sets the community name table

## ***Source Route Bridging***

- Sets the three-digit attached ring number
- Sets the three-digit internal number

After doing some changes on these windows, you have the option to save the configuration to a file, but if you exit the configuration window without saving the information you just entered, the Management Facility will ask you if you want these changes to be made on the 8235. If you select **OK**, this configuration will be saved to your 8235.

Now you only need to add one user list to the 8235, which is used to give access to the LAN through the 8235 only to defined users.

## **6.2.4 Management**

The 8235 can be managed or configured in three ways:

### 1. Operating System Shell (Out-of-Band)

It is possible to set all parameters in the 8235 via the operating system shell, which is accessible through any of the serial ports via an RS232 terminal (or dial-up).

You can also get statistics reports and perform problem determination using this interface.

### 2. 8235 Management Facility

This is a DOS/Windows V3.1 based program that allows the user to configure and manage the 8235 from any locally or remotely LAN-attached workstation. This facility also allows you to log 8235 activities and errors in a log file.

### 3. SNMP Management (In-Band)

Using a combination of standard SNMP flows and BOOTP, all of the configuration and management of the device can be accomplished.

Using management applications such as NetView for AIX and NetView for Windows, you can manage the 8235 in a graphical environment.

**NetView for AIX:** NetView for AIX allows you to:

- Browse the 8235 MIB
- Receive traps from the 8235
- Issue GETS and SETS (Read or set the 8235 configuration)

In Figure 195 you can see one Browse MIB window of NetView for AIX.

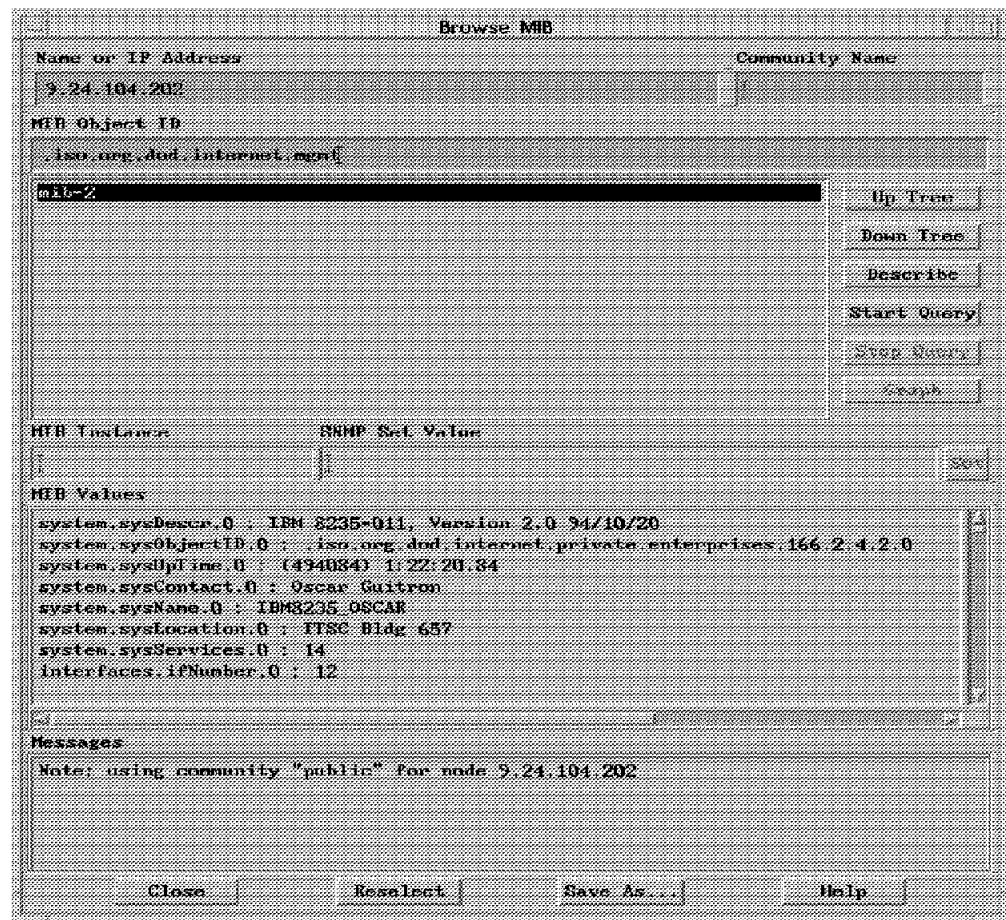


Figure 195. Sample 8235 MIB Browsing Using NetView for AIX

**NetView for Windows:** NetView for Windows is another SNMP management platform. It allows you to:

- Browse the 8235 MIB
- Receive traps from the 8235
- Issue GETS and SETS

---

## 6.3 Remote Personal Communications 802.2 Session via Dial-In Client Windows

See Figure 186 on page 186 for details on the configuration that is described here.

You do not need to install NetWare Client on your windows workstation to access a NetWare for SAA server, because you can access a NetWare for SAA server without using IPX /SPX definition. We will do here an 802.2 attachment to a NetWare for SAA server, via the 8235 link.

For more details on the installation and configuration of the remote Dial-In Client, refer to *Dial-In Access to LAN Clients for OS/2 DOS and Windows User's Guide*, GA27-4019.

### 6.3.1 Windows Dial-In Client Installation

Before you install Dial-In Client on your remote workstation, be sure your Personal Communications 802.2 session is running in LAN-attached mode. Then make a copy of the following files:

CONFIG.SYS  
AUTOEXEC.BAT  
PROTOCOL.INI

Use the .LAN extension for example. This will be useful later for switching between LAN attached and remote mode on your workstation (see 6.3.5, "Switching between 8235 and LAN-Attached Mode on Windows" on page 202 for more information).

To install the Dial-In Client product for Windows, do the following steps:

1. Insert the Dials Client diskette in the diskette drive
2. Open Windows Program Manager. On the command line of the File/Run dialog box, type the following `a:\setup.exe`. The Client setup box appears. Select **OK** to continue. The Setup program prompts you for the location to install the files. We recommend that you use the default (`C:\DIALS`).

You are asked for the COM port and the modem to be used. For the test, we used an IBM MC217 PCMCIA modem, located on the COM2 port .

### 6.3.2 Configuring the Drivers for Windows

You can manually update the PROTOCOL.INI and CONFIG.SYS files to match the driver's definition needed on the Windows remote workstation, but we recommend that you do it via the LAN Support Program (LSP) Automatic Installation Utility (DXMAID).

Insert the LSP diskette in the diskette drive and type `DXMAID`.

Select **YES** for the message "Do you have an adapter option diskette?"

When you are prompted for the location of the adapter configuration files, type the name of the installation directory for Dial-In Client (might be `C:\DIALS`).

Select **OK** to complete the installation and configuration of the drivers.



In the Adapter Driver section of the Configuration panel, press F6 for a list of the adapter drivers. Select the DIALS Client driver for NDIS (dialndis.exe).

In order to configure the DIALS driver, highlight it and press F5; you can then fill in the Network Adapter Address:

```
[DIALS_NIF]
  DRIVENAME=SDIALIN$
  NETADDRESS="400011111111"
```

DXMAID could have taken these from your previous configuration (for LAN attachment). If so, you can leave it as is. Otherwise, you need to obtain a valid LAA from your network administrator.

In the Protocol Drivers section, press F6 for a list of the protocol drivers. Select the

1. IBM DOS NetBIOS (DXMT0MOD.SYS),
2. IBM DOS IEE 802.2 Protocol for NDIS (DXME0MOD.SYS).

The installation and configuration are now completed.

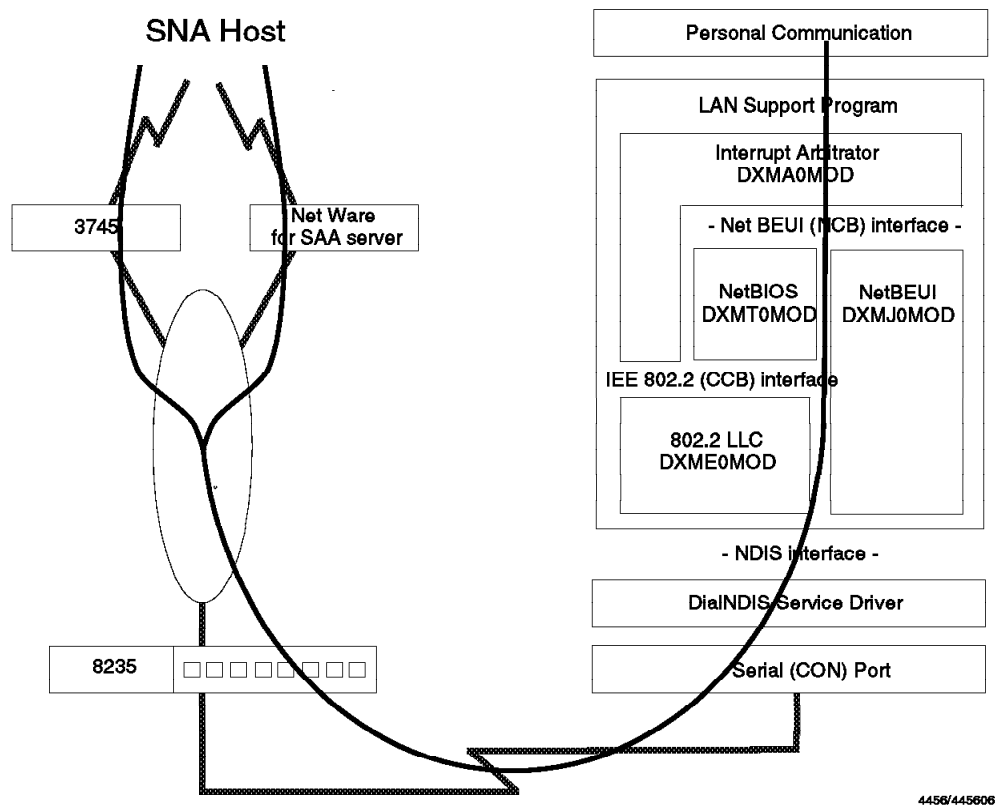


Figure 196. Protocols Layers to Use 802.2 via 8235 in a DOS Mobile

Check your CONFIG.SYS, PROTOCOL.INI and AUTOEXEC.BAT files against those in Figure 197 on page 200, Figure 198 on page 200, and Figure 199 on page 200.

```

FILES=50
BUFFERS=40
device=C:\DOS7\HIMEM.SYS
dos=high
DEVICE=C:\THINKPAD\IBMDSS01.SYS /D
DEVICE=C:\THINKPAD\IBMDOSCS.SYS
DEVICE=C:\THINKPAD\DICRMU01.SYS /MA=C800-CFFF /SH=1
DEVICE=C:\THINKPAD\ICPMDOS.SYS
REM DEVICE=C:\DOS7\SETVER.EXE
REM DEVICE=C:\DOS7\POWER.EXE
DEVICE=C:\THINKPAD\AUTODRV.SYS C:\THINKPAD\AUTODRV.INI
DEVICE=C:\THINKPAD\DISKDRV.SYS
STACKS=9,256
DEVICE=C:\DOS7\ANSI.SYS
DEVICE=\LSP\PROTMAN.DOS /I:\LSP
DEVICE=\LSP\DIALNDIS.EXE
DEVICE=\LSP\DXMAOMOD.SYS 001
DEVICE=\LSP\DXMEOMOD.SYS
DEVICE=\LSP\DXMTOMOD.SYS ES=1 EST=1 O=N CF=Y T1=10 T2=10 TI=10

```

Figure 197. CONFIG.SYS File

```

[PROTMAN_MOD]
    DriverName = PROTMAN$
[DXMAIDXCFG]
    DXMEO_MOD = DXMEO.NIF
    DIALS_MOD = DIALS.NIF
    DIALS2_MOD = DIALS.NIF
    IBMXLN_MOD = IBMXLN.NIF
    IBMXLN2_MOD = IBMXLN.NIF
[DXMEO_MOD]
    DriverName = DXMEO$
    Bindings = DIALS_MOD
[DIALS_MOD]
    DriverName = SDIALIN$
    NETADDRESS = "400011111111"

```

Figure 198. PROTOCOL.INI File

```

\LSP\NETBIND
SET ETC=D:\TCPDOS\ETC
C:\WINDOWS\SMARTDRV.EXE
ãECHO OFF
SET PATH=C:\WINDOWS;C:\DOS7;D:\TCPDOS\BIN;C:\DIALS
SET DIALS=C:\DIALS
SET TEMP=C:\DOS7
C:\DOS7\MOUSE.COM
C:\DOS7\DOSKEY.COM

```

Figure 199. AUTOEXEC.BAT File

### 6.3.3 Personal Communications via 8235

Once your workstation is connected to the 8235 you are able to start an 802.2 session under Personal Communications. You can configure your 802.2 session to point to the 3745 SNA gateway (specifying its MAC address in the Destination Address field of the configuration screen) as well as to point to a NetWare for SAA gateway (you just fill in the MAC address of this server in the Destination Address field of the configuration screen).

Previously, you needed to access to the NetWare for SAA server at least to authorize the MAC address of your workstation in the configuration of the NetWare server.

To know how to configure the NetWare for SAA server, refer to 6.4.1, "Configuration in VTAM and in the NetWare for SAA Server" on page 203.

Connect to the 8235 by clicking on the **Connection program** in the DIALS group under Windows. Configure the call, following the example shown in Figure 200.

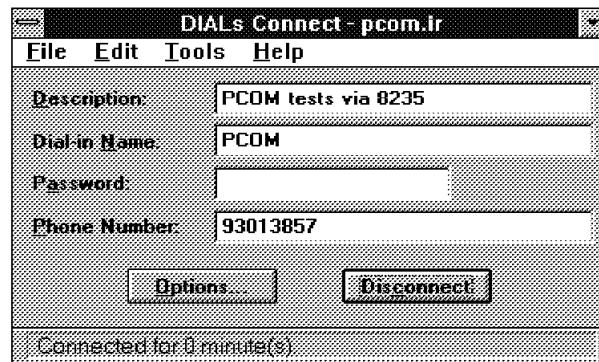


Figure 200. 8235 Connection Window

Click on the **Options** button. Select **Netbeui/LLC protocol**. Deselect IP as well as IPX, because we will only use 802.2 link over the 8235 connection.

To save this information, on menu bar select **File**, then **Save as...**, and give a name to your configuration. Thus next time you only have to select **File**, then **Open**, and then the name of your configuration.

Click on the **Connect** button. The modem starts to dial.

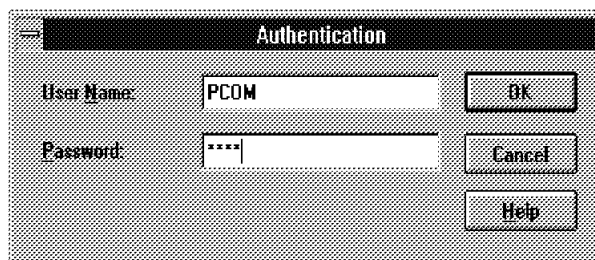


Figure 201. 8235 Connection Signon Window

You are prompted for the password. See the panel shown in Figure 201. When you are connected, you can see the elapsed time written at the bottom of your Connection window. Minimize the DIALS window and start your 802.2 session. If the session doesn't work, refer to 6.3.4, "Resolving Problems in a 802.2 Session via the 8235" on page 202.

### 6.3.4 Resolving Problems in a 802.2 Session via the 8235

When you have a LAN via IEEE 802.2 attachment via the 8235 you can fix possible problems doing the following:

Do not use asynchronous communications setup in Personal Communications, be sure your 802.2 session is configured as if you planned to use it in LAN-attached mode.

If you are using a low-speed modem (9.6 kbps), add

**DS=1024 R=1024 MO=1 MI=1**

to the DXMT0MOD.SYS parameter line in the CONFIG.SYS file.

If the problem remains, retry with a Workspace to 16 for LLC by adding:

**,16**

to the DXME0MOD.SYS parameter line in CONFIG.SYS. The line looks as follows:

DEVICE=\LSP\DXME0MOD.SYS ,16

If you are in trouble using the NetWare for SAA server, check in your Personal Communications 802.2 configuration that the SAP is the same as the one that is defined on your NetWare for SAA server, and check also the LU (LOCADDR). Check that the screen size has the same value on your workstation and on the NetWare for SAA server (for example 24x80).

Check, too, the right MAC address of your remote workstation has been authorized on the server. Refer to 6.4.1, "Configuration in VTAM and in the NetWare for SAA Server" on page 203 for more details. Look at the server console if the MAC address of your remote workstation is connected or not. If yes, then the problem is related to the link between the NetWare for SAA server and your SNA network. Refer then to 6.4.1, "Configuration in VTAM and in the NetWare for SAA Server" on page 203.

### 6.3.5 Switching between 8235 and LAN-Attached Mode on Windows

The workstation should be used in LAN-attached mode in the office as well as in remote mode via 8235. The following system files need to be changed in order to switch from one mode to the other:

CONFIG.SYS

PROTOCOL.INI

AUTOEXEC.BAT

As you saved those files with extension .LAN prior to installing the 8235 Dial-In Client software on your workstation, we suggest you write a simple batch file to manage the copy of those .LAN files and the .REM ones (REM for remote). Then reboot to be able to work in either LAN-attached or remote configuration.

## 6.4 Remote Personal Communications IPX/SPX session via Dial-In Client OS/2

We do not reproduce here the steps for installing and configuring a NetWare Server 4.1, and the steps for installing NetWare for SAA server.

See Figure 187 on page 186 for an overview of the configuration that is described here.

Please refer to the ITSO document: *Managing NetWare Environments from MVS using NPM, MSM-NetWare and MSM-LMU*, SG24-4527 for more information.

### 6.4.1 Configuration in VTAM and in the NetWare for SAA Server

#### Overview of the Configuration

In order to understand what has to be configured in the server as well as in VTAM and in the client workstation, please refer to the scheme presented in Figure 202.

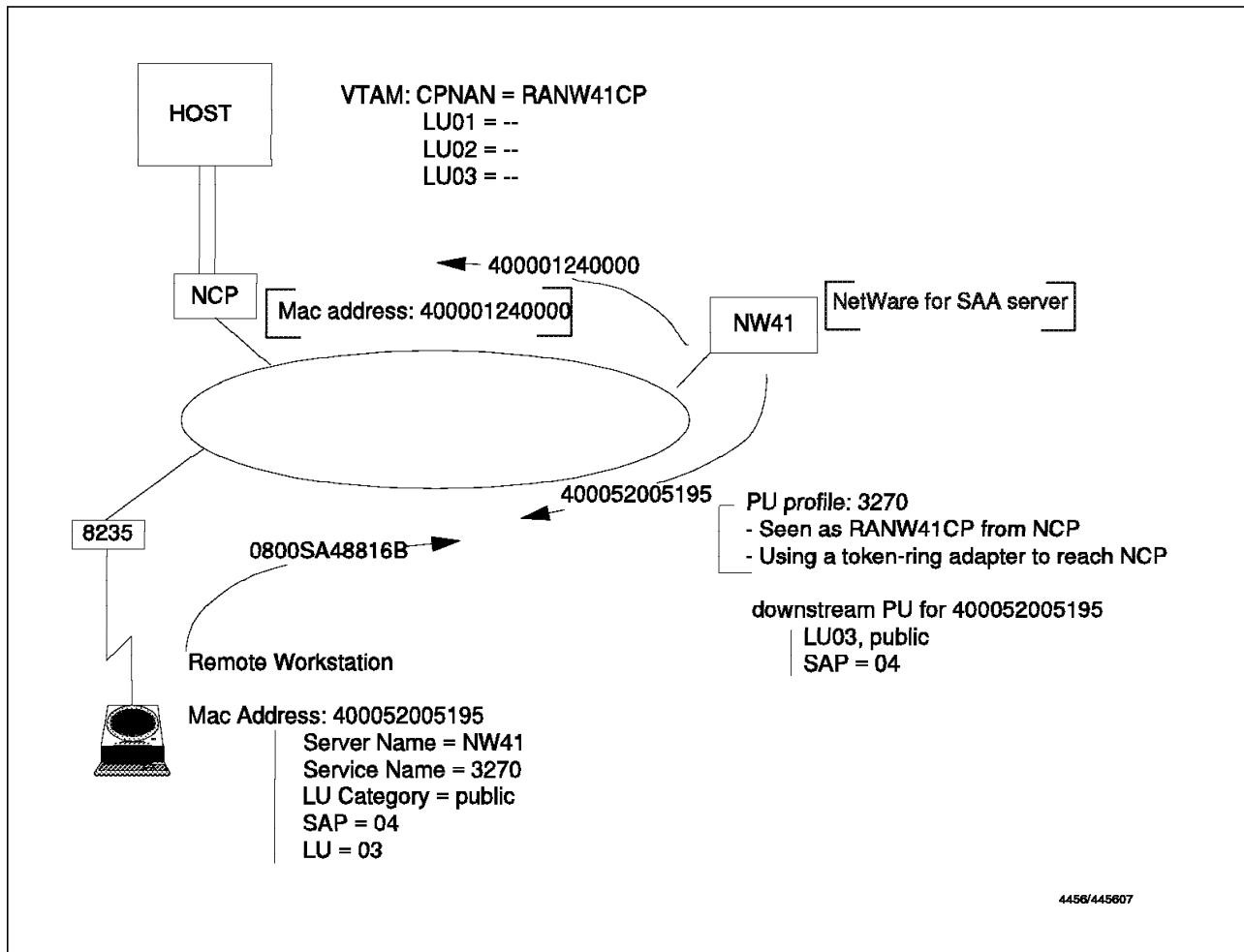


Figure 202. Configuring NetWare for SAA Access - Overview

## Major Node Definition

Your NetWare for SAA server needs to be defined as a major node in VTAM. To do so add the following member to the SYS1.VTAMLST file on the MVS system running VTAM:

```
*****
*
*          VTAM SWITCHED MAJOR NODE FOR NW41 NETWARE SERVER          *
*
*****
          VBUILD MAXGRP=4,                                         X
                MAXNO=4,                                         X
                TYPE=SWNET
*
RANW41  PU  ADDR=C1,                                             X
          CPNAME=RANW41CP,                                       X
          IDBLK=017,                                             X
          IDNUM=05102,                                           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
*
RANW4102 LU  LOCADDR=2
RANW4103 LU  LOCADDR=3
RANW4104 LU  LOCADDR=4
RANW4105 LU  LOCADDR=5
RANW4106 LU  LOCADDR=6
RANW4107 LU  LOCADDR=7
RANW4108 LU  LOCADDR=8
```

Figure 203. VTAM Major Node Definition

## NetWare for SAA Communications Configuration

Once your NetWare server is installed and running, and your NetWare for SAA software is installed you can perform the configuration of the communications. The following steps show how to configure the Data Link Adapter, the host profile, the downstream PU for your client workstation, and the associate LUs. We will also discuss how to check that the configuration is correct, and how to automatically start the host profile that we will create when the NetWare for SAA server is started.

1. On a NetWare client workstation, log on to your NetWare for SAA server with an administrator user ID. Then attach the SYS volume of the server to (for example) the G: drive.

2. Start a DOS session. If you experience some trouble starting a DOS session check your LASTDRIVE parameter in the DOS settings of your DOS window session (the LASTDRIVE must be set to the last drive physically installed on your workstation).
3. Type G:\SYSTEM\CSCON as the directory, and execute the CSCON.EXE program. This program is the configuration program of NetWare for SAA.
4. A panel appears, as shown in Figure 204.

**Note:** During all the configuration, the following keys are used:

Esc to quit a panel; if some changes were made in the panel you are then prompted whether to save those changes

Enter to open a panel or make a choice

Insert to create an item

Space bar to open a list of the possible choices

F1 to access a useful online help for the field from which you issue the F1 key



Figure 204. Configuring NetWare for SAA - Main Menu

Select **Configure Communication Services**, and choose **NetWare for SAA** in the window that appears. A panel is then displayed as shown in Figure 205 on page 206.

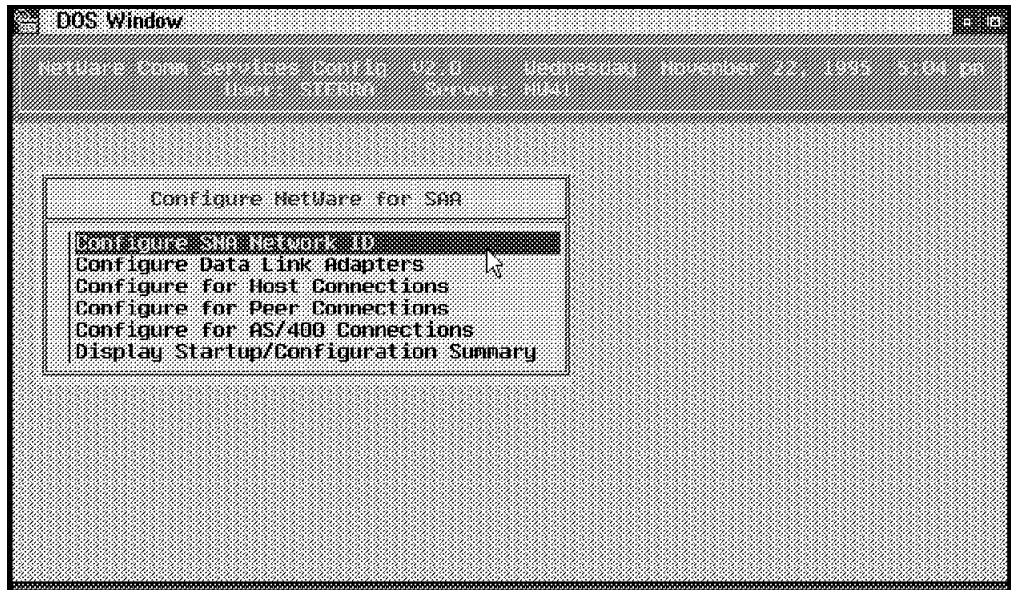


Figure 205. Configuring Communications for NetWare for SAA - Main Menu

5. Select **Configure SNA NetWork ID** and fill in the prompted field with your NetWork ID, as shown in Figure 206.

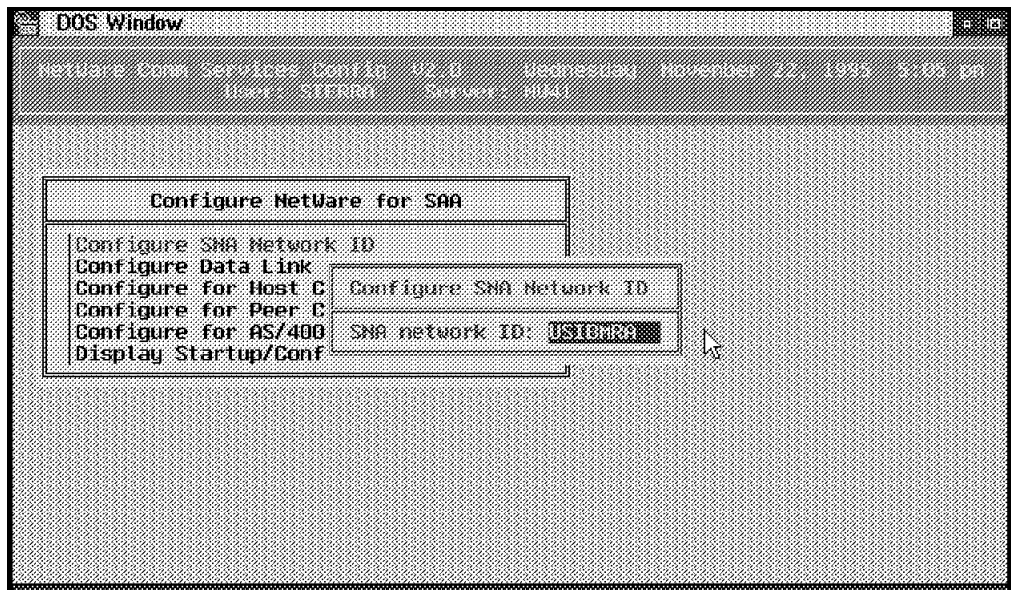


Figure 206. Configuring SNA NetWork ID

6. Quit the panel (press Esc). Once you are back to the panel as shown in Figure 205, select **Configure Data Link Adapters**. A panel then appears as shown in Figure 207 on page 207. You will see lines if you have already created some adapters.



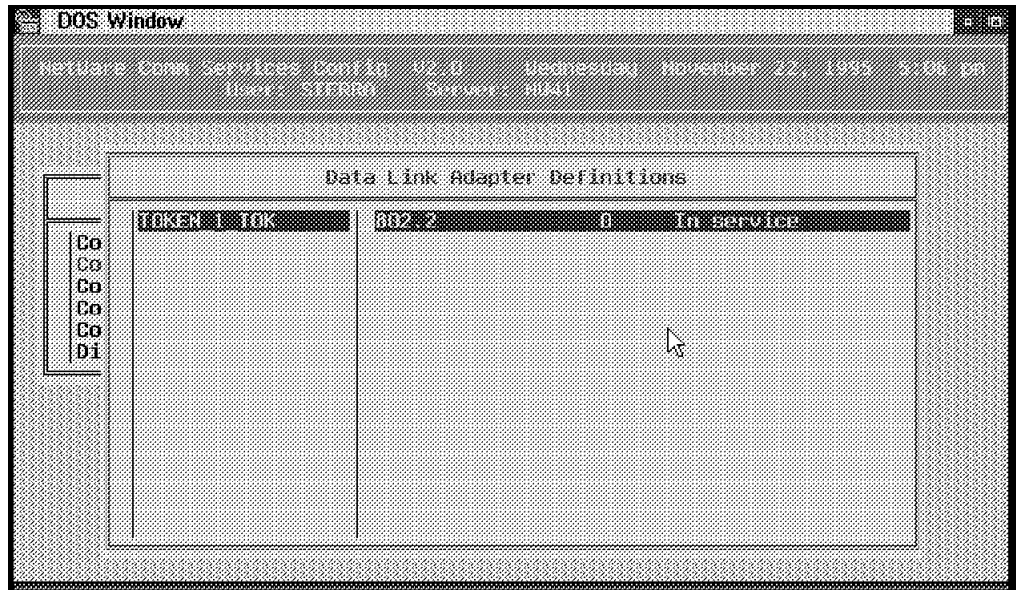


Figure 207. Configuring Data Link Adapters - List of Adapters

To create an Adapter press Insert. You are then prompted with the name to associate to this new adapter and then a panel appears as shown in Figure 208. You have to fill in this panel.

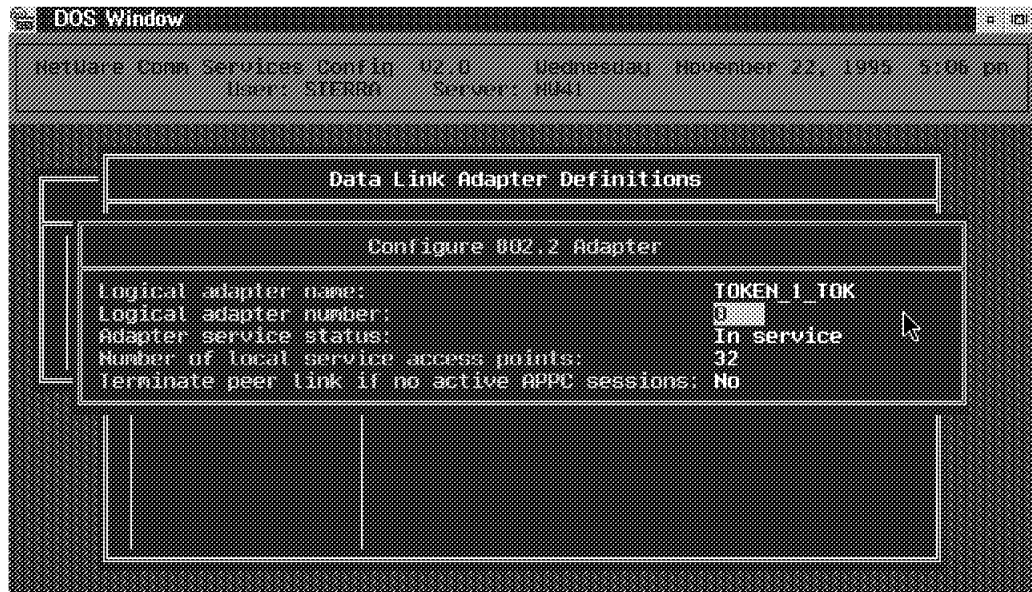


Figure 208. Configuring Data Link Adapters - Parameters

Go back to the Main panel as shown in Figure 205 on page 206, then select **Configure for Host Connections**.

7. A menu-based panel appears, as shown in Figure 209 on page 208.

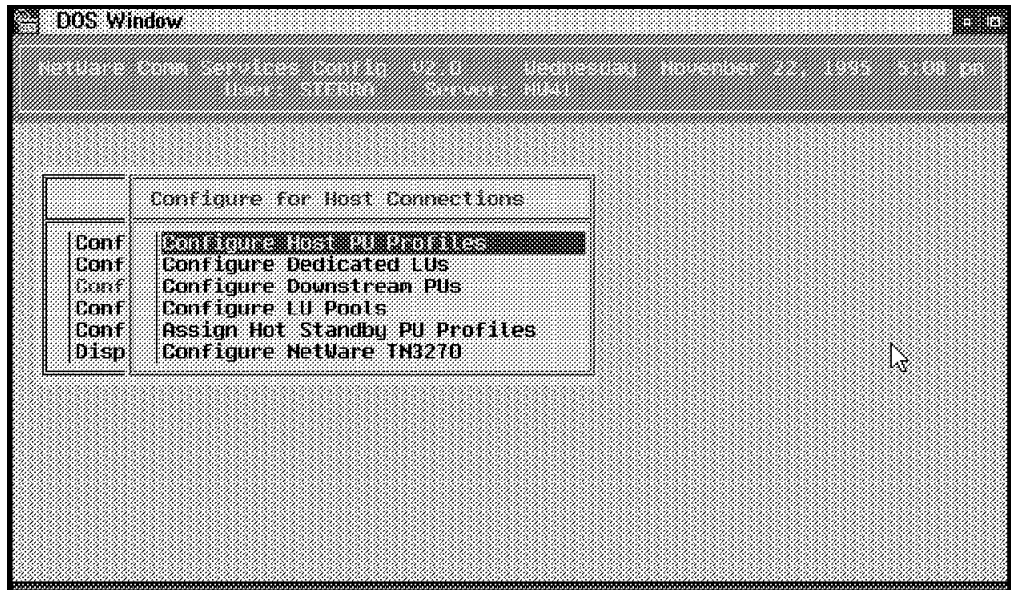


Figure 209. Configuring Host Connections - Main Menu

Select **Configure Host PU Profiles** from this menu. A window appears, showing some eventually already existing profiles (see Figure 210).

8. Press Insert to create a new one; you are then prompted for the name of this new profile (we will name it 3270).

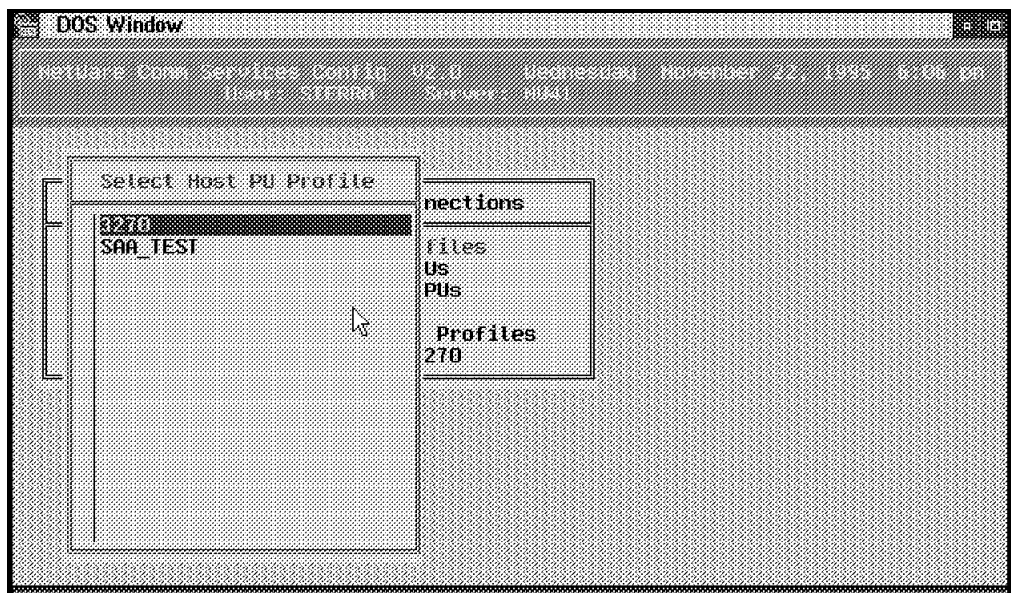


Figure 210. Configuring Host Connections - Creating a New Profile

9. Once you have typed in the name and pressed Enter, a panel is displayed as shown in Figure 211 on page 209.

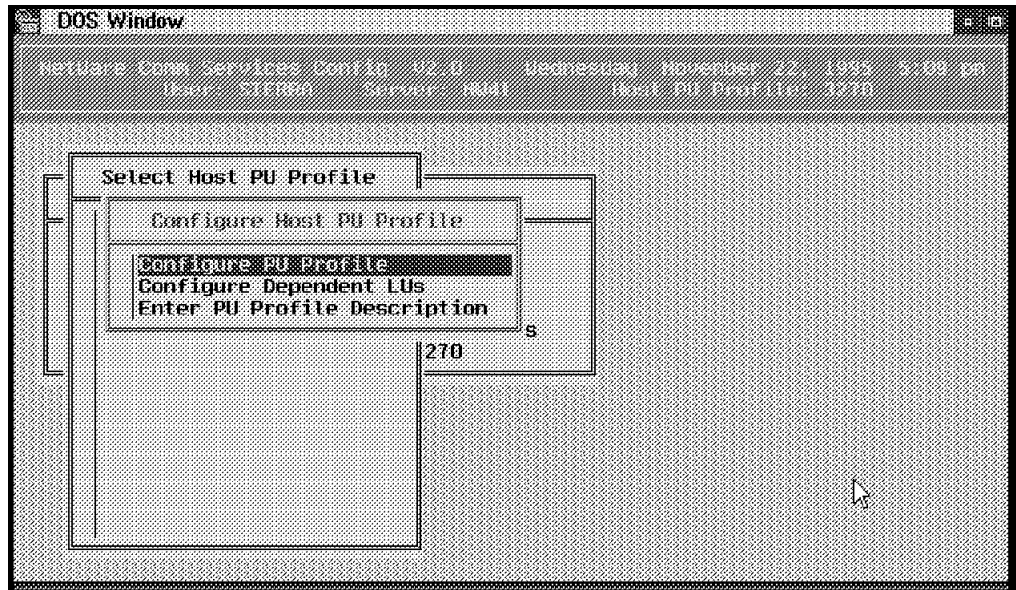


Figure 211. Configuring Host Connections - Creating a New Profile

10. Click on **Configure PU Profile**, and a panel appears as shown in Figure 212.

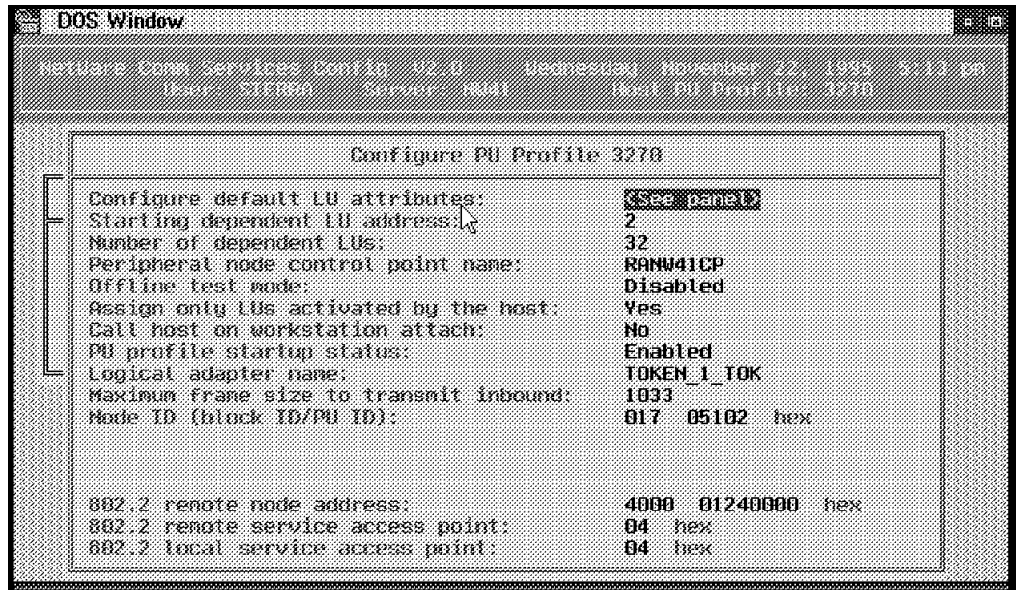


Figure 212. Configuring Host Connections - PU Profile

Configure the default LU attributes as Public, pressing Enter while the **<See panel>** line is highlighted. A panel then appears. Fill in the values as shown in Figure 213 on page 210.

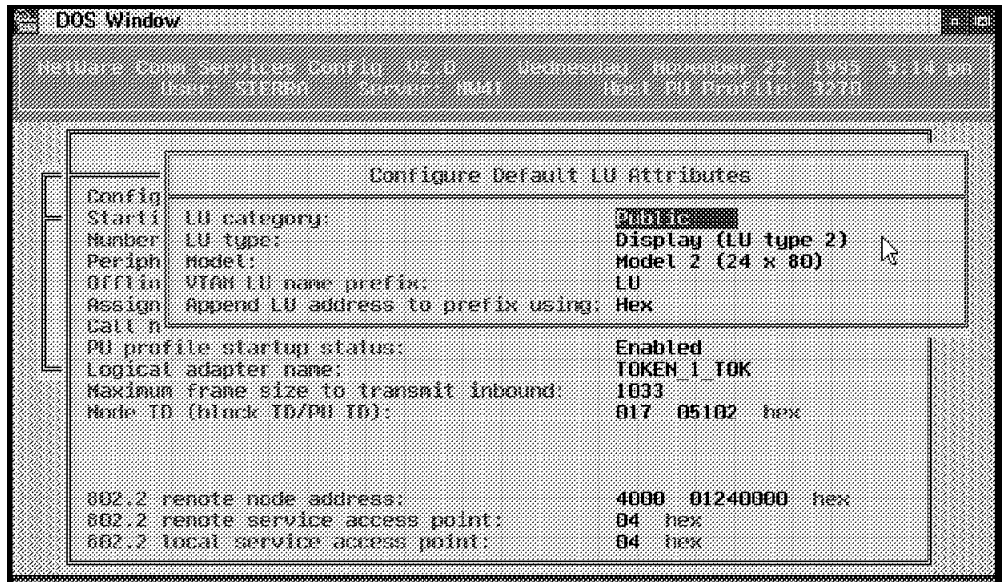


Figure 213. Configuring Host Connections - PU Profile Parameters

Note that the Peripheral node control point name is RANW41CP for our server; this is the name NCP uses for our server. It is the name defining our NetWare for SAA server as a major node in VTAM (see the VTAM list in Figure 203 on page 204).

Note too that 4000 1240000, the 802.2 Remote node address, is the address of the NCP.

11. Press Esc to go back to the panel shown in Figure 211 on page 209. Then select **Enter PU Profile Description**.
12. A panel appears as shown in Figure 214. Fill in some textual information related to your server.

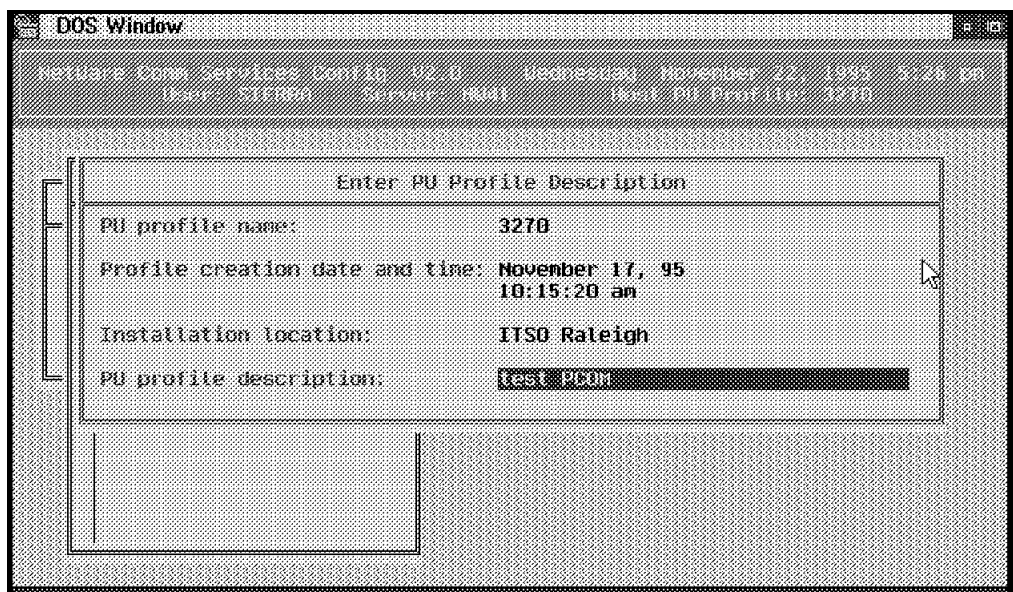


Figure 214. Configuring Host Connections - PU Profile Description

Press Esc to leave this panel and go back to the panel shown in Figure 209 on page 208.

Select **Configure Downstream PUs**. The panel shown in Figure 215 appears if you have already defined PUs. Then press Insert to add a new PU. You are asked to type the name of this new PU.

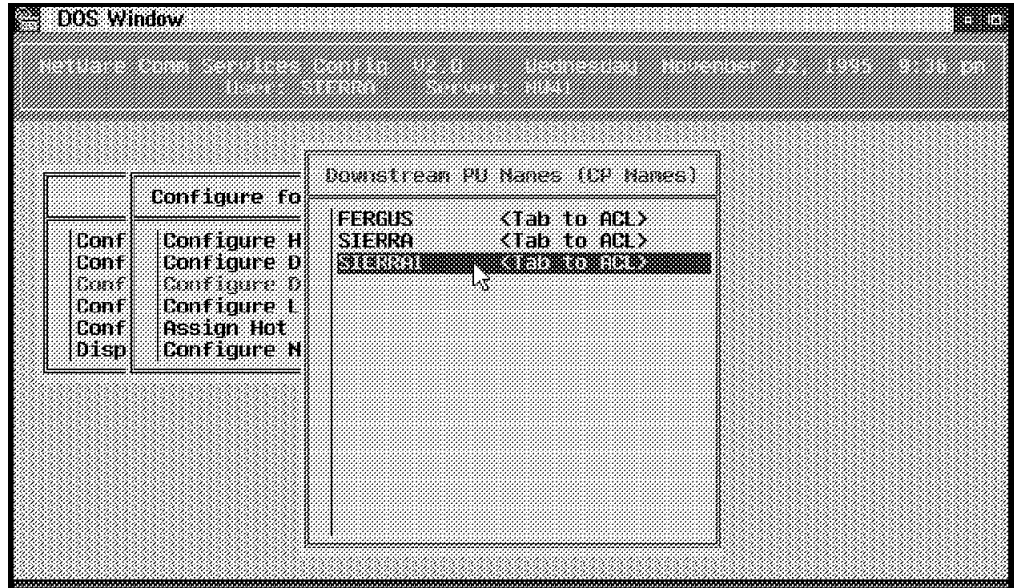


Figure 215. Configuring Downstream PUs - Create a New PU

13. Type the name of the PU and press Enter. The panel shown in Figure 216 appears. You have to fill in this panel with the information related to the PU you want to create.

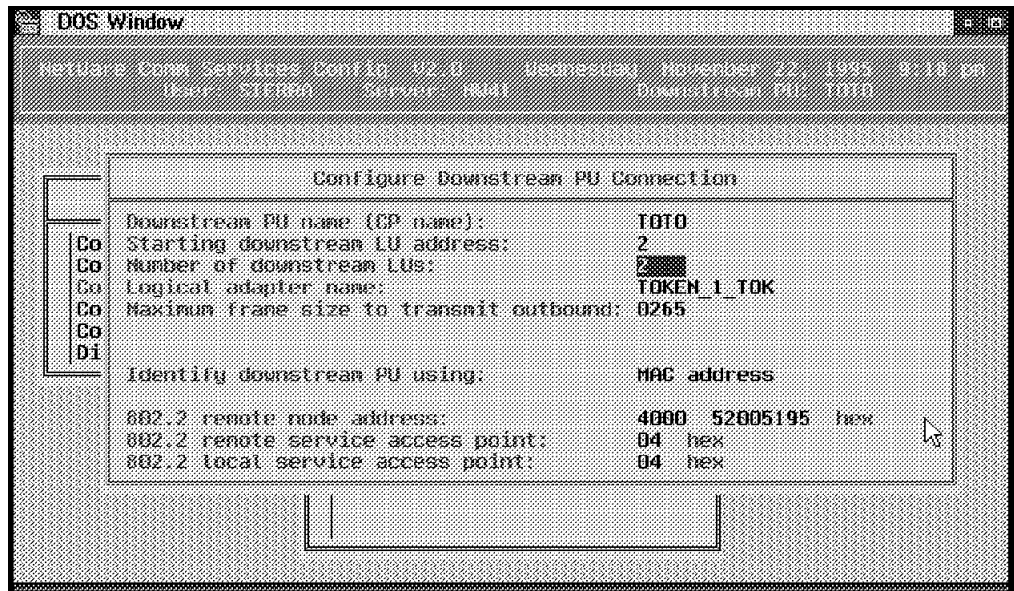


Figure 216. Configuring Downstream PUs - Parameters of the PU



The PU is the remote workstation on which you will use a Personal Communications IPX session to access the NetWare for SAA server. So if you plan to use more than one session at a time you should increase the number of LUs you want to associate to this PU. Let say we want two LUs.

14. Select the Data Link Adapter you have already configured (see Figure 208 on page 207).
15. Select **Mac Address** to identify the client workstation and then type in the Mac Address of the client workstation.  
  
In our example it is 400052005195 (see Figure 228 on page 219 for the PROTOCOL.INI file on the client workstation).
16. Press Esc to quit and save. The panel shown in Figure 217 then appears. Select **Configure LUs for downstream PUs**.

The panel shown in Figure 217 appears.

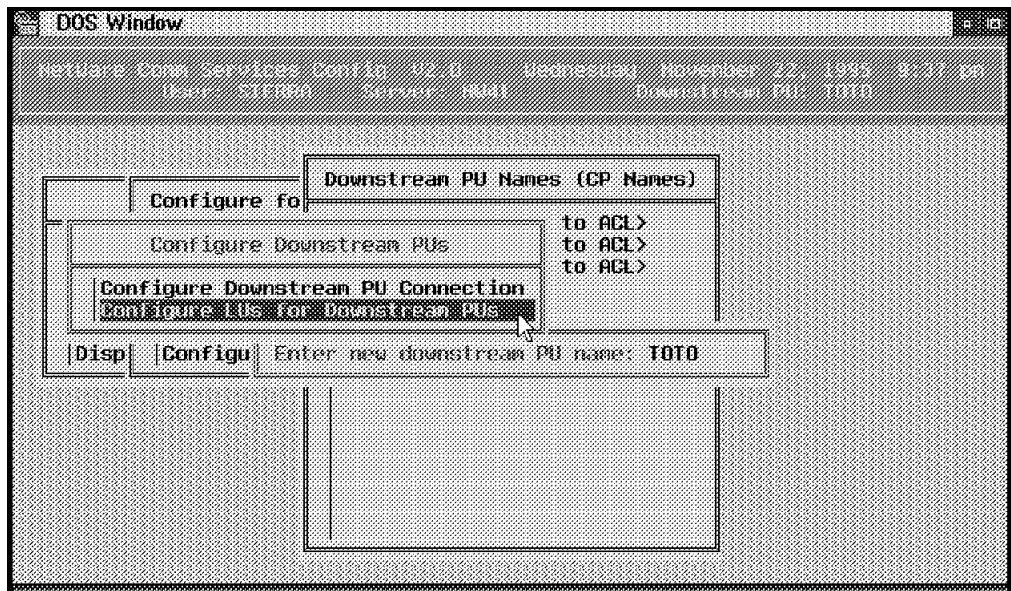


Figure 217. Configuring Downstream PUs - Menu

17. Choose **Configure LUs for Downstream PUs**, and the panel as shown in Figure 218 on page 213 appears.

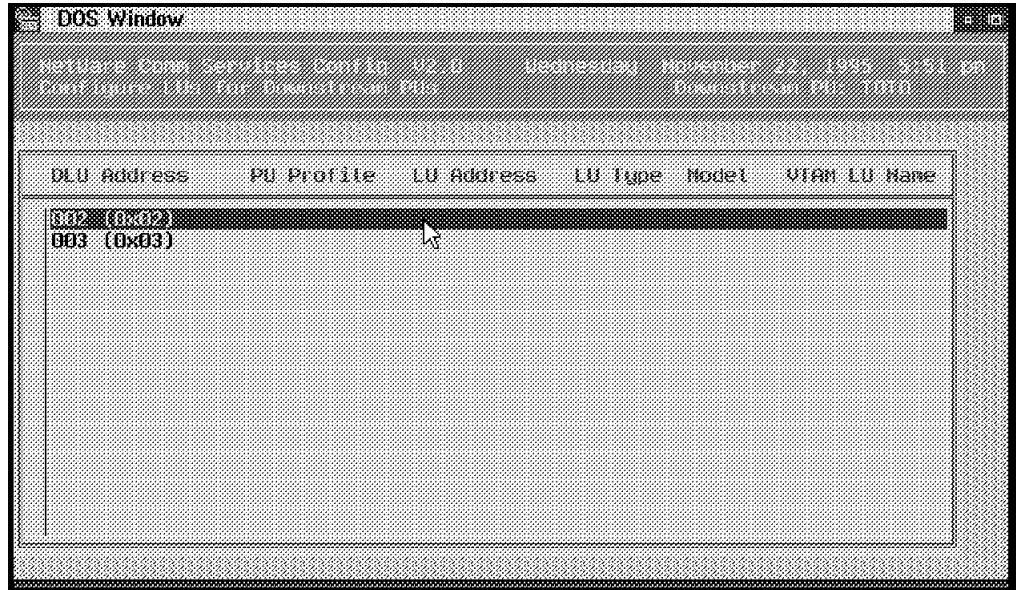


Figure 218. Configuring Downstream PUs - Defining the LUs

18. Press Enter to create the mapping of the downstream LU.

You then need to choose which Host PU Profile to use (see Figure 219).

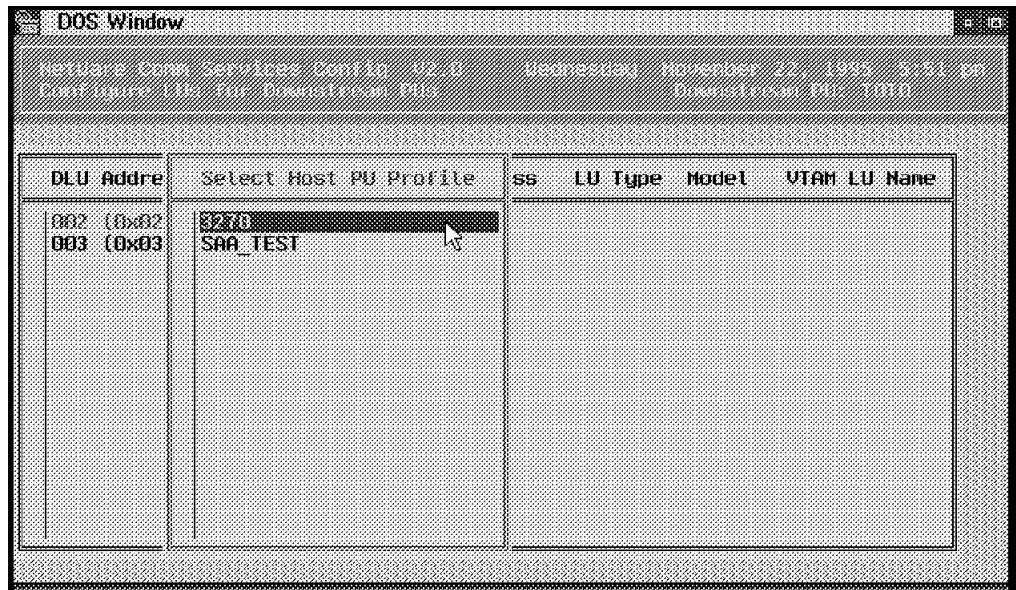


Figure 219. Configuring Downstream PUs - Mapping LUs 1/3

Select the one you have created before (see Figure 212 on page 209).

19. The list of available LUs appears as shown in Figure 220 on page 214. Highlight the one you want to select and press Enter.

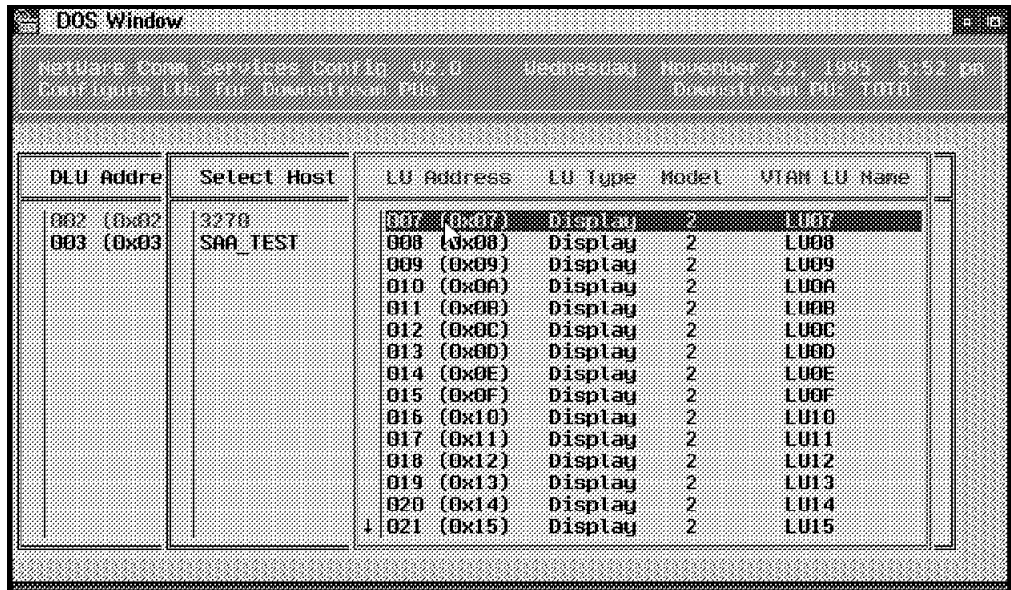


Figure 220. Configuring Downstream PUs - Mapping LUs 2/3

20. Figure 221 is then shown.

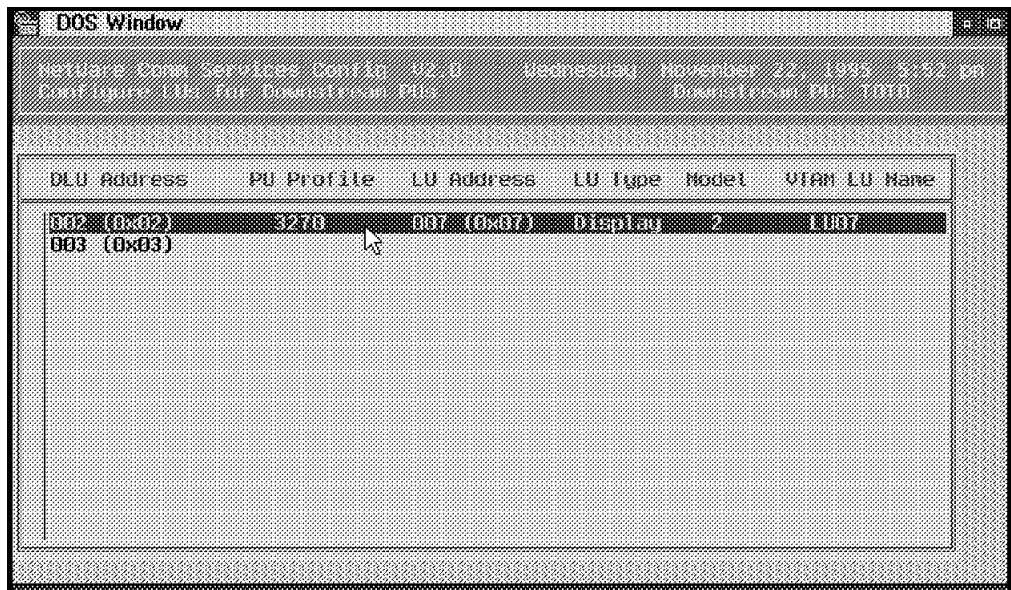


Figure 221. Configuring Downstream PUs - Mapping LUs 3/3

Repeat this process for all the LUs you want to associate to the downstream PU.

21. When all the LUs are configured, press Esc to quit and save.
22. At this time it can be useful to check your PU-LUs association. To do that return to the panel shown in Figure 211 on page 209 and choose **Configure Dependent LUs**. The list of all the available LUs is then shown (see Figure 222 on page 215), and you can check the associations performed.

**Note:** The list of the available LUs is related to the LUs you have defined in VTAM for the PU of the server (see Figure 203 on page 204).



LU Address	LU Type	Model	VFIAM LU Name	Lock	Category: Name
002 (0x02)	Display	2	LU02	No	Mapped: SIERRA
003 (0x03)	Display	2	LU03	No	Mapped: SIERRA
004 (0x04)	Display	2	LU04	No	Mapped: SIERRA1
005 (0x05)	Display	2	LU05	No	Mapped: SIERRA1
006 (0x06)	Display	2	LU06	No	Mapped: FERGIS
007 (0x07)	Display	2	LU07	No	Mapped: TOTO
008 (0x08)	Display	2	LU08	No	Mapped: TOTO
009 (0x09)	Display	2	LU09	No	Public
010 (0x0A)	Display	2	LU0A	No	Public
011 (0x0B)	Display	2	LU0B	No	Public
012 (0x0C)	Display	2	LU0C	No	Public
013 (0x0D)	Display	2	LU0D	No	Public
014 (0x0E)	Display	2	LU0E	No	Public
015 (0x0F)	Display	2	LU0F	No	Public
016 (0x10)	Display	2	LU10	No	Public

Figure 222. Checking PU-LUs Association

Press Esc to go back to the panel shown in Figure 205 on page 206.

23. We need now to make sure the 3270 Profile is started when the NetWare for SAA server is started. Select **Display Startup/Configuration Summary**.

The panel shown in Figure 223 appears.

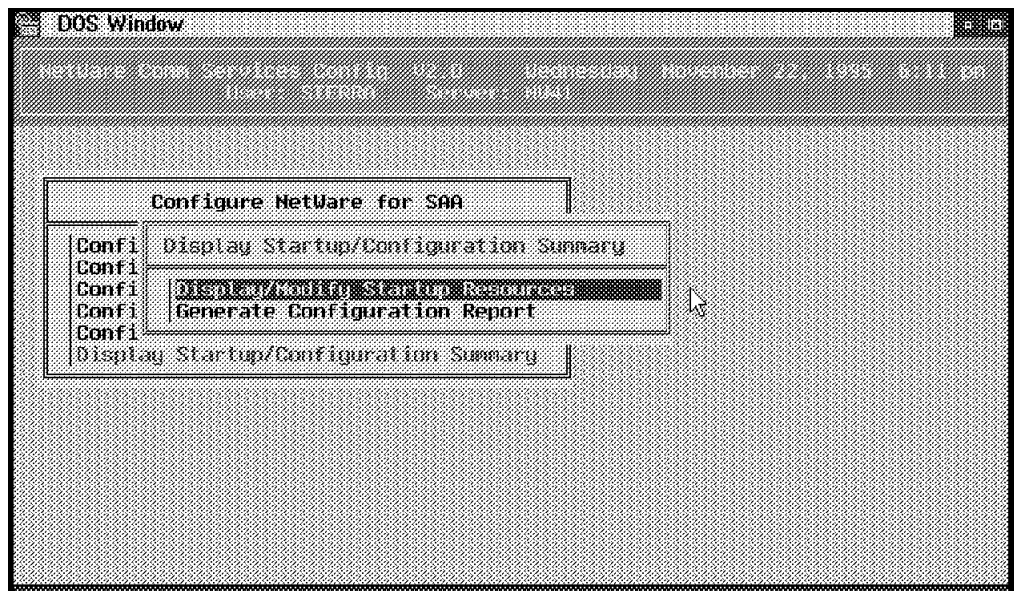


Figure 223. Adding 3270 Host PU Profile to the Server Startup 1/2

24. Select **Display/Modify Startup Resources**. Press Enter when the **Host PU profile name** is highlighted. An empty list then appears.

Press Insert to add the 3270 profile (see Figure 224 on page 216).

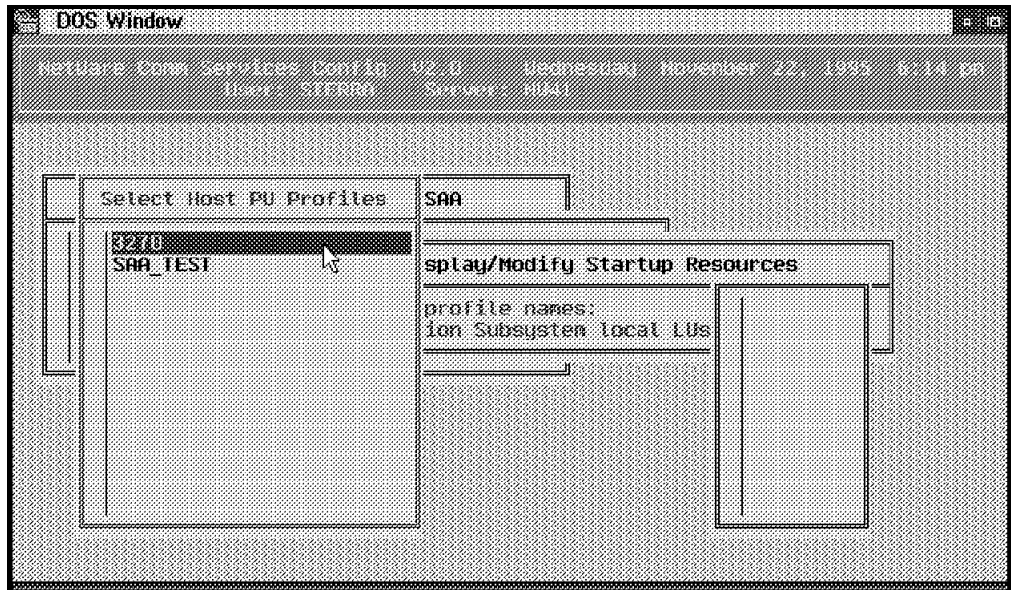


Figure 224. Adding 3270 Host PU Profile to the Server Startup 2/2

25. Press Esc to quit and save.
26. You can quit the ESCON program now. Your NetWare for SAA server configuration is complete.

## 6.4.2 Install and Configure NetWare Client for OS/2

We recommend you to use the NetWare Client for OS/2 as delivered in the OS/2 Warp Connect package. We don't discuss the steps for installing NetWare Client for OS/2. Please refer to the ITSO document *NetView DM for NetWare*, GG24-4416.

If you plan to use the NetWare Client for OS/2 as provided by Novell via the Internet, you have to download the product files from the Novell FTP server to diskettes, and then follow the step-by-step installation provided in Appendix B of *NetView DM for NetWare*.

**Note:** To obtain the NetWare Client for OS/2 software, connect to the following ftp site: <ftp://ftp.novell.com> and go to `/pub/updates/nwos/os2ct211/` directory. You then find out the product diskettes as .EXE files. Download them to your local hard disk. To build a diskette, insert a diskette in your drive and execute the .EXE file with parameter `A:\`.

Fixes (the latest is the file `OS2C1.EXE`) can be found on this FTP server, as well as on the following HTTP resource: <http://netware.novell.com>. In Europe the closest site is <http://www.novell.de>.

If you plan to use the OS/2 Warp Connect package, you need the CD-ROM of Warp Connect. Then to start the installation of NetWare Client for OS/2, insert the CD-ROM and execute the `PRODINST.EXE` program located in the root of the Warp Connect CD-ROM.

The following panel is shown:

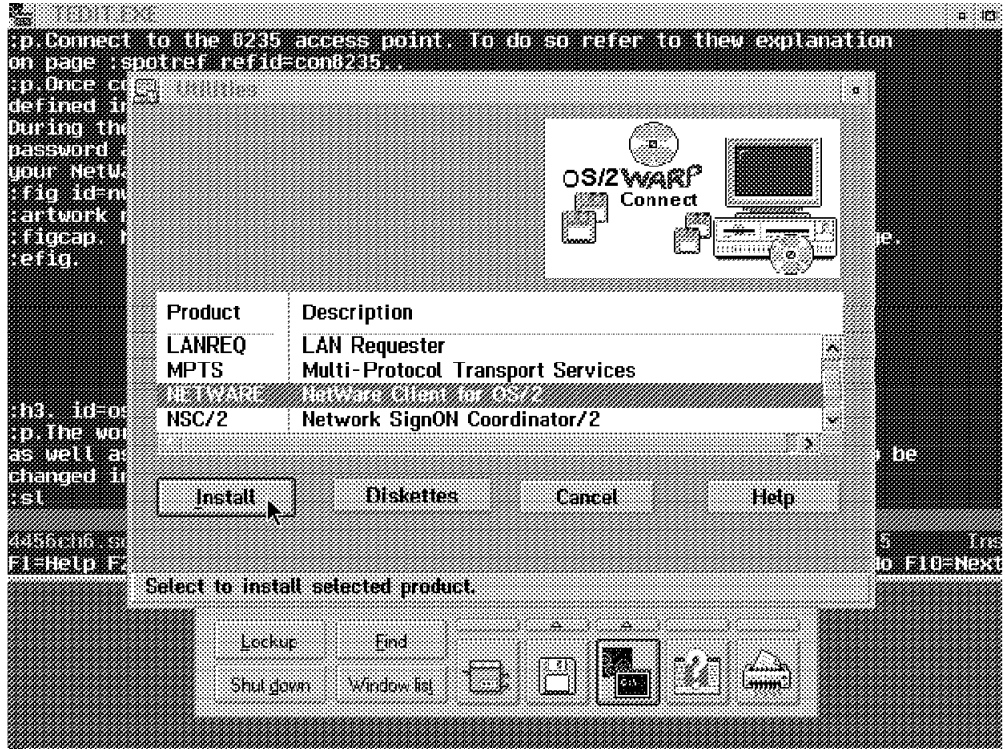


Figure 225. NetWare Client for OS/2 Installation with Warp Connect Package

Select the NetWare Client for OS/2 product and click on the **Install** button. The first panel of NetWare Client for OS/2 installation then appears, as shown in Figure 226.

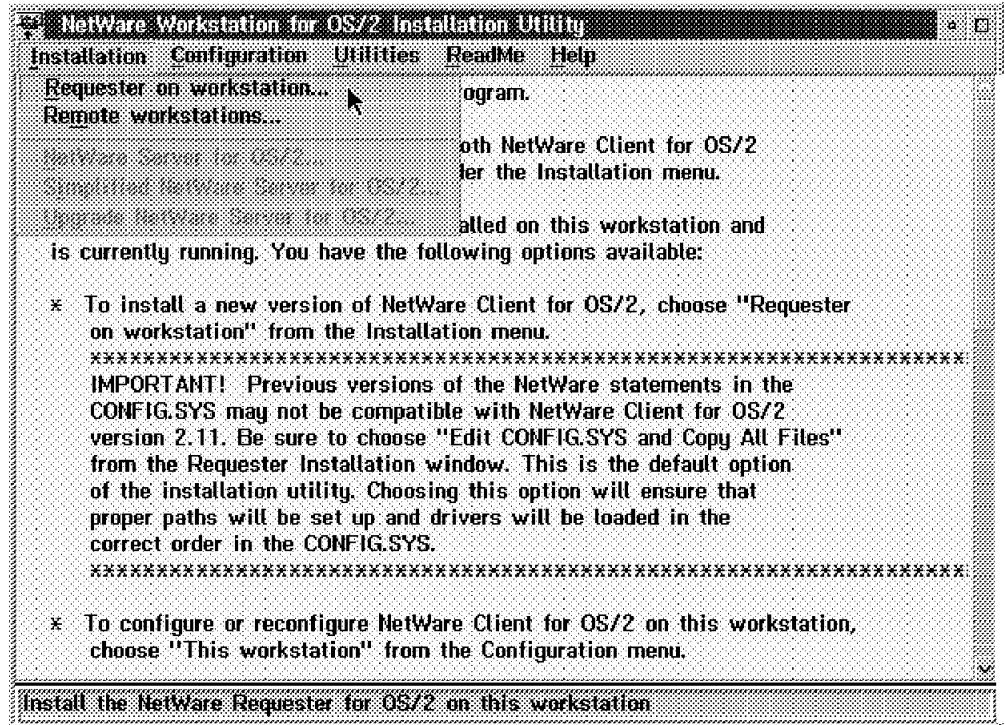


Figure 226. NetWare Client for OS/2 installation Main Panel

You can then follow the instructions provided in Appendix B of *NetView DM for NetWare*, GG24-4416.

The MPTS configuration has to be performed after NetWare Client for OS/2 is installed.

Start MPTS, and add the **NetWare Client** driver to your adapter. That means ODI2NDI driver is now bound to your physical adapter, and then PROTMAN remains the one Protocol Manager, even if you will use the IPX protocol with it.

Quit MPTS. Your CONFIG.SYS file should now contains some major changes, as shown below:

```
DEVICE=C:\IBMCOM\PROTOCOL\ODI2NDI.OS2
REM -- ODI-Driver Files BEGIN --
REM DEVICE=D6\NETWARE\TOKEN.SYS
```

To check that the NetWare Client works properly in LAN-attached mode, try to log on the NetWare for SAA server. If you experience a problem at this point, check your configuration files with the ones shown in "Configuration Files on OS/2 NetWare Client Workstation."

### Configuration Files on OS/2 NetWare Client Workstation

We assume the NetWare product was installed on the D: drive in the examples shows below.

```
...
SET AUTOSTART=TASKLIST,FOLDERS,LAUNCHPAD,CONNECTIONS
...
LIBPATH= ... ;D:\NETWARE;D:\NETWARE\NLS\ENGLISH;L:\OS2;P:\OS2;
SET PATH= ... ;D:\NETWARE;L:\OS2;P:\OS2;
SET DPATH= ... ;D:\NETWARE;D:\NETWARE\NLS;D:\NETWARE\NLS\ENGLISH;
L:\NLS;P:\NLS;
SET HELP= ... ;D:\NETWARE\NLS\ENGLISH;
...
DEVICE=D:\NETWARE\VIPX.SYS
DEVICE=D:\NETWARE\VSHELL.SYS GLOBAL
...
REM --- NetWare Requester statements BEGIN ---
SET NWLANGUAGE=ENGLISH
DEVICE=D:\NETWARE\LSL.SYS
RUN=D:\NETWARE\DDAEMON.EXE
DEVICE=C:\IBMCOM\PROTOCOL\ODI2NDI.OS2
REM -- ODI-Driver Files BEGIN --
REM DEVICE=D6\NETWARE\TOKEN.SYS
REM -- ODI-Driver Files END --
DEVICE=D:\NETWARE\ROUTE.SYS
DEVICE=D:\NETWARE\IPX.SYS
DEVICE=D:\NETWARE\SPX.SYS
RUN=D:\NETWARE\SPDAEMON.EXE
rem DEVICE=D:\NETWARE\NMPIPE.SYS
rem DEVICE=D:\NETWARE\NPSEVER.SYS
rem RUN=D:\NETWARE\NPDAEMON.EXE
DEVICE=D:\NETWARE\NWREQ.SYS
IFS=D:\NETWARE\NWIFS.IFS
RUN=D:\NETWARE\NWDAEMON.EXE
rem DEVICE=D:\NETWARE\NETBIOS.SYS
rem RUN=D:\NETWARE\NBDAEMON.EXE
rem DEVICE=C:\OS2\MDOS\LPTDD.SYS
REM --- NetWare Requester statements END ---
...
DEVICE=C:\IBMCOM\MACS\IBMTOK.OS2
```

Figure 227. CONFIG.SYS on OS/2 NetWare Client Workstation

```

[PROT_MAN]
  DRIVERNAME = PROTMAN$

[IBMLXCFG]
  landd_nif = landd.nif
  netbeui_nif = netbeui.nif
  odi2ndi_nif = odi2ndi.nif
  IBMTOK_nif = IBMTOK.NIF

[NETBIOS]
  DriverName = netbios$
  ADAPTERO = netbeui$,0

[landd_nif]
  DriverName = LANDD$
  Bindings = IBMTOK_nif
  NETADDRESS = "T400052005195"
  ETHERAND_TYPE = "I"
  ...

[netbeui_nif]
  DriverName = netbeui$
  Bindings = IBMTOK_nif
  NETADDRESS = "T400052005195"
  ETHERAND_TYPE = "I"
  USEADDRREV = "YES"
  OS2TRACEMASK = 0x0
  ...

[odi2ndi_nif]
  DriverName = odi2ndi$
  Bindings = IBMTOK_nif
  NETADDRESS = "T400052005195"
  TOKEN-RING = "yes"
  TOKEN-RING_SNAP = "no"
  ETHERNET_802.3 = "no"
  ETHERNET_802.2 = "no"
  ETHERNET_II = "no"
  ETHERNET_SNAP = "no"
  TRACE = 0x0

[IBMTOK_nif]
  DriverName = IBMTOK$
  NETADDRESS = "400052005195"
  MAXTRANSMITS = 6
  RECVBUFS = 20
  RECVBUFSIZE = 256
  XMITBUFS = 2
  XMITBUFSIZE = 256

```

Figure 228. PROTOCOL.INI on OS/2 NetWare Client Workstation

### 6.4.3 Install and Configure 8235 Dial-In Client for OS/2

Before you start installing the 8235 Client layer on your OS/2 remote workstation, copy your CONFIG.SYS and PROTOCOL.INI files with the extension .LAN (for example). This will be useful later to switch between LAN-attached and remote mode on your workstation (see 6.4.6, "Switching between 8235 and LAN-Attached Mode on OS/2" on page 229).

#### Install 8235 Client for OS/2

Do the following to install 8235 Client software on your OS/2 workstation:

1. Insert DIALs Client diskette in your diskette drive.
2. From an OS/2 command prompt, type `a:\setup2.exe` and press Enter.
3. Select **OK** to continue with the setup program.
4. The following panel is shown. Type the name of the directory where you want the DIALs Client to be installed.



Figure 229. 8235 Directory Choice for Installation

5. The next panel is as shown in Figure 230.

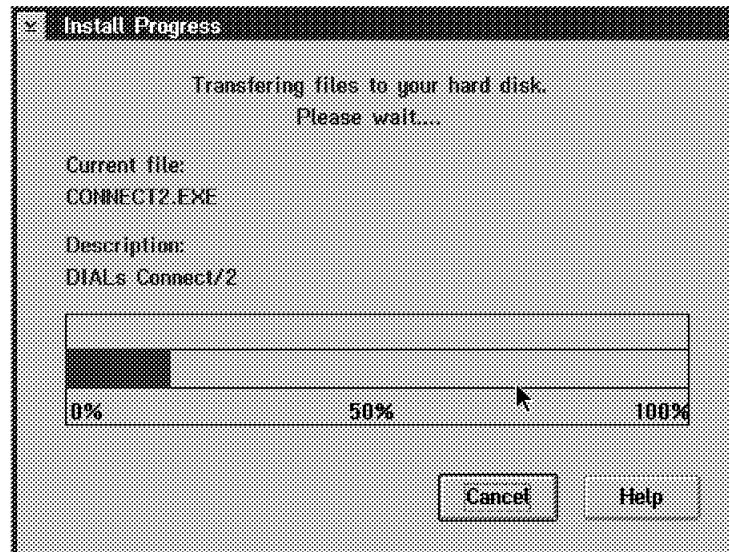


Figure 230. 8235 Installation in Progress

6. The following panel prompt you to select the Port and the modem type to be set up for the 8235 connection. We will use for the test a 7855 on port COM1.

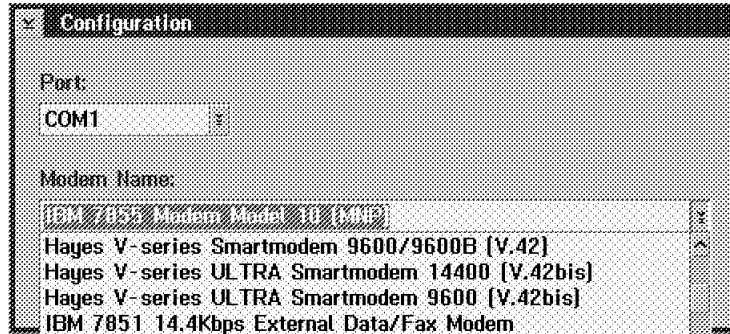


Figure 231. 8235 Port and Modem Setup

**Note:** You will be able to modify those parameters later.

7. When the panel as shown in Figure 232 appears, you have completed the installation of DIALS Client software for OS/2.

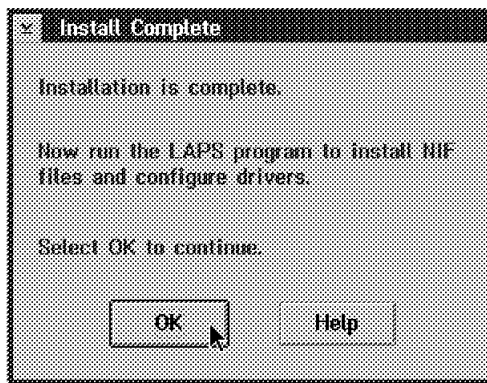


Figure 232. 8235 Installation Completed

## Configuring the Drivers

You need now to install the DIALS Client device driver. Do the following:

1. Launch MPTS product (MPTS is located under \IBMCOM, but you should have an MPTS icon on your desktop).
2. Click on **Install**. An entry field for the location of the adapter file (DIALS.NIF) appears. The DIALS.NIF file was placed in the installation directory (in the present case it is E:\DIALS) by the Setup program. Change the path from A:\ to E:\DIALS.
3. Click on **OK**. Then the Installation Complete message box appears.

You need now to configure MPTS. Do the following:

1. Select **Configure** from the MPTS logo window.

The Configuration panel appears, as shown in Figure 233 on page 222.

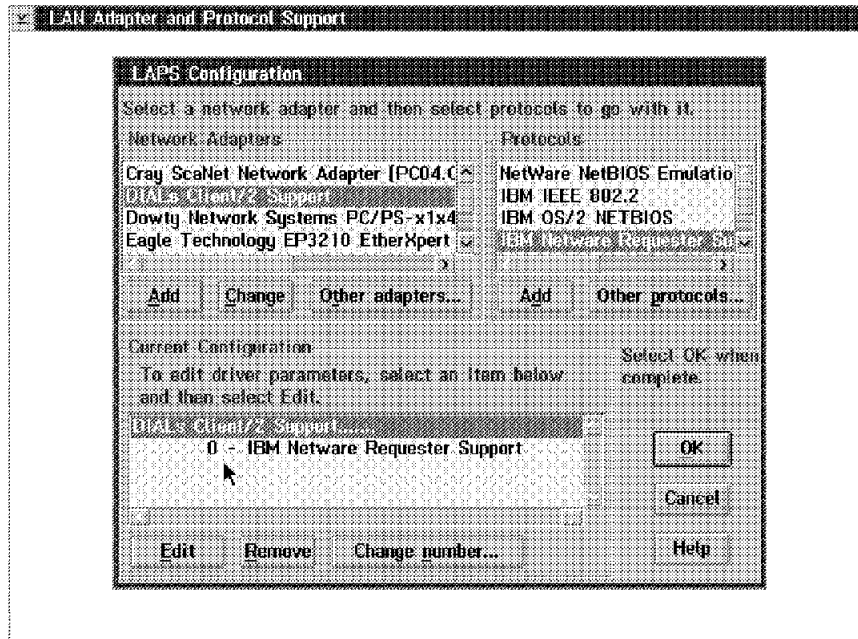


Figure 233. Configuring MPTS Drivers

2. From the Network Adapters list, select **DIALS Client/2 Support** and click on the **Add** button.
3. In the Protocol list, select **NetWare Requester Support** and click on the **Add** button.
4. Select the line **DIALS Client /2 Support** and click on **Edit**.

The Configuration window for the DIALS adapter appears as shown in Figure 234.

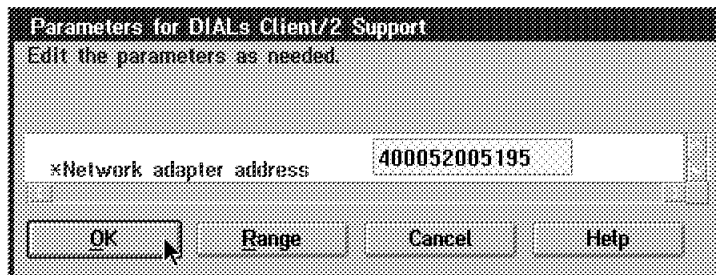


Figure 234. Configuring DIALS Adapter

5. Fill in the LAA you want to use for the adapter, and click on **OK** to save.

**Note:** This address must be authorized to access your NetWare for SAA server. For mode details, refer to 6.4.1, "Configuration in VTAM and in the NetWare for SAA Server" on page 203.

6. Select **NetWare Requester Support** and click on **Edit**.



The Configuration window for the DIALs adapter appears as shown in Figure 235.

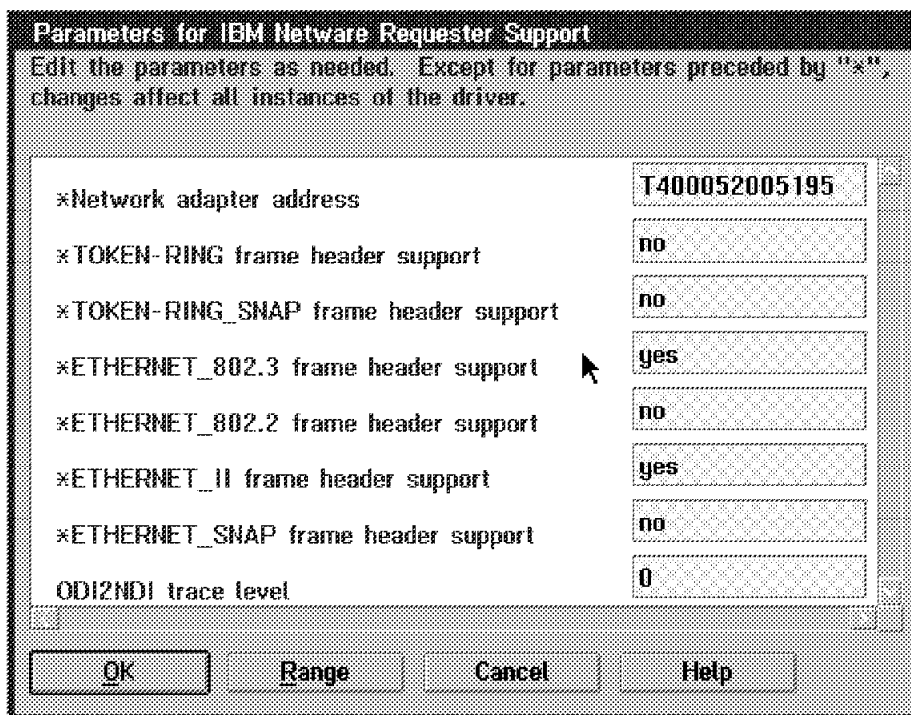


Figure 235. Configuring ODI2NDI Protocol

7. Fill in the LAA you want to use for the IPX protocol, and click on **OK** to save.

**Note:** This address must be authorized to access your NetWare for SAA server. For mode details, refer to 6.4.1, "Configuration in VTAM and in the NetWare for SAA Server" on page 203.

8. Select **ETHERNET-820.3** and **ETHERNET II** frames to be sent through the adapter.

9. You can quit MPTS. Your CONFIG.SYS and PROTOCOL.INI are then updated.

Now you need now to configure NetWare Client to enable it to work properly through the 8235 connection. To do this configuration, edit the NET.CFG file (in general it is located in the Root directory (D:\ for example, if your system is located on the D: drive). Do the following changes to the NET.CFG file:

```
LINK DRIVER ODI2NDI

NETWARE REQUESTOR
  PREFERRED SERVER NW41
  REQUEST RETRIES 7
```

To be sure the NET.CFG file will be correctly used, put a hard carriage return/Line feed at the end of each line, including the last one.

You should set your NetWare for SAA server name in the PREFERRED SERVER statement. Our server is named NW41.

**Note:** As we plan to use NetWare Client to access an IPX server (the NetWare for SAA one) through the 8235, we don't need to start the ROUTE on the Client workstation, because 8235 is an IPX router. Check then that the following statement is remarked in your CONFIG.SYS:

```
REM DEVICE=D:\NETWARE\ROUTE.SYS
```

**Note:** The RUN=E:\NETWARE\NWDAEMON.EXE statement must also be commented out (use REM) of the CONFIG.SYS file before the workstation is started. Otherwise there are long delays due to the fact that the connection is not up and running as soon as the workstation is started (you have to connect via 8235 first) and then the retries and delays in NetWare startup are the cause of these delays.

**IMPORTANT:** That means you have to start this NWDAEMON.EXE process once connected via 8235, and prior to the start of IPX traffic. To do so, once connected type on an OS/2 prompt DETACH E:\NETWARE\NWDAEMON.EXE. You could do a command file and an icon so that this task could be done easier each time you connect via 8235.

## System Files

Below are the PROTOCOL.INI, CONFIG.SYS, and NET.CFG file changes done during the 8235 installation and configuration.

```
[PROT_MAN]
  DRIVERNAME = PROTMAN$

[IBMLXCFG]
  ODI2NDI_nif = ODI2NDI.NIF
  DIALNDIS_nif = DIALNDIS.nif

[ODI2NDI_nif]
  DriverName = odi2ndi$
  Bindings = DIALNDIS_nif
  NETADDRESS = "T400052005195"
  TOKEN-RING = "no"
  TOKEN-RING_SNAP = "no"
  ETHERNET_802.3 = "yes"
  ETHERNET_802.2 = "no"
  ETHERNET_II = "yes"
  ETHERNET_SNAP = "no"
  TRACE = 0x0

[DIALNDIS_nif]

  DriverName = SDIALIN$
  NETADDRESS = "400052005195"
```

Figure 236. PROTOCOL.INI after the Installation of 8235

```

...
SET AUTOSTART=TASKLIST,FOLDERS,LAUNCHPAD,CONNECTIONS
...
LIBPATH= ... ;D:\NETWARE;D:\NETWARE\NLS\ENGLISH;L:\OS2;P:\OS2;
SET PATH= ... ;D:\NETWARE;L:\OS2;P:\OS2;
SET DPATH= ... ;D:\NETWARE;D:\NETWARE\NLS;D:\NETWARE\NLS\ENGLISH;
L:\NLS;P:\NLS;
SET HELP= ... ;D:\NETWARE\NLS\ENGLISH;
...
DEVICE=D:\IBMCOM\LANMSGDD.OS2 /I:D:\IBMCOM
DEVICE=D:\IBMCOM\PROTMAN.OS2 /I:D:\IBMCOM
RUN=D:\IBMCOM\LANMSGEX.EXE
...
DEVICE=D:\NETWARE\VIPX.SYS
DEVICE=D:\NETWARE\VSHELL.SYS GLOBAL
...
DEVICE=D:\IBMCOM\MACS\DIALNDIS.OS2
...
REM --- NetWare Requester statements BEGIN ---
SET NWLANGUAGE=ENGLISH
DEVICE=D:\NETWARE\LSL.SYS
RUN=D:\NETWARE\DDAEMON.EXE
DEVICE=C:\IBMCOM\PROTOCOL\ODI2NDI.OS2
REM -- ODI-Driver Files BEGIN --
REM DEVICE=D6\NETWARE\TOKEN.SYS
REM -- ODI-Driver Files END --
DEVICE=D:\NETWARE\ROUTE.SYS
DEVICE=D:\NETWARE\IPX.SYS
DEVICE=D:\NETWARE\SPX.SYS
RUN=D:\NETWARE\SPDAEMON.EXE
rem DEVICE=D:\NETWARE\NMPIPE.SYS
rem DEVICE=D:\NETWARE\NPSEVER.SYS
rem RUN=D:\NETWARE\NPDAEMON.EXE
DEVICE=D:\NETWARE\NWREQ.SYS
IFS=D:\NETWARE\NWIFS.IFS
REM RUN=D:\NETWARE\NWDAEMON.EXE
rem DEVICE=D:\NETWARE\NETBIOS.SYS
rem RUN=D:\NETWARE\NBDAEMON.EXE
rem DEVICE=C:\OS2\MDOS\LPTDD.SYS
REM --- NetWare Requester statements END ---
...
CALL=D:\IBMCOM\PROTOCOL\NETBIND.EXE

```

Figure 237. CONFIG.SYS after Installation of 8235

```

LINK DRIVER ODI2NDI

NETWARE REQUESTOR
  PREFERRED SERVER NW41
  REQUEST RETRIES 7

```

Figure 238. NET.CFG after the Installation of 8235

## 6.4.4 Configure Personal Communications IPX/SPX Session

To see how to configure for an IPX/SPX session in Personal Communications, perform the following steps, starting from the Customize Communication panel, as shown in Figure 239.

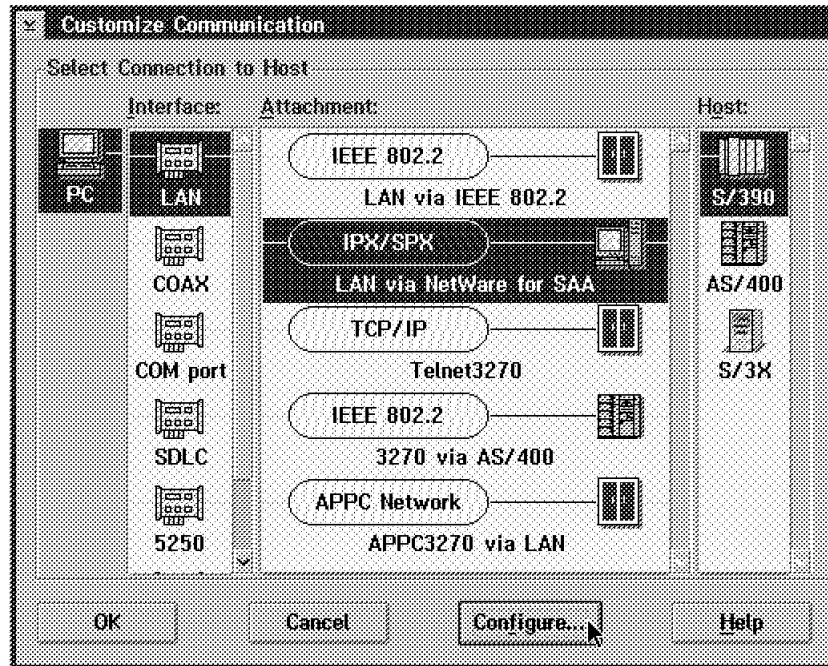


Figure 239. Personal Communications Configuration Main Panel

Click on **Configure** button. The following panel then appears:

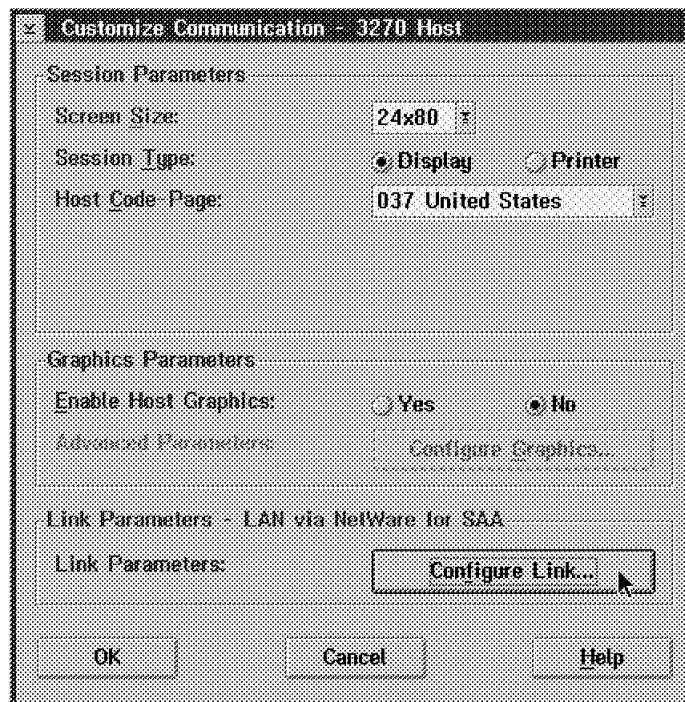


Figure 240. IPX/SPX Session Configuration Panel

Click on **Configure Link**, and the following panel prompts you for some IPX related information, as shown in Figure 241.

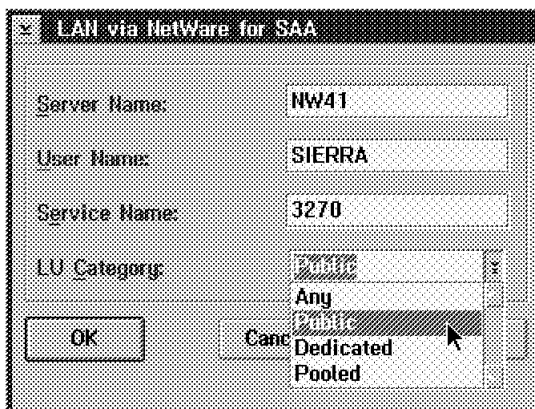


Figure 241. IPX/SPX Information Panel

You can see here that our NetWare for SAA server is named **NW41**. The User Name must be a NetWare User ID that has been authorized to access the NW41 server. The Service Name is set to **3270**. For more explanations refer to 6.4.1, "Configuration in VTAM and in the NetWare for SAA Server" on page 203. For explanation of the LU category, which is set to **Public** here, refer to "NetWare for SAA Communications Configuration" on page 204.

You can save your configuration. It is ready to be used.

### 6.4.5 Starting IPX Session via 8235 and NetWare for SAA Gateway

Connect to the 8235 access point. To do so:

1. Click on the **Connect/2** icon to start DIALs Client program.
2. Fill in the panel as shown in Figure 242.

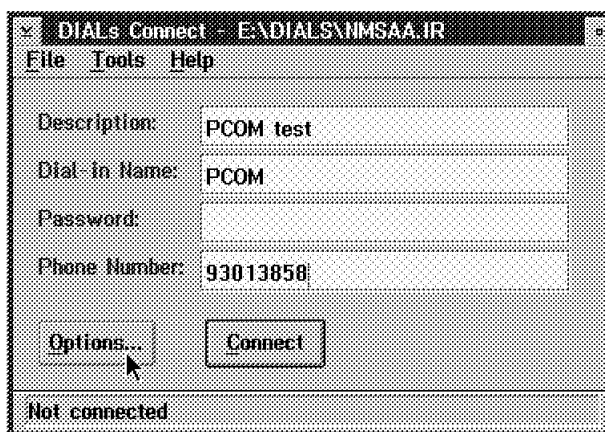


Figure 242. 8235 Client Connection Panel

3. Click on the **Options** button. A panel appears as shown in Figure 243.

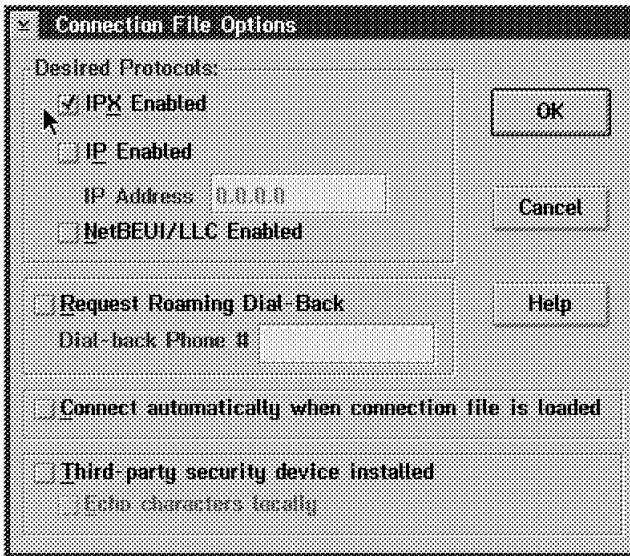


Figure 243. 8235 Client Options Window

Select IPX only, then Quit the option window by clicking on **OK**.

4. Click on **Connect** to start the connection.

The modem then starts dialing. The following panel will appear while the connection is being established (see Figure 244).

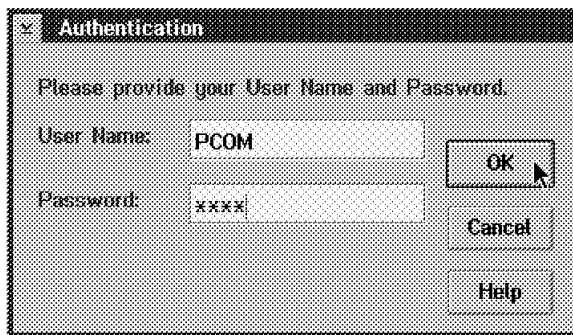


Figure 244. 8235 Signon Window

5. type your password, then click on **OK**.

6. When the connection is established, you will see the following panel:

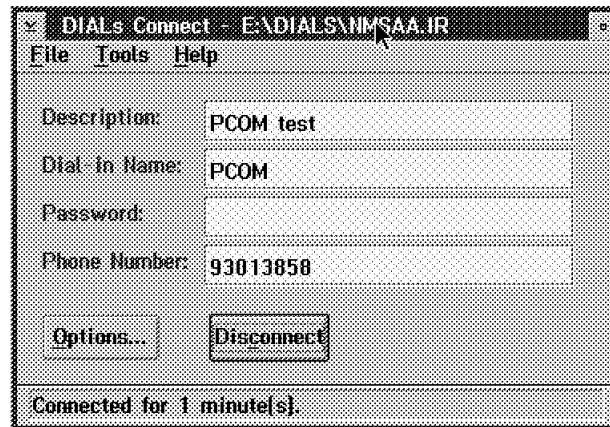


Figure 245. 8235 Window When Connected

7. You are now connected to your 8235 entry point.

Now you need to start the E:\NETWARE\NWDAEMON.EXE process. (See note on page 224 for more details about that.)

Now the IPX session in Personal Communications should work. Start it, and during the establishment of this session, you are prompted for the password associated with the user ID you defined and authorized in your NetWare for SAA server, as shown in Figure 246.

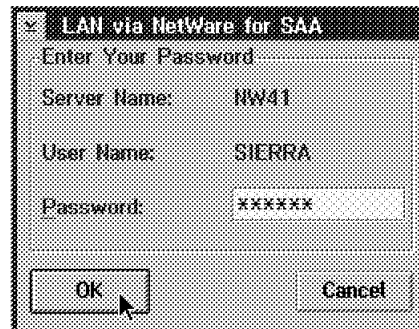


Figure 246. Signon Panel during IPX/SPX Personal Communications Session Establishment

In case of problems, refer to 6.4.7, "Resolving Problems Using IPX via NetWare for SAA and 8235" on page 230.

### 6.4.6 Switching between 8235 and LAN-Attached Mode on OS/2

The workstation can be used in LAN attached mode in the office as well as in remote mode via 8235. The following system files need to be changed in order to switch from one mode to the other:

- CONFIG.SYS
- PROTOCOL.INI
- NET.CFG

As you saved those files with extension .LAN prior to installing the 8235 Dial-In Client software on your workstation, we suggest you write a simple batch file to manage the copy of those .LAN files and the .REM ones (REM for Remote). Then reboot to be able to work in either LAN-attached or remote configuration.

### 6.4.7 Resolving Problems Using IPX via NetWare for SAA and 8235

If you can't connect a host in the described configuration, you should first isolate the problem by trying the IPX session in LAN-attached mode. To do so switch your CONFIG (see 6.4.6, "Switching between 8235 and LAN-Attached Mode on OS/2" on page 229), and try to establish the session. Remember the ROUTE statement in the CONFIG.SYS file for a LAN-attached configuration should not be remarked out if you need to pass through at least one bridge to access the NetWare server. The only case where you don't need ROUTE in a LAN-attached mode is when the NetWare server and your workstation are located on the same segment, or when you are connecting through the 8235.

First try to log on to your NetWare for SAA server. If you cannot, then the problem is related to your NetWare user ID or to some path between your workstation and the server. Check then with OS2PING to reach it.

If you can log to your NetWare for SAA server, try in LAN attached mode to connect the Personal Communications IPX session. Check at the Server console that your workstation is correctly connected. The Figure 247 shows what kind of information should be displayed at the server console, when the workstation is connected.

```
11-21-95 10:08:25 am: NWSAA-7.0-200089[DLCI] informational
LLC802.2 LINK ESTABLISHED
to remote node 400052005195-04
from local node 08005a48816b-04
on adapter TOKEN_1_TOK
```

Figure 247. Message at the Server Console When Connected

If you can not get in touch with the NetWare for SAA server through the IPX session under Personal Communications, check that your Mac address is authorized on the server (in the example shown in Figure 247, the Mac address of the client workstation is 400052005195). Refer to "NetWare for SAA Communications Configuration" on page 204, and more precisely to Figure 216 on page 211.

Check the definition of your IPX session (in the example shown in Figure 247, the Mac address of the NetWare for SAA server is 08005A48816B).

Be sure that you use the SAP 04 in your session.



---

## Chapter 7. Wireless Connectivity

The marriage of wireless communications and mobile computing will transform the way we do business. The convergence of hardware, software communications and wireless technologies will ensure that information and services will be available to computer users at all times, in all places. Many different wireless communication technologies currently support hundreds of services. Wireless communication is growing at an explosive rate around the world.

The wireless technology most widely used in a LAN network is based on two methods using Infrared (IR) or Radio Frequency (RF) signals.

- Infrared technology is based on optical signals at wavelengths longer than 780 nm. Diffuse infrared light produced by an LED can be used for data communications (IR wireless LANs). Since the infrared light is diffuse, the signal will bounce off ceilings, walls and floors before reaching the receiver. The transmitter and receiver need not be in a direct line of sight. Typically, the area covered by an infrared transmitter is about 10 x 10 meters, with a line of sight up to 17 m.
- Radio technology is based on radio waves and frequency bands. IBM's Wireless LAN operates in the 2.4 GHz frequency band. Radio waves in this spectrum can pass through nonmetallic objects, such as walls and furniture. Solid objects, however, absorb and reflect parts of the radio signal, which means that there are many possible paths for a signal to take from transmitter to receiver. The average maximum distance between the base station and a wireless workstation depends on the space environment. It is between 25 meters in a closed space and up to 180 meters in an open space.

Wireless LAN will be standardized in IEEE 802.11.

Wireless communication in WANs most widely used is named the Mobitex Network. Mobitex has now become the de facto standard in North America and Europe (excepted Germany). Mobile Mobitex workstations use UHF radio equipment for connection to the cellular structured network. The radio channels are 12.5 KHz wide and each base radio station (BRS) can have up to 16 different channel frequencies.

- Mobitex in the US transmits from the base station on channels in the range of frequencies 935-940 MHz and receives in the range of 896-901 MHz. The transmit and receive frequencies for any channel are always 39 MHz apart.
- Mobitex in Europe has different frequency allocations for each country, but they are all in the range of 410-459 MHz. Except for this difference in radio carrier frequency, the European and North American system are the same.

If you are interested in background knowledge on wireless communication technologies, refer to the IBM Redbook *An Introduction to Wireless Technology*, SG24-4465-01.

IBM, as a technology leader, has developed many mobile/wireless devices and other products in individualized ways, implementing seamless connectivity available for mobile solutions today.

In this chapter, we show a connectivity scenario of a ThinkPad (mobile workstation) equipped with a wireless PCMCIA card and using Personal Communications Version 4.1 connecting via a Base Station to a S/390 or an AS/400.

The following wireless PCMCIA cards are available today, as well as adapter cards for ISA and MCA systems:

- **IBM Wireless LAN Credit Card Adapter** for an RF wireless LAN consists of a PCMCIA Type II controller card and a radio module.
- **IBM Infrared Wireless Credit Card Adapter** for a IR wireless LAN consists of a PCMCIA Type II controller card and and LED transmitter/receiver module.
- **IBM Wireless Modem for Mobitex** designed to connect to the Mobitex network consists of a PCMCIA Type III modem card, a booster battery and an antenna.

---

## 7.1 Radio Frequency Wireless LAN Connection

The scenario of a radio frequency (RF) wireless LAN is the same as that of any LAN, when providing peer-to-peer or terminal-to-host communication in a local area. Ideally, it should appear to the user to be exactly the same as a wired LAN. For Personal Communications in particular, it does not change anything in comparison a normal LAN attachment using the IEEE 802.2 protocol, installed on top of the wireless device drivers.

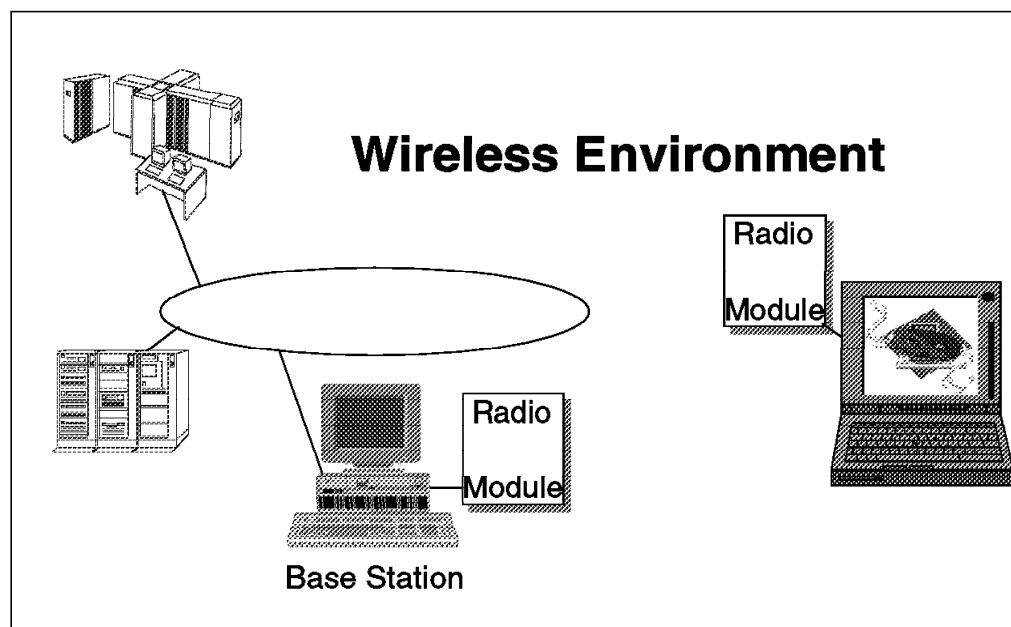


Figure 248. Personal Communications and Radio Frequency Wireless LAN Connection

In this connectivity scenario, a wireless ThinkPad workstation is communicating to its base station. Personal Communications AS/400 and 3270 Version 4.1 are used to connect to a 37XX Communication Controller acting as a gateway for 3270 sessions and to an AS/400 for 5250 sessions at the same time, via wireless communication.

The 37XX (a 3745 Communication Controller) is channel-attached to the MVS host, although the Personal Communications workstation physically is wireless attached via a base station with a bridge function to the 37XX in the token-ring LAN. VTAM treats this connection as a switched line. A VTAM switched major node definition is required to define a PU and associated LUs for the PC/3270 V4.1 workstation.

The AS/400 is connected to the same token-ring LAN as the 3745 and the base station that we are communicating over.

For a connection as shown in Figure 248 on page 232, be aware of the following requirements:

- The ThinkPad requires a IBM Wireless LAN Credit Card Adapter.
- The PCMCIA device driver must be installed and ready.
- The IBM Wireless LAN Program diskettes for DOS/Windows or OS/2 workstations are required.
- A base station must provide you a wired LAN cell. A wired LAN cell is a radio cell connected to a token-ring or Ethernet network using the bridge function in the base station.

We need to customize the following:

- Set up the wireless part on the ThinkPad workstation.
- Configure Personal Communications WorkStation sessions for S/390 and AS/400 host systems
- Define the wireless workstation on the base station
- On the S/390 host side, we need to define:
  - The 37XX Token-Ring adapter and attachment, known as NTRI (NCP Token-Ring Interconnection), in the NCP definitions
  - The PCOM workstation as a PU, with two LUs, in a switched major node in VTAM
- On the AS/400 system we need to define:
  - The TRLAN adapter attachment
  - Allow Personal Communications to use the Auto-Configuration Facility to connect

**Note:** Not all of the required configuration, customization or definition panels will be shown; only those that are significant to the example are included.

### 7.1.1 Setting Up the Wireless Workstation for DOS (Full-Function Mode)

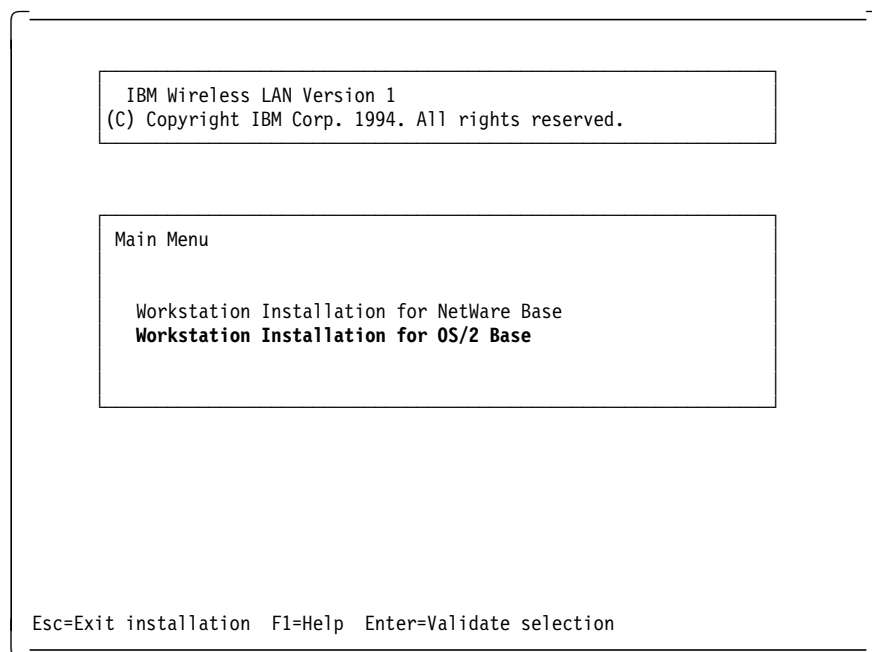
For the first wireless workstation (a ThinkPad computer working under IBM PC DOS Version 7.0) we need to do the following:

- Install and customize the IBM Wireless LAN workstation services
- Install and customize the IBM Wireless LAN NDIS driver (7.1.6, “Install and Customize LSP for DOS/Windows” on page 247)
- Install and customize Personal Communications to use a LAN IEEE 802.2 attachment (2.2, “Install PC/3270 for DOS (Full-Function Mode)” on page 12)

To operate a wireless adapter and NDIS device driver in a PCMCIA machine, you need to have previously installed and configured the Card and Socket Services support. Refer to A.1, "Installing PCMCIA Device Drivers for DOS/Windows" on page 335 and to your PCMCIA Adapter documentations.

To install and customize the IBM Wireless LAN workstation services, perform the following steps:

- Insert the IBM Wireless LAN DOS/Windows Workstation labeled diskette into the A: drive.
- Type A: at the command prompt and press Enter.
- Type INSTDOS at the command prompt and press Enter
- You will see the IBM logo panel. Press Enter to begin the installation/configuration process.



*Figure 249. IBM Wireless LAN Workstation Installation for OS/2 Base Panel for DOS (Full-Function Mode)*

Since we want to communicate with an OS/2 Base Station, select **Workstation Installation for OS/2 Base** and press Enter.

If you have a base station installed on a NetWare Server, choose the related **Workstation Software for NetWare Base**.

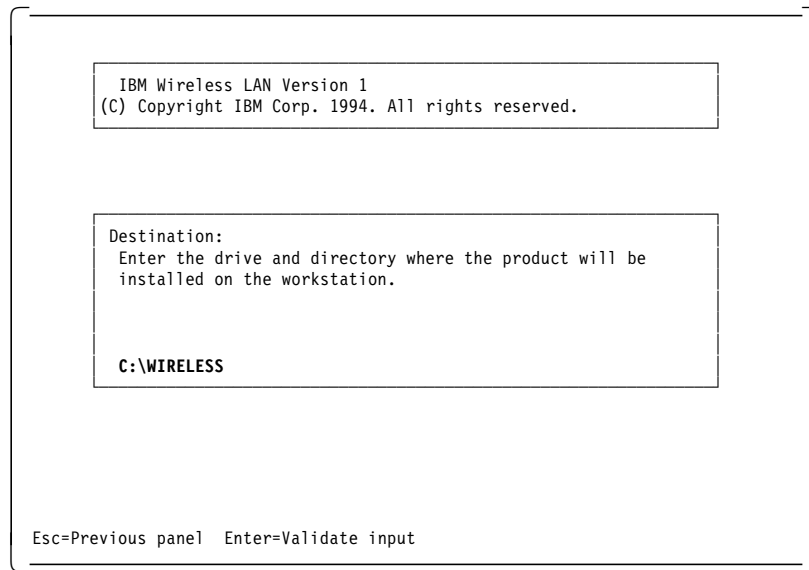


Figure 250. IBM Wireless LAN Workstation Destination Panel for DOS (Full-Function Mode)

Take the default, and press Enter to validate.

The IBM Wireless LAN Workstation Installation will now begin copying files from the installation diskette to C:\WIRELESS directory. You'll see a message panel asking you whether you want to update your AUTOEXEC.BAT file.

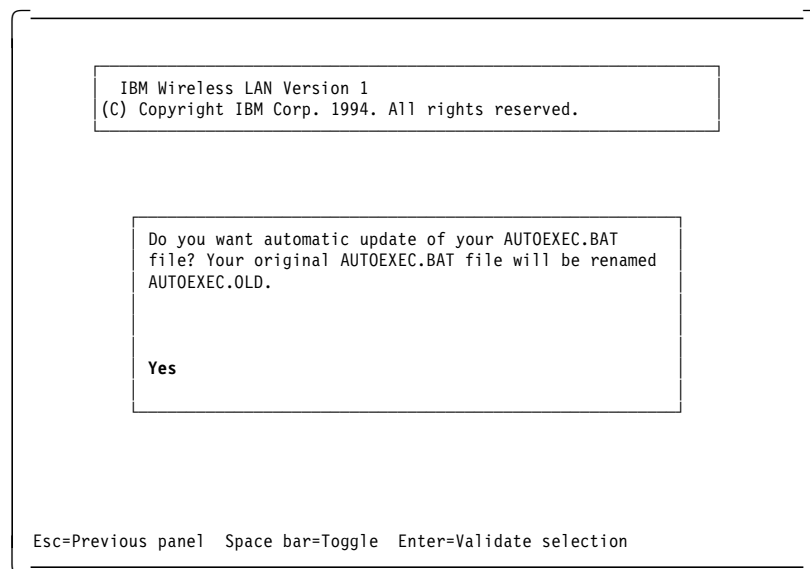


Figure 251. IBM Wireless LAN Workstation Update Panel for DOS (Full-Function Mode)

Select **Yes** and press Enter to validate. The following two lines will be added to the AUTOEXEC.BAT:

```
C:\WIRELESS\IBMWLDDM      <-- TSR Module
C:\WIRELESS\RSSI2 /L /D   <-- RSSI Control
```

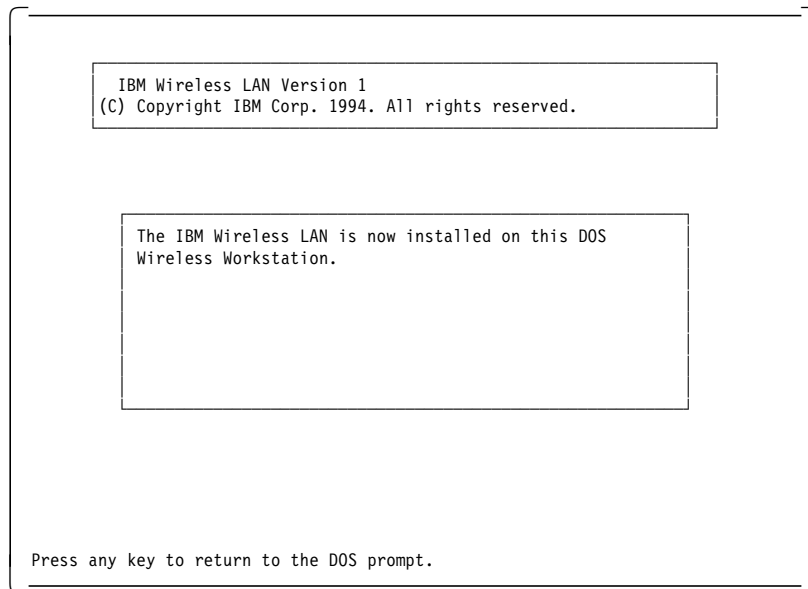


Figure 252. Create Configuration File Panel for DOS (Full-Function Mode)

The IBM Wireless LAN software will automatically be loaded the next time DOS starts.

## 7.1.2 Setting Up the Wireless Workstation for Windows

For the next wireless workstation (a ThinkPad computer working under IBM PC DOS Version 7.0 and Microsoft Windows 3.1) we need to do the following:

- Install and customize the IBM Wireless LAN workstation services
- Install and customize the IBM Wireless LAN NDIS driver (7.1.6, “Install and Customize LSP for DOS/Windows” on page 247)
- Install and customize Personal Communications to use a LAN IEEE 802.2 attachment (7.1.4, “Customize Personal Communications to Use AS/400 and S/390” on page 241)

To operate a wireless adapter and NDIS device driver in a PCMCIA machine, you need to have previously installed and configured the Card and Socket Services support. Refer to A.1, “Installing PCMCIA Device Drivers for DOS/Windows” on page 335 and to your PCMCIA adapter documentation.

To install and customize the IBM Wireless LAN workstation services perform the following steps:

- Start Microsoft Windows 3.1
- Insert the IBM Wireless LAN DOS/Windows Workstation labeled diskette into the A: drive
- Type A: at the command prompt and press Enter
- Click on the **File** option of the Program Manager window and select **Run** to get the Run panel.

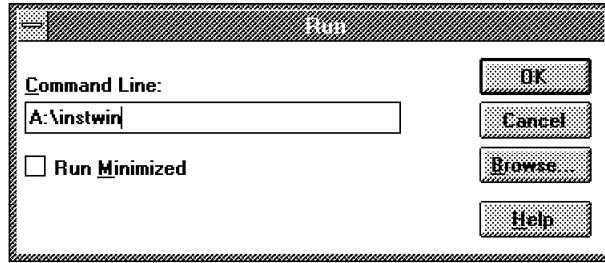


Figure 253. Windows Program Manager Run Panel - Wireless LAN

After a few seconds, you will see a message panel that tells you it is loading files and after a while, you will see the IBM logo panel with the Windows Wireless Workstation Install panel shown in the figures that follow.

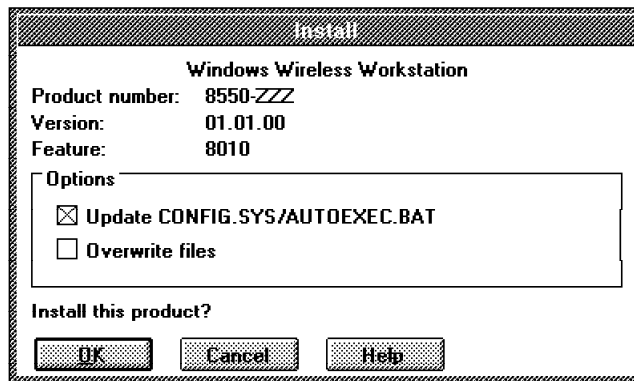


Figure 254. Windows Wireless Workstation Install Panel - Wireless LAN

On this panel, keep **Update CONFIG.SYS/AUTOEXEC.BAT** selected. It is easier to let the install program do it for you and the IBM Wireless LAN software will automatically be loaded the next time DOS/Windows starts.

Clicking on **OK** takes you to the Install Selection and Directories panel.

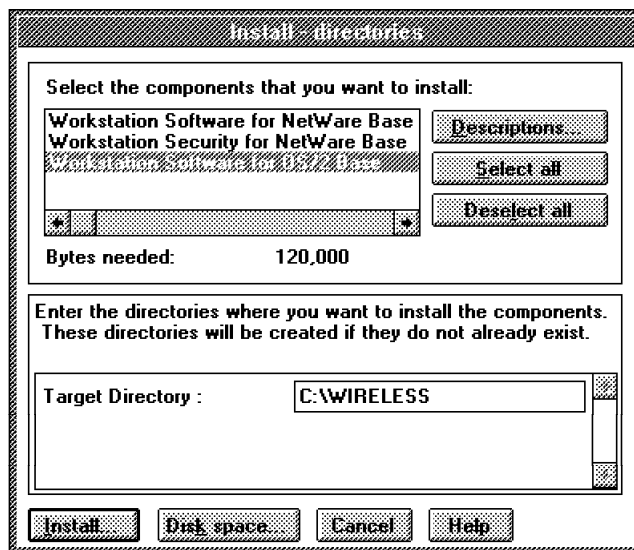


Figure 255. Install Selection and Directories Panel - Wireless LAN

Since we want to communicate with an OS/2 Base Station, select **Workstation Installation for OS/2 Base** and press Enter.

If you have a Base Station installed on a NetWare Server, choose the related **Workstation Software for NetWare Base**.

Allow it to use the default path (C:\WIRELESS), or specify your own and click on **Install**.

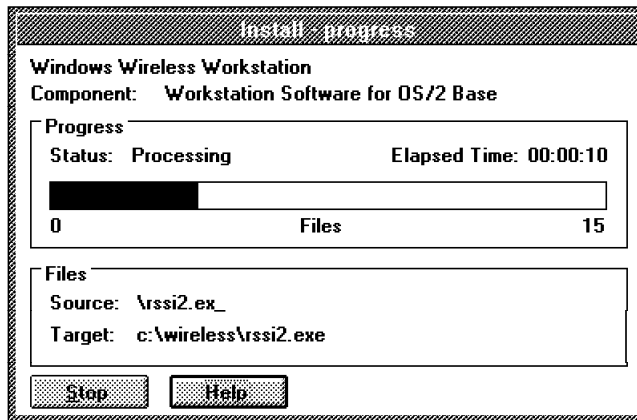


Figure 256. Install Process Panel - Wireless LAN

You can see, during the installation process, how much it has done. When the files are copied, you get a message that the CONFIG.SYS file has been updated and that you need to restart the system before the changes can take effect.

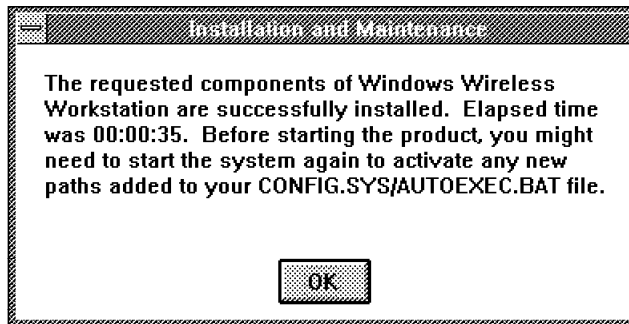


Figure 257. Installation and Maintenance Message Panel - Wireless LAN

Click on **OK** and you see the IBM Logo panel again. Select **Exit** from the File pull-down menu to leave installation program.

A new group Wireless Services has been added to the Program Manager (Figure 262 on page 241).



### 7.1.3 Setting Up the Wireless Workstation for OS/2

For the next wireless workstation (a ThinkPad computer working under OS/2 Warp Version 3.0) we need to do the following.

- Install and customize the IBM Wireless LAN workstation services
- Install and customize the IBM Wireless LAN NDIS driver (7.1.7, “Install and Customize LAPS or MPTS for OS/2” on page 254)
- Install and customize Personal Communications to use a LAN IEEE 802.2 attachment (7.1.4, “Customize Personal Communications to Use AS/400 and S/390” on page 241)

To operate a wireless adapter and NDIS device driver in a PCMCIA machine, you need to have previously installed and configured the Card and Socket Services support. Refer to A.2, “Installing PCMCIA Device Drivers for OS/2” on page 337 and to your PCMCIA Adapter documentations.

To install and customize the IBM Wireless LAN workstation services perform the following steps:

- Open an OS/2 window
- Insert diskette #1 (labeled: IBM Wireless LAN OS/2 Base/Workstation Volume 1) into the A: drive
- Type A: at the OS/2 prompt and press Enter
- Type INSTOS2 at the OS/2 prompt and press Enter
- After a few seconds, you’ll see a message panel that tells you it is loading files and after a while, you’ll see the IBM logo panel with the OS/2 Wireless Station Install panel shown in the figures that follows:

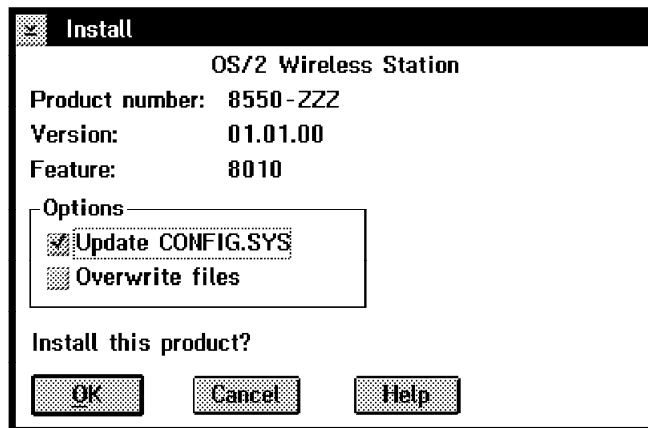


Figure 258. OS/2 Wireless Station Install Panel - Wireless LAN

On this panel, keep **Update CONFIG.SYS** selected. It’s easier to let the install program do it for you and the IBM Wireless LAN software will automatically be loaded the next time OS/2 starts.

Clicking on **OK** takes you to the Install Selection and Directories panel.

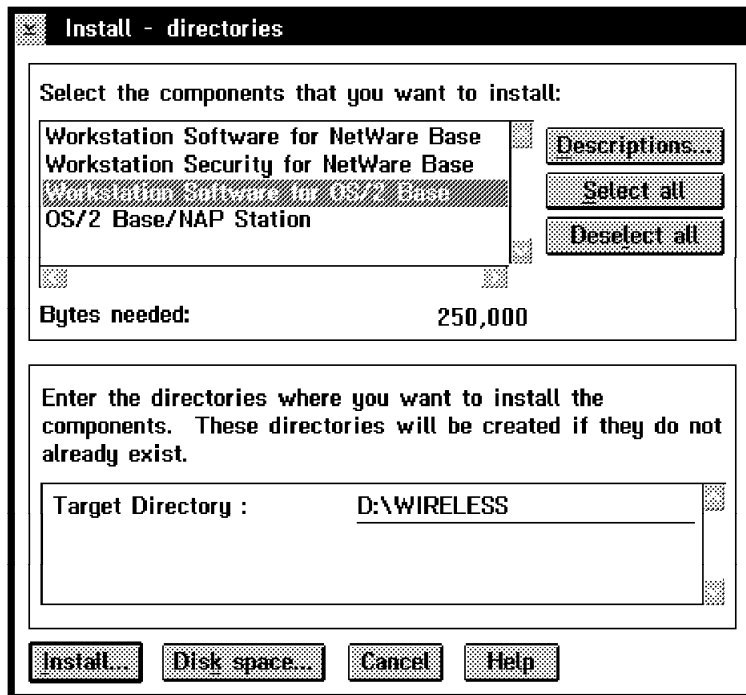


Figure 259. Install Selection and Directories Panel - Wireless LAN

Since we want to communicate with an OS/2 Base Station, select **Workstation Installation for OS/2 Base** and press Enter.

If you have a Base Station installed on a NetWare Server, choose the related **Workstation Software for NetWare Base**.

Allow it to use the default path (C:\WIRELESS), or specify your own and click on **Install**.

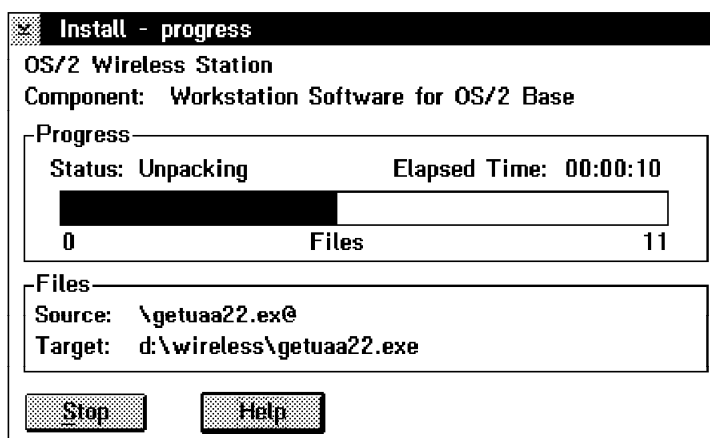


Figure 260. Install Process Panel - Wireless LAN

You can see, during the installation process, how much it has done. When the files are copied, you get a message that the CONFIG.SYS file has been updated and that you need to shut down and reboot your system, before the changes can take effect.

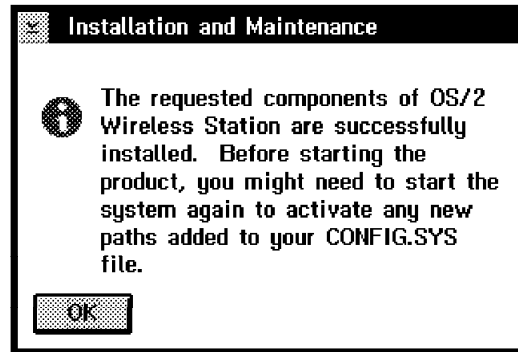


Figure 261. Installation and Maintenance Message Panel - Wireless LAN

Click on **OK** and you see the IBM Logo panel again. Select **Exit** from the File pull-down menu to leave the installation program.

A new folder, IBM Wireless Services, has been added to the OS/2 Desktop, where we added some more useful program icons, as shown.

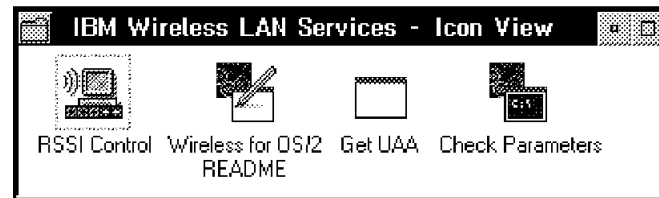


Figure 262. IBM Wireless LAN Services Folder/Group

#### 7.1.4 Customize Personal Communications to Use AS/400 and S/390

Our next step is to install Personal Communications AS/400 and 3270 Version 4.1, which we can connect to the S/390 host and an AS/400 system simultaneously. To install PCOM follow the steps at...

- 2.4, "Install PCOMM for OS/2" on page 14
- 2.3, "Install PCOMM for Windows" on page 13

To customize a Personal Communications double-click on the **Start/Configure Session** icon to start an empty PCOM WorkStation session, which will be overlaid by the Customize Communication panel (both are preceded by the IBM logo and a Welcome message).

## Customize the IEEE 802.2 Attachment for a S/390

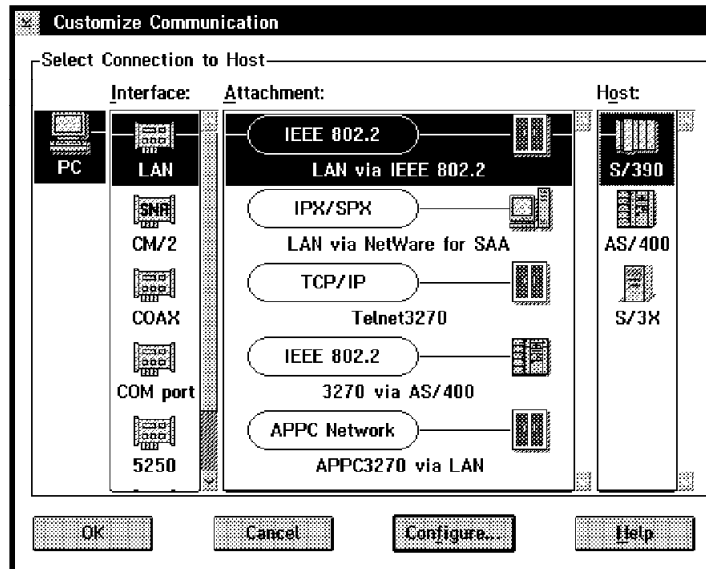


Figure 263. Customize Communication Panel - IEEE 802.2 Attachment

On the Customize Communication panel select the **S/390** host and the **LAN via IEEE 802.2** attachment, as you would do for a normal LAN environment. There are no differences for PCOM to customize it for a wireless LAN environment.

Double-click on the **IEEE 802.2** attachment type or click on **Configure Link...** If you are on the Customize Communication panel (shown in Figure 3 on page 18) specify the Link Parameters as shown in the figure below.

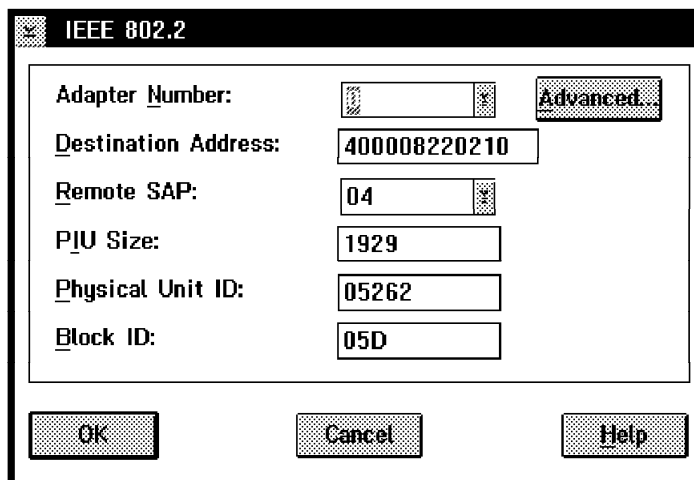


Figure 264. IEEE 802.2 Link Parameters Panel for a S/390

In this scenario it is essential for 3270 workstation sessions that the destination address matches the NTRI (NCP Token-Ring Interconnection) address of the 37xx gateway, and that the PUID and Block ID match the IDNUM and IDBLK respectively in the VTAM switched major node definition. The PIU size should match the value of MAXDATA in the VTAM switched major node definition.

Click on **Advanced...** for the advanced link option. A new panel will appear as shown in Figure 268 on page 247 with the parameters for the local SAP, receive buffer count and link station count. To connect to the 37xx gateway and to the AS/400 simultaneously, you need to increase the link station count to the number 2.

A further description of the correct parameters for the IEEE 802.2 panels is covered in 7.1.5, "Consideration of Parameters for LAN via IEEE 802.2 Attachment" on page 245. Don't forget to customize the Session Parameters covered in "Customize Communication - 3270 Host" on page 17.

### Customize the IEEE 802.2 Attachment for an AS/400

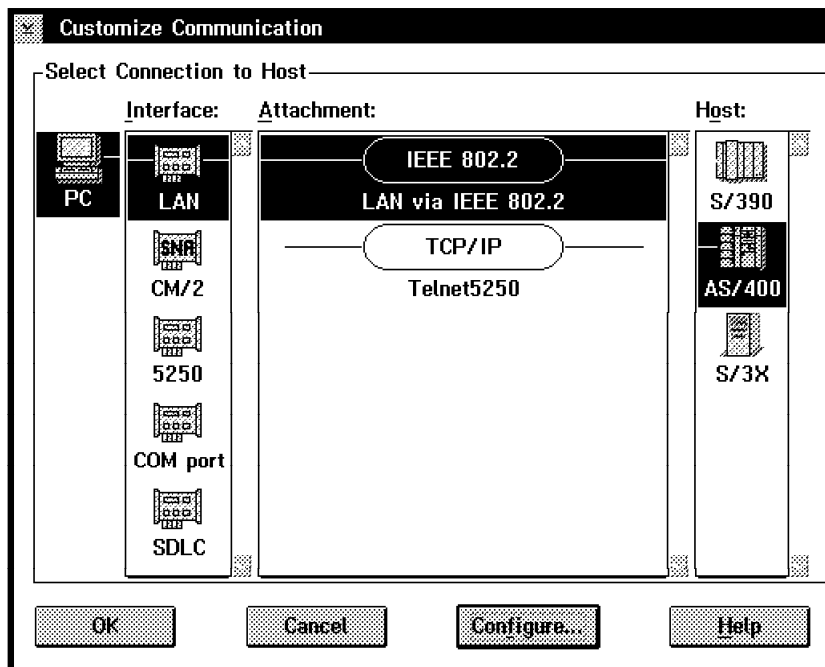


Figure 265. Customize Communication Panel - IEEE 802.2 Attachment

On the Customize Communication panel select the **AS/400** host and the **LAN via IEEE 802.2** attachment, as you would do for a normal LAN environment. There are no differences for PCOM to customize it for a wireless LAN environment.

Double-click on the **IEEE 802.2** attachment type or click on **Configure Link...** If you are on Customize Communication panel (shown at Figure 5 on page 19) specify the Link Parameters as shown in the figure below.

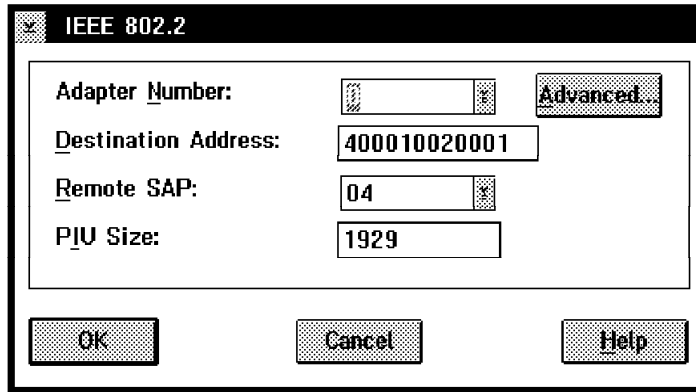


Figure 266. IEEE 802.2 Link Parameters Panel for an AS/400

For the 5250 WorkStation sessions, the parameters for the destination address must match the TRLAN local adapter address of the AS/400 line description, Remote SAP and PIU size. The PIU size should match the value of MAXFRAME (Maximum frame size) for your workstation definition on the AS/400.

Click on **Advanced...** for the advanced link option. A new panel will appear as shown in Figure 268 on page 247, with the parameters for the local SAP, receive buffer count and link station count. To connect to the AS/400 simultaneously and to the 37xx gateway, you need to increase the link station count to the number 2.

A further description of the correct parameters for the IEEE 802.2 panels is covered in 7.1.5, "Consideration of Parameters for LAN via IEEE 802.2 Attachment" on page 245.

The Session Parameters covered in "Customize Communication - 5250 Host" on page 19 are more important for an AS/400 connection than for an S/390 connection. To see that panel here again, double-click on the **AS/400** host icon on the panel shown in Figure 265 on page 243.

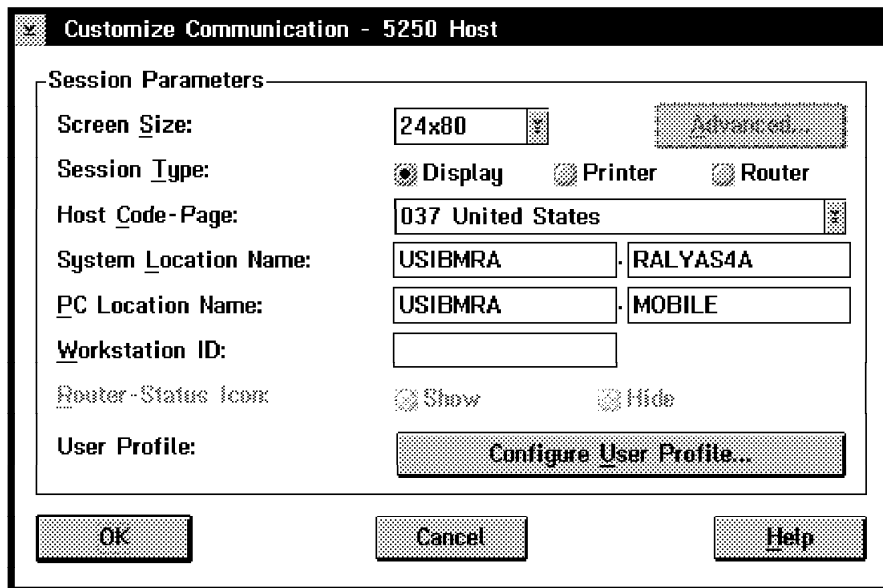


Figure 267. Customize Communication - 5250 Host Panel

The System Location Name and the PC Location Name defines the name of the AS/400 system and your workstation. Together these are known as the Full Qualified Network Name for these systems.

#### Number of terminal sessions

Personal Communications does not have a parameter for the number of sessions. If you need more than one, you can simply start the same session again by clicking on the **WorkStation** session icon. If you need some different sessions on your workstation, Personal Communications allows you to customize each WorkStation session separately. This is used if you have a printer session or if you want to communicate with different host systems or if there is any other reason to customize separate sessions.

### 7.1.5 Consideration of Parameters for LAN via IEEE 802.2 Attachment

Once you have selected the **LAN via IEEE 802.2** attachment, Figure 264 on page 242 allows you to specify the link parameter.

#### Adapter Number

The Adapter Number defines which LAN adapter is to be used for host communication. Adapter **0** corresponds to the primary adapter; adapter **1** corresponds to the alternate.

#### Destination Address

The destination address is the address of the gateway and *must* match the address specified in one of the following:

- For a 3174 gateway: Question 900 (the 3174 LAN address)
- For a 37xx gateway: LOCADD= parameter on the NCP LINE definition (the 37xx NTRI address)
- For a 9370 gateway: MACADDR= parameter on the PORT definition (the 9370 LAN address)
- For a PC/3270 V4.1 gateway: the 4000nnnnnnnn address specified on the DXMC0MOD.SYS device driver in the CONFIG.SYS file (PC/3270 V4.1 gateway locally administered address)
- For an OS/2 Communication Manager gateway: the Specify Adapter Address in the IEEE 802.2 Profile of the Advanced Configuration, LAN Feature Profile.
- For an AS/400 gateway: the Local adapter address in the token-ring line description (the AS/400 LAN address).

#### PIU Size

This size defines the number of bytes in the Path Information Unit (PIU) which is used for the link level communication. It is important that the PIU size be configured to fit into your network plan. If it is not correct, you will not get a connection, or you will be logged off. The PIU size **0265** is provided as the default and has an acceptable range to 2042 that *must* match one of these:

- For a 3174 gateway: Question 941, F value (defines the frame size).

- For a 37xx or 9370 gateway: both can accept a large value.
- For a PC/3270 V4.1 gateway: it is a good idea to match the PIU size configured in the network station profile for this particular station (although if the two values differ, the smaller of the two will actually be used).
- For an OS/2 Communication Manager gateway: the RU size will be specified in the Advanced Configuration, SNA Profiles and DLC Profile; The value here *must* be 9 bytes less than the PIU size in PCOM.
- For an AS/400 gateway: it should match the value you enter for the maximum frame size in the Create Ctl Desc panel.

### Physical Unit ID and Block ID

The PUID is also known by other names in the other systems: NODE ID, PUID, exchange ID, XID and IDNUM are some of them. The block ID is also part of the identification. Technically, the exchange ID or XID is a combination of the block ID and PUID. The XID is used to communicate with the host systems for a connection defined as if it were switched to the host.

For 37xx/NCP and 9370 connections, the PUID and block ID *must* be specified in an active VTAM switched major node definition. The PUID must match an IDNUM= statement in the VTAM definition. The block ID must match IDBLK= for the same PU.

Personal Communications is assigned a block ID of 061. However, you can change this if you wish. This is especially useful if you are migrating from some other emulator, or testing an OS/2 CM definition. For example, a 3174 has a block ID of 017 and OS/2 CM has a block ID of 05D. You could enter these block ID values here to use host definitions that already exist.

The PUID and block ID are not used at all by Personal Communications when connecting to 3174 and OS/2 CM gateways. The PUID is optional for a PC/3270 V4.1 gateway as it depends on how the network station profiles at the gateway are defined. It is a good idea to always enter something predefined in this field, so that you know what it is.

For AS/400 connections the PUID and block ID combined should match the bxchange identifier that is entered on the Create Ctl Desc (Remote WS) panel.

### Remote SAP/Local SAP Addresses

Generally the remote SAP and local SAP should match. The most used Service Access Point (SAP) default for SNA connections is X'04'. There are some circumstances in which this could be different, but they are most uncommon. Typically this would be when you are using two communications programs on your workstation.

- The remote SAP is a remote service access point where applications communicate. The remote SAP is defined in the gateway or control unit and should match the value for each link to the host.
- The local SAP is a local service access point for the workstation. This value should match the SAP number which is configured in the gateway device.

Contact your host systems personnel for assistance if X'04' doesn't match your communication.



The Personal Communications for Windows or OS/2 link parameters IEEE 802.2 panel has an Advanced... customize communication button. (See Figure 264 on page 242 and Figure 266 on page 244.) Click on Advanced... button for the advanced link option. A new panel will appear, as shown in Figure 268, where you can specify the link parameters.

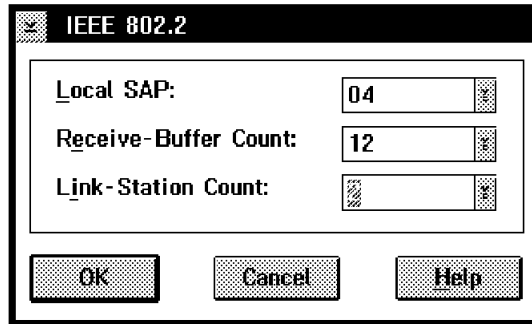


Figure 268. Advanced IEEE 802.2 Link Parameters Panel

#### Receive-Buffer Count

The Receive-Buffer Count is the number of the receive buffers for the local SAP that will be allocated in the conventional memory. Unless you are going to use an unusually high number of sessions, the default value will be adequate. The default value is **12**.

#### Link-Station Count

The Link-Station Count is the maximum number of gateways or host systems that will be used with the same network adapter and SAP number. The default value is 1. If the workstation connects to several gateways by using the same adapter and SAP number, you will need to increase this number to equal the number of different gateways.

Since we want to connect to an AS/400 and a S/390 host system, we must increase this number to 2.

**Note:** If you need to increase the Receive-Buffer and/or the Link-Station Count, you must do it in the configuration for the first session that starts, because this is the session that opens the adapter or starts the link task.

### 7.1.6 Install and Customize LSP for DOS/Windows

In a LAN environment, such as the Wireless LAN environment, Personal Communications for DOS and Windows uses the LAN Support Program (LSP) Version 1.3x to use the IEEE 802.2 protocol.

The Wireless Device Driver for the IBM Wireless PCMCIA Adapter provides the NDIS interface used by the LSP to bind with the protocols you want to use. Make sure that you have an LSP diskette with the latest version (1.38 today) on it and the IBM Wireless LAN DOS/Windows Workstation labeled diskette.

To install LSP and the Wireless Device Driver, follow these steps:

- Insert the IBM LAN Support Program labeled diskette into the A: drive.
- Type A: at the command prompt and press Enter.

- Type DXMAID at the command prompt and press Enter.
- You will see the IBM logo panel, where you press Enter to begin the installation/configuration process.
- Read the messages and press Enter to continue, to get the panel below.

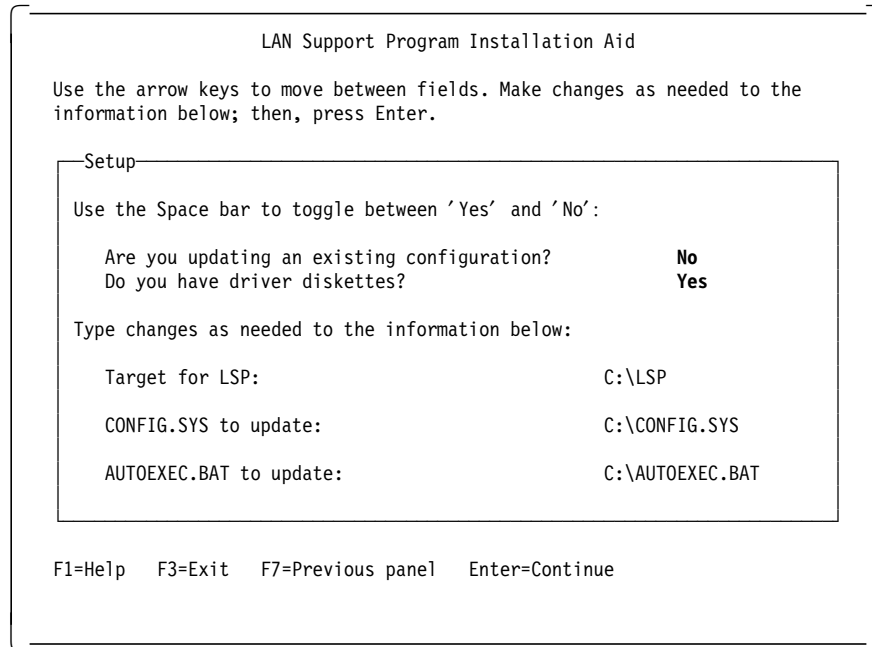


Figure 269. LAN Support Program Installation Aid Selection Panel

DXMAID is the utility provided by LSP that allows you to install and configure the NDIS MAC Device Drivers and Protocols that you want to use. Answer the questions in this panel and type in the information, as needed.

Pressing the Enter key takes you to the next LSP panel, where it asks for the device driver diskette.

- Insert the IBM Wireless LAN DOS/Windows Workstation labeled diskette into the A: drive.
- Verify the drive and directory for DOS NDIS files. They are in the A:\DOS directory on the wireless diskette for the DOS environment. Change it as needed and press Enter to continue.
- A message panel says that driver diskette files are processed at A:\DOS. Press Enter to continue. We don't want to process additional driver diskettes.
- Insert the IBM LAN Support Program labeled diskette into the A: drive and press Enter.

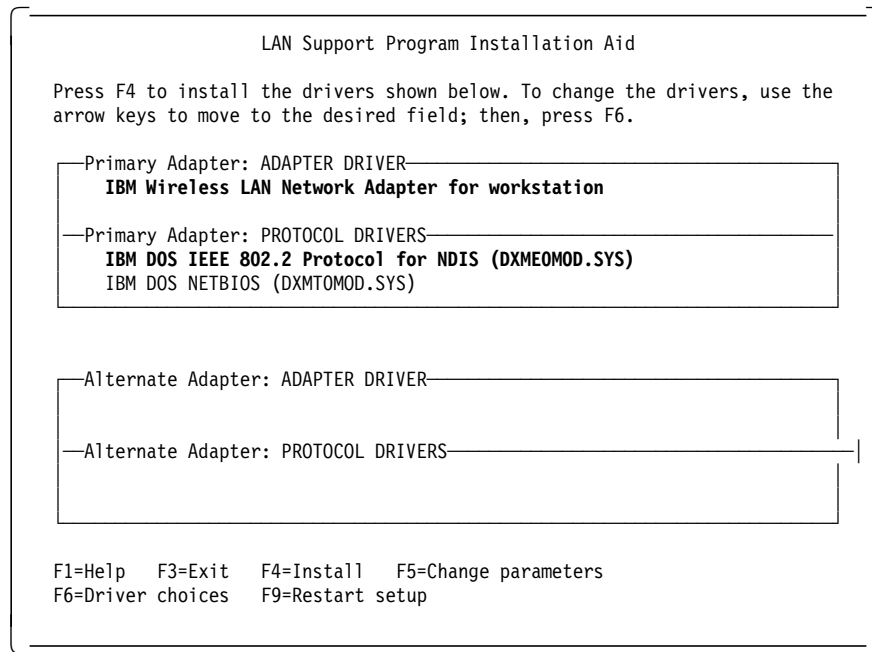


Figure 270. LAN Support Program Adapter and Protocol Panel

This is the main panel of LSP, from which all selection and customization for the adapter and protocol drivers can be done.

Highlight the **IBM Wireless LAN Network Adapter for workstation** as your primary adapter. Press F5 to customize its parameters, as shown in Figure 271.

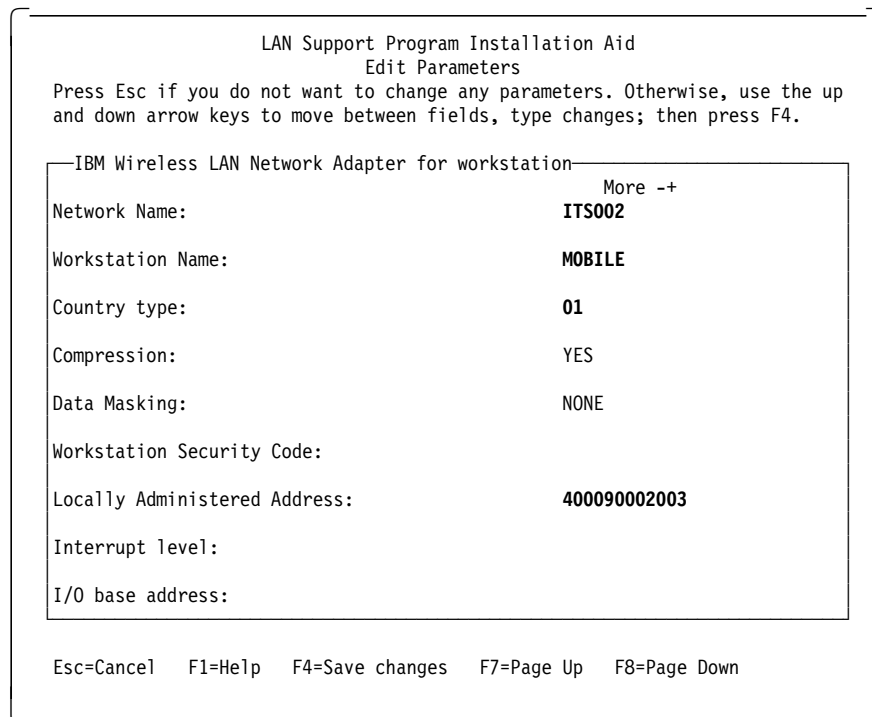


Figure 271. LAN Support Program Wireless LAN Network Adapter Panel

The IBM Wireless LAN Network Adapter for Workstation Parameter panel lets you customize all relevant wireless communication parameter for your workstation. Please refer to Figure 278 on page 256 to find the parameter description for this panel. They are exactly the same.

If you are finished with your customization, press F4 to save your parameters to the PROTOCOL.INI file and get back to the main panel (Figure 270 on page 249).

Select the required protocol drivers there. Move down, using the cursor key, to the Primary Adapter: PROTOCOL DRIVERS box and press F6 to get the choices. Select **IBM DOS IEEE 802.2 Protocol for NDIS (DXME0MOD.SYS)**, that we use for Personal Communications. You may need to select **IBM DOS NETBIOS (DXMT0MOD.SYS)** also, by typing an X before its line. Press F4 to save your selection.

Then highlight **IBM DOS IEEE 802.2 Protocol for NDIS (DXME0MOD.SYS)** and press F5 to customize that.

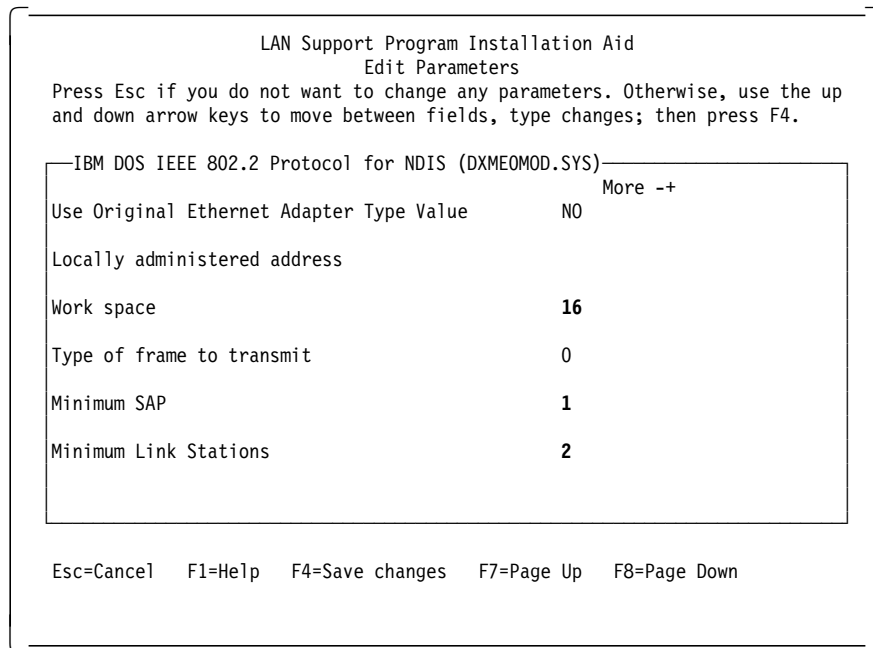


Figure 272. LAN Support Program IEEE 802.2 Protocol for NDIS Panel

On this panel, we have to increase the work space to 16 KB for the Wireless LAN Network Adapter. We also select 1 Minimum SAP and 2 Minimum Link Stations, since we want to use SAP 04 for Personal Communications and we want connect to an AS/400 and a S/390 host system. Do not specify a locally administered address on this panel. That has to be done on the panel in Figure 271 on page 249.

**Note:** If you are also using NetBIOS, you should provide large enough values for Extra SAPs (ES=1) and Extra Stations (EST=2) at its driver DXMT0MOD.SYS for PCOM.

Press F4 to save your changes. Press F4 again to complete the LSP installation and/or customization.

## Considerations on the Related Configuration Files

After your system has been rebooted, the changes will take effect. As a result of configuring the above profiles, the following should be noted. As illustrated in the following figures, the following changes have been made:

### CONFIG.SYS file

Figure 274 on page 252 shows you an example of statements created in the DOS CONFIG.SYS file by the installation programs for an IBM Wireless LAN DOS/Windows Workstation, as used in our IBM ThinkPad 755C.

The statements added by the LAN Support Program are shown in the LSP NDIS Device Drivers section.

### PROTOCOL.INI file

Figure 273 shows you an example of statements created in the LSP PROTOCOL.INI file by the LSP DXMAID configuration programs for an IBM Wireless LAN DOS/Windows Workstation.

### AUTOEXEC.BAT file

Figure 275 on page 252 shows the DOS AUTOEXEC>BAT file, used on a IBM ThinkPad 755C. Some of the statements are optional or depend on your home country National Language Support (NLS).

### SYSTEM.INI file

Figure 276 on page 253 shows the PCOM related drivers in the [386Enh] section of the Windows SYSTEM.INI file. The highlighted drivers are required and the other are optional, depending on the functions you want to use.

**Note:** The samples shown below also include the definitions to use TCP/IP as a second protocol in addition to IEEE 802.2 used for PCOM. To enable it, remove the rem statements in these configuration files.

```
[PROTMAN_MOD]
  DriverName = PROTMAN$           > NDIS Protocol Manager

[DXMAIDXCFG]
  DXMEO_NIF = DXMEO.NIF
  DXMJOMOD_NIF = DXMJOMOD.NIF
  IBMWL_NIF = IBMWL.NIF
  IBMWL2_NIF = IBMWL.NIF

[DXMEO_NIF]
  DriverName = DXMEO$             \ IEEE 802.2 NDIS Interface
  Bindings = IBMWL_NIF           /

; [TCP/IP_V21]
;   DriverName = DOSNDIS$         \ enable it, if you want
;   Bindings = IBMWL_NIF         / to use TCP/IP for DOS/Windows

[IBMWL_NIF]
  DriverName = IBMWL$             \ Wireless LAN Network Adapter
  NETWORKID = "ITS002"           / NDIS MAC driver parameters
  STATIONNAME = "MOBILE"
  COUNTRYCODE = 1
  COMPRESSION = "YES"
  DATAMASKING = "NONE"
  NETADDRESS = "400090002003"    /
```

Figure 273. LSP PROTOCOL.INI - Wireless LAN Workstation

```

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-dfff
                                                x=e000-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\IBDSSO1.SYS /D /SO=2         <-- Socket Services
DEVICE=C:\THINKPAD\IBDOSCS.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 ***** LSP NDIS Device Drivers *****
DEVICE=C:\LSP\PROTMAN.DOS /I:C:\LSP            <-- NDIS Protocol Manager
DEVICE=C:\LSP\IBMWL.DOS                       <-- Wireless LAN MAC Driver
DEVICE=C:\LSP\DXMAOMOD.SYS 001                 <-- Interrupt Arbitrator
DEVICE=C:\LSP\DXMEOMOD.SYS N ,16,0,1,2       <-- IEEE 802.2 Driver
rem DEVICE=C:\LSP\DXMTOMOD.SYS ES=1 EST=2 C=16 N=16 O=N <-- NetBIOS Driver
rem DEVICE=C:\TCPDOS\BIN\DOSTCP.SYS            <-- TCP/IP 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 274. DOS CONFIG.SYS - Wireless LAN Workstation

```

C:\LSP\NETBIND                                <-- initiates the bind process
C:\WIRELESS\IBMWLDDM                          <-- TSR Module for DOS and Windows workstations
C:\WINDOWS\SMARTDRV.EXE
@ECHO OFF
rem SET PATH=C:\DOS7;C:\PC3270;C:\WIRELESS;C:\TCPDOS\BIN;          <-- for DOS only
SET PATH=C:\DOS7;C:\WINDOWS;C:\PCOMWIN;C:\WIRELESS;C:\TCPDOS\BIN;
SET ETC=C:\TCPDOS\ETC                                           <-- used for TCP/IP only
SET TEMP=C:\DOS7\TEMP
C:\DOS7\NLSFUNC C:\DOS7\COUNTRY.SYS                          \
C:\DOS7\MODE.COM CON CP PREP=((437) C:\DOS7\ISO.CPI)          \ NLS Support for
C:\DOS7\MODE.COM CON CP SEL=437                               / non US countries
C:\DOS7\KEYB US,,C:\DOS7\KEYBOARD.SYS /ID:000                /
C:\DOS7\MOUSE.COM
C:\DOS7\DOSKEY.COM
rem RSSI2 /L /D                                             <-- RSSI Control for DOS only
rem CALL TCPSTART                                             <-- starts TCP/IP for DOS/Windows

```

Figure 275. DOS AUTOEXEC.BAT - Wireless LAN Workstation

```

[386Enh]
:
VPoolHeapSize=46                <-- specifies Data-Transfer Buffers Size
device=D:\PCOMWIN\Vpo11D.386    <-- Virtual Polling Driver
device=D:\PCOMWIN\Vs1anD.386   <-- IEEE 802.2 Interface
device=D:\PCOMWIN\VvlanD.386   <-- NetBIOS Interface
device=D:\PCOMWIN\Vdosh11D.386 <-- Virtual DOS EHELLAPI Driver
device=D:\PCOMWIN\VpcsrtrD.386 <-- Virtual DOS Router Driver
device=D:\PCOMWIN\Vint21hD.386 <-- Interrupt #21 Handler
device=D:\PCOMWIN\VvprtD.386   <-- Virtual Printer Driver
:
EMMExclude=C000-CFFF          <-- exclude upper Memory, used by PCMCIA Cards

```

Figure 276. Windows SYSTEM.INI - Personal Communications WorkStation

## Setting IO Base Address and Interrupt Request Level

IBM Wireless Device Driver allows you to set up an IO Base Address and Interrupt Level. These parameters are accessible during installation as a PROTOCOL.INI input (editable by LSP (dxmaid), LAPS or MPTS).

As a first approach, these parameters may be left blank and once a station is started, messages are displayed to indicate the initialized values for IO Base address and Interrupt level.

Note that the default values for IBM Wireless in NDIS environment are IRQ= 11 and IOBASE= 0x400.

The IOBASE default value or the one set in PROTOCOL.INI file is used by the IBM Wireless software as a starting value in the initialization routine.

**Note:** For the IBM ThinkPad 755xx series, IOBASE address must be set to 0x220 in the PROTOCOL.INI file.

The IRQ value set in PROTOCOL.INI file is the value requested by the system. If this value is rejected or if no value is set in the PROTOCOL.INI file, the initialization routine will iterate within the applicable range (11, 15, 5, 10), starting with the default value. Depending on the available resources in the machine you use, the initialization routine may end up with another value within the applicable range.

## Initialization Failure

At boot time, the IBM Wireless driver will return messages indicating if the initialization was successful or not. In the case of an initialization problem, a specific message will indicate the origin of the problem. Basically, these messages refer to Card and Socket Services problems (not found, improper version or not correctly parameterized), or to IO Base Address or Interrupt level assignment problem.

In the case of an IO Base Address or Interrupt problem, you will need to replace the default values by values taken from the applicable range. (Refer to the range provided during the LSP or LAPS edition.)

### 7.1.7 Install and Customize LAPS or MPTS for OS/2

Some NDIS Drivers for OS/2 are part of Network Transport Services/2 (NTS/2) (LAPS) or the Multiple Protocol Transport Services (MPTS) provided in LAN Server V4.0, OS/2 Warp Connect and Warp Server Version 3.0. If you don't have already one of the above products (LAPS or MPTS) installed, perform the following steps:

- Open an OS/2 window.
- Insert the LAPS or MPTS diskette #1 into the A: drive.
- Type A: at the OS/2 prompt and press Enter.
- Type LAPS or MPTS (depends on the diskette you have) at the OS/2 prompt and press Enter.
- When the IBM welcome panel is displayed, click on **Install**.
- The next panel lets you select the target drive and directory. Take the default (IBMCOM) at the boot drive whenever possible.
- You will be prompted when the installation is completed. Click on **OK**. Then remove the diskette from drive A:.
- Shut down and reboot your system

For further details on LAPS installation, refer to the *LAN Adapter and Protocol Support Configuration Guide*.

The IBM Wireless LAN NDIS drivers are on the IBM Wireless LAN OS/2 Base/Workstation Volume 1 diskette, which may you have already in drive A:.

- Open an OS/2 window
- Change to the LAPS/MPTS directory (by default type CD \IBMCOM) and press Enter.
- Type LAPS or MPTS (depends on your installation) at the OS/2 prompt and press Enter.
- When the IBM welcome panel is displayed, click on **Install**.
- You will be prompted for additional network drivers. Insert the IBM Wireless LAN OS/2 Base/Workstation Volume 1 diskette into the A: drive and click on **OK**.
- You will be prompted when the installation is completed. Click on **OK**. Then remove the diskette from drive A:.
- Back on the main panel, click on **Configure**.
- On the next panel, select **Configure LAN Transports (LAPS) or LAN Adapters and Protocols** and click on **Continue** or **Configure**.

Now, you will see the most important LAPS Configuration panel, shown in Figure 277 on page 255.



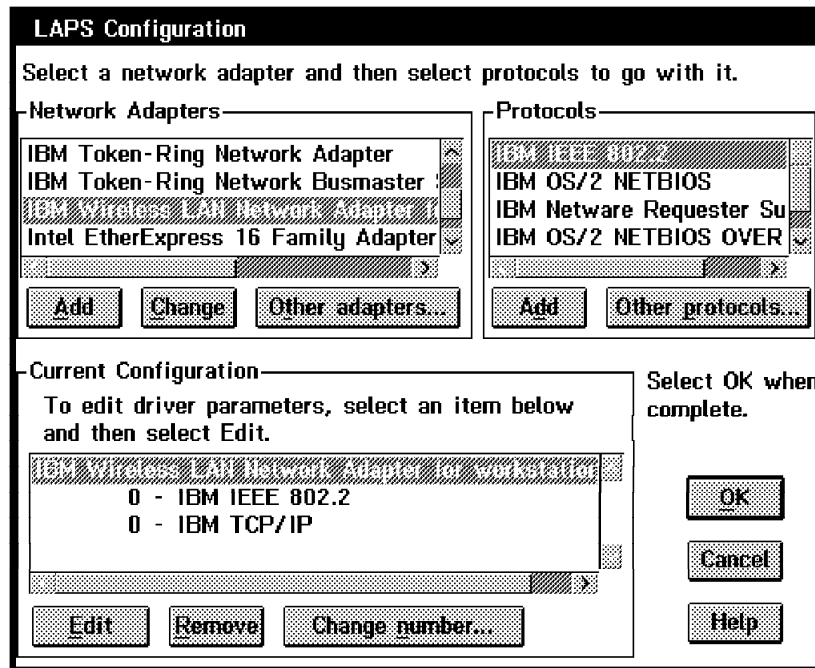


Figure 277. LAPS Configuration Panel - Wireless LAN

You have three boxes within this window:

#### Network Adapters

Use this box to select the required network adapter(s). Notice you have network adapters for token-ring, Ethernet, PC Network, 3174 Peer Communications and others. Look for the IBM Wireless LAN Network Adapter for Workstation, select it and click on **Add**.

#### Protocols

The protocol you choose here will be installed under the current selected network adapter within the Current Configuration box. To choose a protocol, you must have chosen a network adapter before. For our example select **IBM IEEE 802.2** protocol and click on **Add**.

#### Current Configuration

This box shows your actual configuration. You can change parameters for the network adapter(s) or protocol(s) you chose by clicking on **Edit**. You will need to edit the parameters for the IBM Wireless LAN Network Adapter for Workstation. Select it and click on **Edit**, which takes you to the next panel, shown in Figure 278 on page 256.

**Parameters for IBM Wireless LAN Network Adapter for workstation**  
 Edit the parameters as needed.

Network Name:	ITS002
Workstation Name:	MOBILE
Country type:	01
Compression:	YES
Data Masking:	NONE
Workstation Security Code:	
Locally Administered Address:	400090002003
Interrupt level:	
I/O base address:	

OK Range Cancel Help

Figure 278. IBM Wireless LAN Network Adapter for Workstation - Parameter Panel

The parameters for IBM Wireless LAN Network Adapter for Workstation panel lets you customize all relevant wireless communication parameter for your workstation, as follows:

**Network Name**

This parameter specifies the wireless network name to which your workstation wants to communicate. This name uniquely identifies your wireless network and must match the network name entered for your base station in the Network Administration Program (NAP).

**Workstation Name**

This name uniquely identifies your wireless workstation on the wireless LAN network.

**Country Type**

This parameter specifies the country code of your workstation. If you are travelling abroad, enter the country type of the base station you want to connect to. The country type is the last two digits of the serial number printed on the radio sticker (for example: SN: XX-XXXXX-YY where YY is the country type).

**Compression**

Select **YES** for compression if you want data compression on your wireless communication.

**Data Masking**

Type **NONE** as a default if you don't want authentication and encryption on your wireless communication. To set this parameter to **AUTH** or **ENCR**, security must be enabled on your base station.

**Workstation Security Code**

This parameter specifies the workstation security and depends on the base station you are connecting to. It is required only when Data Masking is set to **AUTH** or **ENCR**. Leave this field blank.

**Locally Administered Address**

This parameter is optional and overrides the Universally Administered Address (UAA) of the IBM Wireless LAN adapter card. We recommend that you use a Locally Administered Address (LAA) in your LAN, because it's easier to handle in your LAN Administration and Network Management tasks.

**Interrupt Level and I/O Base Address**

These parameters are required if you are using an ISA Wireless LAN adapter. They are optional for PCMCIA and MCA adapters, but it must match the adapter definitions, if you enter them.

Click on **OK** if you are finished with your customization. This takes you back to Figure 277 on page 255. Clicking on **OK** again lets you exit to LAPS configuration. Follow these panels and let the LAPS/MPTS program update the CONFIG.SYS file. IBM Wireless LAN software will automatically be loaded the next time OS/2 starts.

**Considerations on the Related Configuration Files**

After your system has been rebooted, the changes will take effect. As a result of configuring the above profiles, as illustrated in the following figures, the following changes have been made:

**CONFIG.SYS file**

Figure 279 on page 258 shows you an example of statements created in the OS/2 CONFIG.SYS file by the installation programs for an IBM Wireless LAN OS/2 workstation.

**PROTOCOL.INI file**

Figure 280 on page 258 shows you an example of statements created in the OS/2 PROTOCOL.INI file by the LAPS configuration programs for an IBM Wireless LAN OS/2 workstation.

**Note:** The samples shown below also include the definitions to use TCP/IP as a second protocol, in addition to IEEE 802.2, which is used for PCOM.

```

:
LIBPATH=.;C:\MPTN\DLL;C:\IBMCOM\DLL;D:\PCOMOS2;C:\OS2\DLL;C:\OS2\APPS\DLL;C:\MMOS2\DLL;C:\...
SET PATH=.;C:\MPTN\BIN;C:\IBMCOM;D:\WIRELESS;D:\PCOMOS2;C:\OS2;C:\OS2\APPS;C:\MMOS2;C:\...
SET DPATH=.;C:\IBMCOM;D:\WIRELESS;D:\PCOMOS2;C:\OS2;C:\OS2\APPS;C:\MMOS2;C:\OS2\MDOS;C:\...
:
DEVICE=C:\IBMCOM\PROTOCOL\LANPDD.OS2
DEVICE=C:\IBMCOM\PROTOCOL\LANVDD.OS2
DEVICE=C:\IBMCOM\LANMSGDD.OS2 /I:D:\IBMCOM
DEVICE=C:\IBMCOM\PROTMAN.OS2 /I:D:\IBMCOM
:
CALL=C:\IBMCOM\PROTOCOL\NETBIND.EXE
RUN=C:\IBMCOM\LANMSGEX.EXE
SET ETC=C:\MPTN\ETC
RUN=C:\IBMCOM\PROTOCOL\NETBIND.EXE
DEVICE=C:\IBMCOM\PROTOCOL\LANDD.OS2
DEVICE=C:\IBMCOM\PROTOCOL\LANDLDD.OS2
RUN=C:\IBMCOM\PROTOCOL\LANDLL.EXE
DEVICE=D:\PCOMOS2\VHAPI.OS2 <-- Virtual DOS-Box EHLAPI Driver
DEVICE=C:\MPTN\PROTOCOL\MPTN.SYS
DEVICE=C:\MPTN\PROTOCOL\LIPC.SYS
DEVICE=C:\MPTN\PROTOCOL\INET.SYS
DEVICE=C:\MPTN\PROTOCOL\IFNDIS.SYS
RUN=C:\MPTN\BIN\CNTRL.EXE /P mptn_os$ mptn_in$
CALL=C:\OS2\CMD.EXE /Q /C C:\MPTN\BIN\MPTSTART.CMD
DEVICE=C:\IBMCOM\MACS\IBMWLO.OS2 <-- Wireless LAN MAC Driver

```

Figure 279. OS/2 CONFIG.SYS - Wireless LAN Workstation

```

[PROT_MAN]
  drivervname = PROTMAN$

[IBMLXCFG]
  landd_nif = landd.nif
  TCPIP_nif = TCPIP.nif
  IBMWLO_nif = IBMWLO.nif

[landd_nif]
  DriverName = LANDD$
  Bindings = IBMWLO_nif
  ETHERAND_TYPE = "I"
  SYSTEM_KEY = 0x0
  OPEN_OPTIONS = 0x2000
  TRACE = 0x0
  LINKS = 8
  MAX_SAPS = 3
  MAX_G_SAPS = 0
  USERS = 3
  T1_TICK_G1 = 255
  T1_TICK_G1 = 15
  T2_TICK_G1 = 3
  T1_TICK_G2 = 255
  T1_TICK_G2 = 25
  T2_TICK_G2 = 10
  IPACKETS = 250
  UIPACKETS = 100
  MAXTRANSMITS = 6
  MINTRANSMITS = 2
  TCBS = 64
  GDTS = 30
  ELEMENTS = 800

[TCPIP_nif]
  DriverName = TCPIP$
  Bindings = IBMWLO_nif

[IBMWLO_nif]
  DriverName = IBMWL$
  NetWorkId = "ITS002"
  StationName = "MOBILE"
  CountryCode = 01
  Compression = "YES"
  DataMasking = "NONE"
  NETADDRESS = "400090002003"

```

Figure 280. LAPS/MPTS PROTOCOL.INI - Wireless LAN Workstation

## 7.1.8 Define the Wireless Workstation on the Base Station

To add the wireless ThinkPad workstation to the wireless network, you have to give them access on the base station. Therefore go to the base station, where your IBM Wireless LAN Supervisor is started and start the Network Administration Program (NAP).

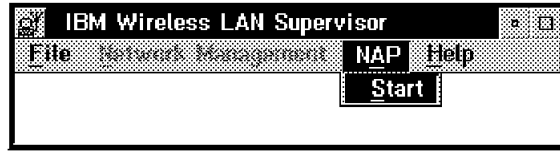


Figure 281. IBM Wireless LAN Supervisor - Base Station

On the NAP panel click on the **Access** tab button of the NAP notebook.

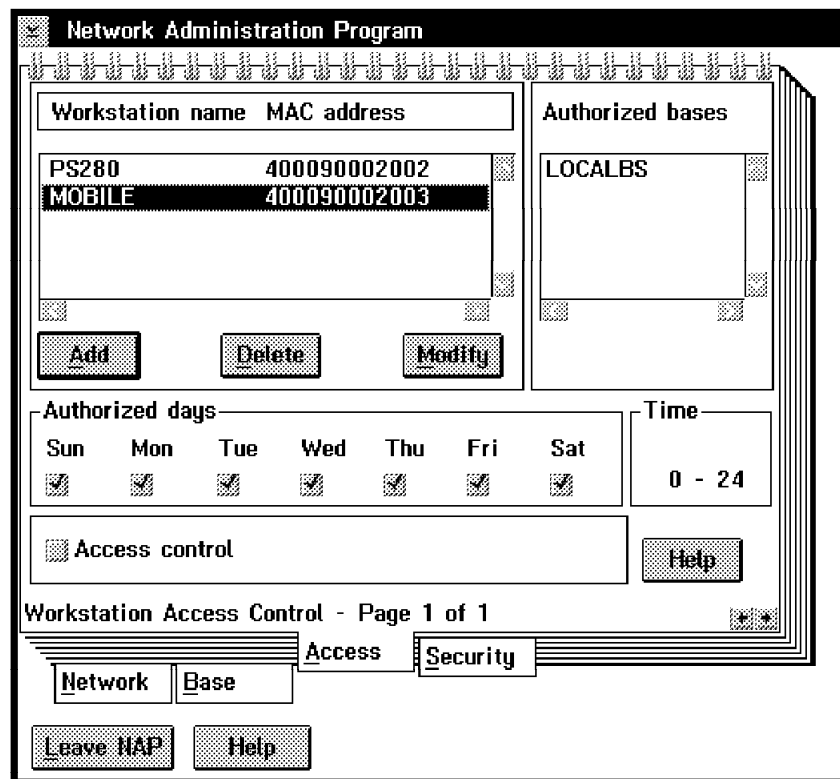


Figure 282. Network Administration Program Panel - Base Station

The workstation list shows the name and MAC address (UAA or LAA) of all the wireless workstations in the network. The authorized base list shows the name of each base station to which a selected wireless workstation is allowed to connect.

To add a new wireless workstation to the list and define its access rights, click on **Add**. You get the Add a Workstation panel, where you can enter the information.

Figure 283. Add a Wireless Workstation to NAP Panel - Base Station

In the Workstation name field, enter the name of the wireless workstation that you have given your workstation during the LAPS configuration shown in Figure 278 on page 256.

In the MAC address field, enter the Locally Administered Address (LAA), that you have given your workstation during the LAPS configuration shown in Figure 278 on page 256. If that field has been left blank, enter the Universally Administered Address of your wireless adapter.

Make your choices for Days and Time to control the authorized connection time. To authorize the connection of your wireless workstation to the base station, click on the name of the base in the Authorized Bases list.

After you finish specifying access rights, click on **OK** to add your new wireless workstation. You'll return to the Workstation Access Control page of the NAP notebook (Figure 282 on page 259). Before you enable Access control, be sure you have defined access rights for all wireless workstations in the network. Workstations without access rights will not be able to connect the network.

This completes the access control setup.

### 7.1.9 VTAM Definitions for PC/3270 V4.1 Workstation

Each PC/3270 V4.1 WorkStation that will connect through a 37xx gateway will require its PU and its LUs to be defined in a VTAM switched major node definition. If the switched major node is not active when a workstation tries to connect, you will receive this message from VTAM:

```
IST690I CONNECTION REQUEST DENIED - INVALID STATION ID = 020005D05262
```

The ID= in the above message comes from the PUID and block ID (...05D05262 in our example) in your Personal Communications configuration. Thus, the message is very useful for determining if you are getting through NCP and into VTAM (deactivate the switched PU and see if you get the messages). This message will also be given for a very common problem: an incorrect IDBLK.

```

*****
*          VTAM SWITCHED MAJOR NODE FOR NTRI          *
*****
E24SW  VBUILD MAXGRP=5,          REQUIRED          X
        MAXNO=12,             REQUIRED          X
        TYPE=SWNET            REQUIRED
E24PS88 PU  ADDR=06,           COULD BE ANYTHING (NOT USED) X
        IDBLK=05D,           PC/3270 WKSTN
        IDNUM=05262,
        DISCNT=NO,
        MAXOUT=4,
        MAXDATA=1929,
        MAXPATH=2,
        PASSLIM=1,
        PUTYPE=2
E24D8801 PATH DIALNO=020440090002003, TO 3270 PC EMULATOR X
        GRPNM=EG24P01,      FROM TIC 2
        GID=1,
        PID=1
E24L8802 LU  LOCADDR=2,        3270 TERMINAL MODEL 2 X
        VPACING=7,
        PACING=7,
        DLOGMOD=D4C32XX3,
        USSTAB=US327X
E24L8803 LU  LOCADDR=3,        3270 TERMINAL MODEL 3 X
        LOGAPPL=RAPAN,
        VPACING=7,
        PACING=7,
        DLOGMOD=D4C32XX3,
        USSTAB=US327X
:
E24L8806 LU  LOCADDR=6,        3270 TERMINAL MODEL 4 X
        VPACING=7,
        PACING=7,
        DLOGMOD=D4C32XX3,
        USSTAB=US327X

```

Figure 284. VTAM Switched Major Node Definition for PC/3270 V4.1 Workstation

Figure 284 shows the switched major node used to represent the PC/3270 V4.1 workstation in VTAM. The maximum number of LUs is eight for a single PC/3270 V4.1 workstation. We defined five LUs here, but specified only two sessions in the PC/3270 V4.1 configuration. This will not hurt anything. It would allow the user to configure up to five sessions for the workstation at a later date if desired.

Note that the GRPNM parameter is highlighted. This is important if there are several token-ring adapters in the same 37xx, in which case it *must* match the appropriate GROUP parameter in the NCP definition. This ensures that both VTAM and the workstation are communicating through the same token-ring adapter.

### 7.1.10 NCP Definitions for 37xx Token-Ring Attachment

This is a partial NCP definition used to illustrate some of the important parameters that *must* match the PC/3270 V4.1 workstation configuration. An OPTIONS macro has to be included; the NEWDEFN=YES has to be specified on this macro for NTRI.

```

*****
*          OPTIONS DEFINITION STATEMENT          *
*****
NCPOPT  OPTIONS NEWDEFN=(YES,ECHO),USERGEN=(FNMNDFGN)
:

```

Figure 285. NCP Definition - Options Statement

The BUILD macro has to include some parameters concerning the token-ring attachment(s). The MXVLINE *must* be equal to the total number of logical lines specified in this NCP definition. Each workstation defined as a PU on the token-ring is considered to be on a logical switched line.

```

*****
* BUILD MACRO SPECIFICATIONS *
*****
NCPBUILD BUILD VERSION=V4R3.1, # NCP V4 REL3 X
      MXRLINE=2, # OF TICS ATTACHED X
      MXVLINE=25, X
      :

```

Figure 286. NCP Definition - Build Macro Specifications

The NUMTYP2 parameter in the LUDRPOOL macro has to be increased with the number of LUs that will be active concurrently on the NTRI.

```

*****
* DYNAMIC RECONFIGURATION POOL SPACE *
*****
DRPOOLLU LUDRPOOL NUMILU=32, RESERVE 32 ILUS
      NUMTYP1=10, RESERVE 10 LUS ON PU.T1 PUS
      NUMTYP2=200 RESERVE 200 LUS ON PU.T2 PUS
      :

```

Figure 287. NCP Definition - Dynamic Reconfiguration Pool Space

Each token-ring interface coupler (TIC), the physical attachment from the 37xx to the token-ring, is specified by a GROUP macro with the parameter ECLTYPE=PHYSICAL. Note that the GROUP name is matched by the GRPNM parameter in the VTAM switched major node definition. This ensures that both VTAM and the PC/3270 V4.1 workstation are both communicating through the same token-ring adapter. The GROUP macro is followed by a LINE, PU and LU macro to fully describe the TIC.

The token-ring address of the 37xx is given by the LOCADD= parameter; this is also the destination address for the PC/3270 V4.1 workstation.

```

*****
* PHYSICAL GROUP FOR NTRI TIC 2 *
*****
EG24P01 GROUP ECLTYPE=PHYSICAL, TRN LAN PHYSICAL GROUP X
      TYPE=NCP, X
      DIAL=NO, X
      LNCTL=SDLC, X
      :
EL24081 LINE ADDRESS=(81,FULL), X
      PORTADD=1, PHYSICAL PORT ADDRESS OF 2ND TIC X
      LOCADD=400008220210, LOCALLY ADMIN. ADDRESS OF 2ND TIC X
      RCVBUFC=4095, MAX RECEIVE BUFFER SIZE X
      MAXTSL=1108, TRANSMIT FRAME SIZE X
      :
EP24081 PU ADDR=01
EU24081 LU ISTATUS=INACTIVE, X
      :

```

Figure 288. NCP Definition - Physical Group for NTRI



Each downstream workstation configured as a PU (stand-alone or gateway) on the ring will need a logical LINE and PU definition. These are defined on a GROUP ECLTYPE=LOGICAL that follows the GROUP ECLTYPE=PHYSICAL for each TIC. Rather than coding a lot of LINE and PU statements, you can use the AUTOGEN facility to automatically generate the required number of concurrently active stations. In this example, the AUTOGEN=12 statement means that up to 12 concurrently active downstream PU workstations are allowed on this TIC. Note also the OWNER= statement in Figure 289. This 37xx is attached to more than one host but this logical group is owned by the subarea host SA2. This means that your VTAM switched major node definition *must* be activated in this subarea.

```

*****
*          LOGICAL  GROUP FOR NTRI TIC 2          *
*****
EG24L01  GROUP ECLTYPE=LOGICAL,                  X
          AUTOGEN=12,                             X
          CALL=INOUT,                             X
          :
          OWNER=SA2,                              X
          PHYPORT=1,                              X
          TYPE=NCP,                               X
          DIAL=YES,                               X
          LNCTL=SDLC,                             X
          :

```

Figure 289. NCP Definition - Logical Group for NTRI

### 7.1.11 AS/400 Definitions for Token-Ring (TRLAN) Adapter

```

Display Line Description - Token-Ring

Line description . . . . . : LIND          TRNLINE01
Resource name . . . . . : RSCRCNAME     LINO21
Online at IPL . . . . . : ONLINE        *YES
Vary on wait . . . . . : VRYWAIT       *NOWAIT
Network controller . . . . . : NETCTL
Maximum controllers . . . . . : MAXCTL    40
Maximum frame size . . . . . : MAXFRAME  1929
TRLAN Manager logging level . . . : TRNLOGLVL *MAX
  Current logging level . . . . . : *MAX
Local adapter address . . . . . : ADPTADR  400010020001
Exchange identifier . . . . . : EXCHID
Source service access points . . . : SSAP    04

Error threshold level . . . . . : THRESHOLD *OFF

More...

Press Enter to continue.

F3=Exit  F12=Cancel

```

Figure 290. AS/400 Configuration Panel - Local Adapter Address



## Chapter 8. Communications Manager/2 Asynchronous Connectivity

Using Communications Manager/2 for its transport capacity is certainly the most likely scenario where both products actively run on an OS/2 workstation. In fact, IBM has made a statement of direction that the emulator function in CM/2 will be replaced by the Personal Communications for OS/2 emulator in a future version. This implies that any Communications Manager/2 user wishing to use an emulator will most likely use Personal Communications emulator services over CM/2 links.

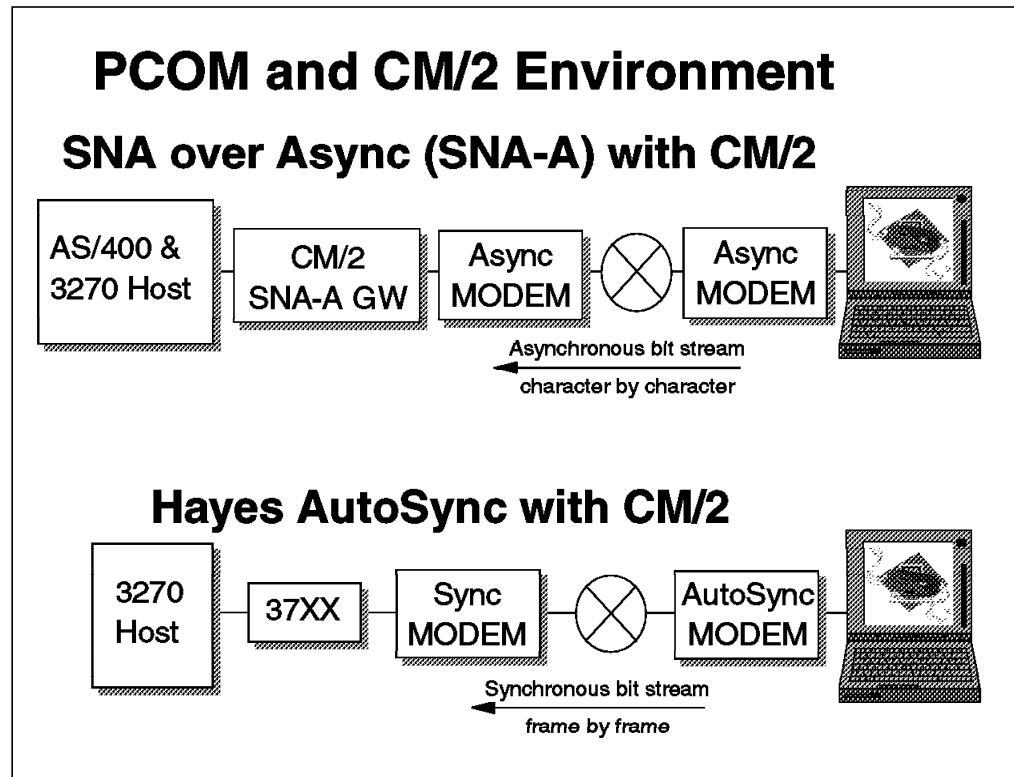


Figure 291. Personal Communications and Asynchronous Communications Manager/2 Connectivity

### Why should a mobile user use Personal Communications on top of Communications Manager/2?

Of course Personal Communications Version 4.1 can do asynchronous connections as well as Communications Manager/2 can do it. But there are some reasons to use Personal Communications on top of Communications Manager/2:

**APPN** APPN (Advanced Peer-to-Peer Networking) is a key part of the more modern SNA architecture. It basically provides enhanced support for connecting independent LU6.2 sessions between cooperating machines. It is essentially a "flat" type of network among peer machines with no necessity for a single master controlling the network.

**Note:** In fact, APPN is not strictly limited to the support of independent LU6.2 sessions. Recent advancements, such as DLUr/s, also take advantage of an APPN network and LU2 sessions do indeed flow on the APPN network.

The main functions of APPN can be summarized as follows:

- Intermediate session routing

In an APPN network, the SNA session traffic can be routed over multiple intermediary machines. The optimum path as determined by the customer's criteria is chosen dynamically when the session is established. The routing ability also implies a link multiplexing capability whereby incoming SNA sessions from several links can all share one outgoing link.

- Minimized configuration

APPN can dynamically and automatically locate a partner system anywhere on the network. It alleviates the need for most network definitions. The network is automatically made aware of new or unavailable paths and can always locate newly available resources.

**Note:** Communications Manager/2 is one of the very rare Intel-based products that provides full APPN support.

**APIs** API (Application Programming Interfaces) are the second key reason to keep Communications Manager/2 on your workstation. The following APIs can be used in a CM/2 asynchronous communication that are not available in PCOM:

**ACDI** Asynchronous Communications Device Interface is a standardized API for accessing the workstation's serial ports.

**APPC** The Advanced Program-to-Program Communications interface is a Communications Manager/2-specific LU6.2 implementation. It is a complete communications interface for developing sophisticated client/server applications.

**CPI-C** CPI-C is the Common Programming Interface for communications. It is the SAA-compliant counterpart to APPC. It is an easier, more portable interface than APPC. It has some limitations, however, in that it does not take full advantage of the OS/2 environment.

**LUA** The conventional LU Application API supports two interfaces for dependent LU programming. The Request-Unit Interface (RUI) is the lower level used by the higher Session-Level Interface (SLI).

The LUA3270 via CM/2, APPC3270 via CM/2, and 5250 via CM/2 are attachment types of Personal Communications Version 4.1 that use Communications Manager/2 as their communications subsystem to establish a link.

Communications Manager/2 Version 1.11 introduces a significant feature called SNA Phone Connect. Figure 291 on page 265 shows the two possibilities, using CM/2 in an asynchronous environment:

1. Asynchronous SNA Phone Connections with asynchronous modem communication via the serial communications devices/adapters, such as a COM port or any adapter configured as a serial port.
2. AutoSync SNA Phone Connections to connect to synchronous modems using a Hayes AutoSync-compatible modem and the serial communications devices/adapters, such as a COM port or any adapter configured as a serial port.

Personal Communications Version 4.1 for OS/2 is designed to use the CM/2 communications subsystem in two different ways:

1. APPC3270 via CM/2 and/or APPC5250 via CM/2 using the SNA Network (LU6.2).

APPC3270 and APPC5250 communicates to a host system via the APPC interface and allows you to use host programs concurrently with other APPC or CPI-C applications using the same APPC interface supported by Communications Manager/2.

2. LUA3270 via CM/2 using the SNA Network (LU 0, 1, 2 or 3).

LUA3270 communicates to a host system via the LUA interface and allows you to use host programs through the various attachments that are supported by Communications Manager/2.

To communicate in an environment, as explained above, the following is required for an IBM ThinkPad workstation:

- A PCMCIA 14.4 bps high speed modem with either asynchronous or Hayes AutoSync capability depending on the connection.
- Communications Manager/2 Version 1.11 (older versions don't support the SNA Phone Connect feature). LAPS must be on level WR07020 or above.
- Personal Communications Version 4.0 for OS/2 or higher (Personal Communications for Windows does not support these type of connections).

## 8.1 SNA over Asynchronous to a CM/2 Gateway/Network Node

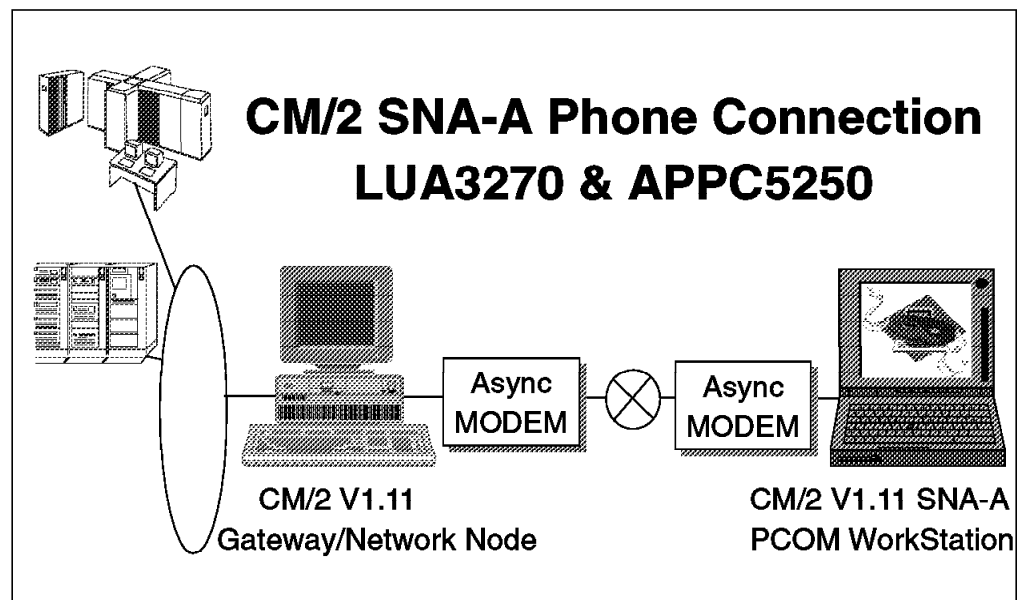


Figure 292. Personal Communications via CM/2 SNA-over-Asynchronous to a CM/2 Gateway/NN

In this scenario, we have a CM/2 end node connected to a CM/2 gateway and network node, using an asynchronous link. Over this link, we are using Personal Communications AS/400 and 3270 Version 4.1 for 5250 display emulation session to an AS/400 and a 3270 display session to an S/370 host, using the CM/2 attachments.

Both the AS/400 and the S/370 host are on the same LAN as the CM/2 gateway/network node, where we dial in.

On the ThinkPad we have installed CM/2 Version 1.11 in addition to Personal Communications AS/400 and 3270 Version 4.1 for OS/2 acting as an end node. Since we want to use an asynchronous connection, we use the IBM PCMCIA 14.4/14.4 Data/Fax Modem assigned to COM2 port, operating at 9600 bps and connected to the public switched network.

On the downstream side of the gateway/network node, we are using the COM1 port and an IBM 7855 modem, set for auto-answer in order to listen in for calls from the end node. On the upstream side, we use a TRN adapter which allows us to connect, over TRN, to both a S/370 host for 3270 emulation, and an AS/400 for 5250 emulation.

The CM/2 network node plays a double role here. First, as a network node, it provides intermediate session routing for independent LUs; in this case, the 5250 emulation session, which uses an independent LU 6.2 session, is routed from the CM/2 end node, through the network node, to the destination LU on the AS/400.

Second, as a dependent LU gateway, it provides access to a S/370 host for LUs that are downstream of the CM/2 gateway node. Therefore, in this case, the S/370 has no knowledge of the downstream workstation as a node; the only PU/LU definitions in the S/370 are for the CM/2 network node.

**Note:** Not all of the required configuration, customization or definition panels will be shown; only those that are significant to the example are included.

### 8.1.1 Configuration of CM/2 V1.11 Using SNA-A Phone Connections

First, on the ThinkPad workstation, we have to configure CM/2 V1.11 as an end node using SNA Phone Connect. The easiest way to configure the end node is to use the quick configuration panel method. However, for this example, we do not need to configure Emulation features for 3270 and 5250, since we want to use Personal Communications AS/400 and 3270 Version 4.1 for OS/2 for these sessions emulation. But for the dependent LUs provided by the gateway, we need to configure the LUA API, which is used by PCOM for its 3270 sessions, and for the AS/400 connection, we need partner LU and mode definitions, for which there is no single quick configuration process.

Therefore, we will first use the quick configuration process for 5250 Emulation. This allows us to access the AS/400 using SNA Phone Connect. Once completed, before exiting the configuration, we will delete the single 5250 Emulation session, adding the LUA definitions that we need to provide for Personal Communications 3270 sessions, to complete what we need for this example from CM/2.

**Note**

Make sure that you have installed LAPS level WR07020 or above before configuring SNA Phone Connect.

After starting the configuration process through CMSETUP, and giving a name to our new configuration file (we called it MOBILE), we get to the main configuration panel which shows a list of the commonly used definitions.

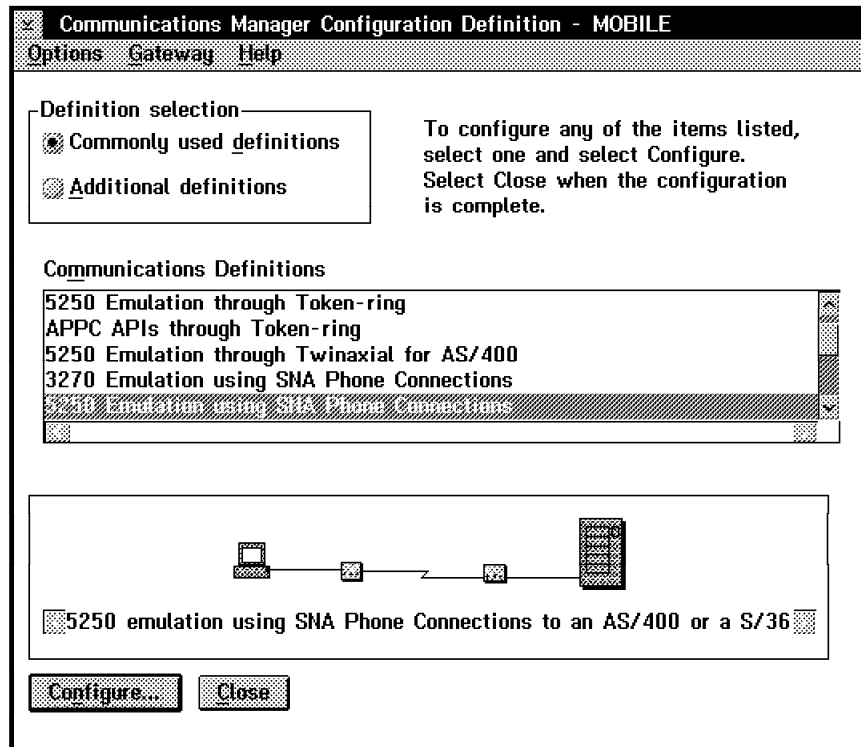


Figure 293. CM/2 Main Configuration Panel - MOBILE

We then select the **5250 Emulation using SNA Phone Connections** from the Common Definitions list and clicking the **Configure...** button.

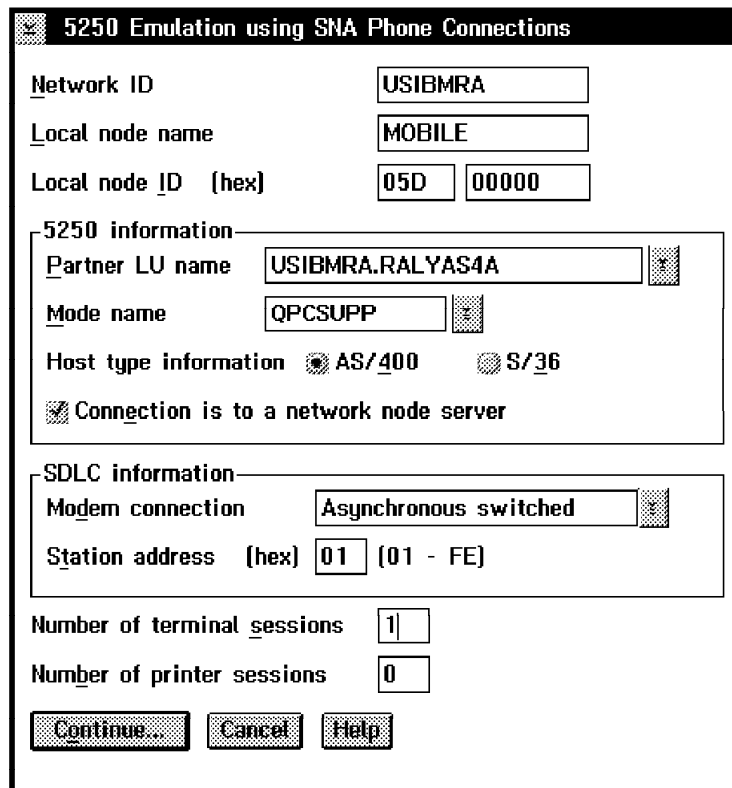


Figure 294. CM/2 5250 SNA Phone Connect Quick Configuration - Panel 1

On the first panel above, there are three types of Information that you have to fill in.

1. Information about your local node (workstation):

**Network ID**

This is the name of the network to which this node belongs. Usually each organization will have a naming convention that needs to be followed. In our environment it's USIBMRA.

**Local node name**

This is the CP name of this node, also called the Local WorkStation Name in PCOM. We use MOBILE as its name.

**Local node ID**

This value defaults to 00000. It is usually the IDBLK/IDNUM on the host NCP configuration or the block ID/physical unit ID in PCOM. It is not needed since we are connecting to a CM/2 Gateway/Network Node.

2. 5250 information to connect the AS/400:

**Partner LU name**

The Partner LU name is on the AS/400, which should be supplied to you by your network administrator. In our case this is RALYAS4A, but we recommend that you use the fully qualified LU name USIBMRA.RALYAS4A. This is the Network Name and the AS/400 System Name.

**Mode name**

The AS/400 system usually uses QPCSUPP as its default mode name. Type in that name or create one for CM/2.

Select **AS/400** as host type and click on the check mark for **Connection to an network node server**, because we want to connect to an CM/2 Gateway/Network Node before accessing the AS/400.

3. SDLC information for the SNA Phone Connect function:

**Modem connection**

There are six possible connections in the list box supported by SNA Phone Connect. Select **Asynchronous switched**.

**Station address**

This value defaults to 01. This value is not important in the switched connection environment.

Last but not least, one terminal session is customized by default. But we don't want to use it, so we have to delete it at the end of our quick configuration process. Set the number of printer sessions at its default 0.

Clicking on **Continue...**, takes you to the second panel of the quick configuration (see Figure 295 on page 271), where we select the specific modem to be used in our asynchronous connection.



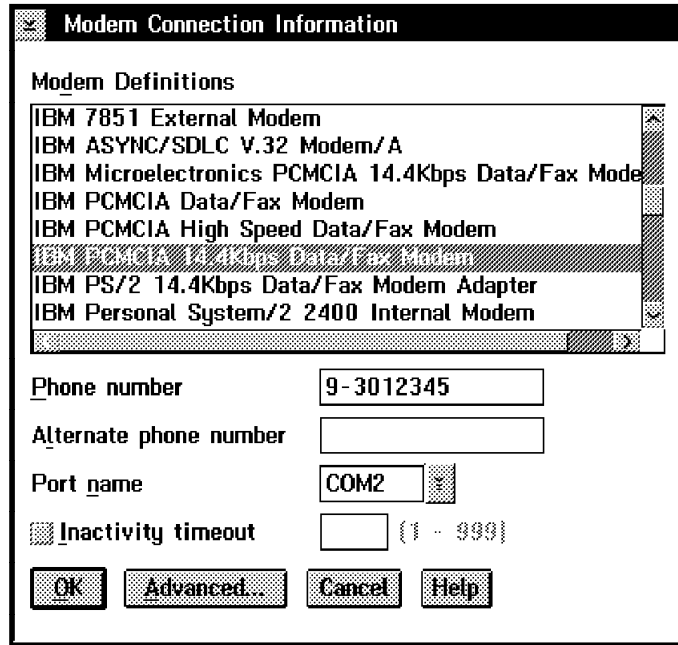


Figure 295. CM/2 SNA Phone Connect Quick Configuration - Panel 2

The IBM PCMCIA 14.4 Kbps Data/Fax Modem matches the modem in our ThinkPad, so we chose that.

Also enter the Phone number to be auto-dialed at connection time and select the COM port to be used (select **COM2** as customized for the PCMCIA 14.4/14.4 Data/Fax Modem).

**Important**

Be aware of the COM port and IRQ level configured on an AT-bus ThinkPad, since SNA Phone Connect will only work using IRQ 3 or 4. You can disable the internal serial port for your system using the reference diskette. Therefore you should be able to use COM2 with IRQ 3 for example.

Make sure that the port name assigned is the same as the port name configured in your Port Connection Manager.

CM/2 will return an error such as "PCM could not access port COM3 because the hardware is not properly configured or is missing," when it configures the PCMCIA card as COM3 with IRQ 5.

Clicking on **OK** brings us back to the main configuration panel (Figure 293 on page 269). If all we wanted was 5250 Emulation over asynchronous, our configuration would now be complete and we could exit the configuration process at this time.

However, in this case, we want to use Personal Communications to emulate 5250 sessions and not CM/2, so we then click on **Options** at the menu bar and then on **Configure any profile or feature**. This opens a new panel with a configuration list of all CM/2 profiles. The already customized profiles has a check mark, which means that they have been done.

Search down the list and select **5250 emulation**. Clicking on the **Configure...** button takes you to the 5250 Emulation panel, from where you can delete the customized 5250 session.

Back on the CM/2 Configuration List panel, you see that the check mark for 5250 emulation is gone.

Before you can define the LUA API, we must change one parameter in the link definition. Therefore select **SNA connections** and click on **Configure...** to open the Connections List panel. There select the existing link:

### **LINK0001 SDLC using SNA Phone Connect 2**

and click on **Change...** and then on **Continue...**, which opens the Connection to a Network Node panel, as shown below.

**Connection to a Network Node**

Link name   Activate at startup

Adjacent node ID (hex)

Partner network ID

Partner node name  (Required for partner LU definition)

Permanent connection

Permanent connection name

Outgoing call directory entry

Use this network node connection as your preferred server

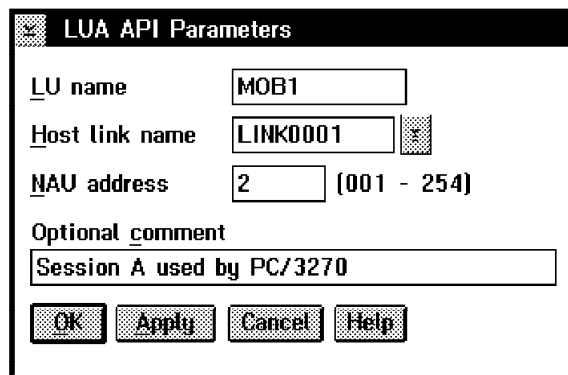
Solicit SSCP-PU Session

Optional comment

Figure 296. CM/2 Connection to a Network Node Panel

On this panel, check the **Solicit SSCP-PU Session** to customize the LUA API for this link. Then click on **OK** and then **Close**, which takes you back to the CM/2 configuration list panel.

Now, we can select the **SNA LUA APIs** and click on **Configure...**, which opens the LUA API Definition panel, from which you can create LUA definitions.



The screenshot shows a dialog box titled "LUA API Parameters". It contains the following fields and values:

- LU name:** MOB1
- Host link name:** LINK0001
- NAU address:** 2 (001 - 254)
- Optional comment:** Session A used by PC/3270

At the bottom of the dialog are four buttons: OK, Apply, Cancel, and Help.

Figure 297. CM/2 LUA API Definition Parameters Panel for PC/3270 Sessions

#### **LU name**

This is the name that you can give for this LU. It will be used in Personal Communications customization.

#### **Host link name**

This is the default name of the host link from the previous quick configuration. Take it.

#### **NAU address**

This Network Addressable Unit (NAU) also known as dependent LU address must match the workstation definition on the gateway. Start with address 2 for your first session and increase it for following sessions.

Clicking on **Apply** or click on **OK** at this point to go back to the LUA API Definition panel. There you see the LUAs customized. Clicking on **Close** takes you back to the CM/2 Configuration List panel.

Finally click on **Close**, which takes you back to the main configuration panel, where you click on **Close** again to exit the configuration process.

At this point, the file verification will take place and installation activities may take place if this is the first time that this was configured. Most likely, there will be a need to reboot if installation of any component was done and if some of the system files needed to be updated.

## 8.1.2 Customize Personal Communications to Use the CM/2 LUA Attachment

Our next step is to install Personal Communications AS/400 and 3270 Version 4.1 for OS/2, to connect to the S/390 host and an AS/400 system simultaneously. To install PCOM follow the steps in 2.4, "Install PCOMM for OS/2" on page 14.

To customize Personal Communications, double-click on the **Start/Configure Session** icon to start an empty PCOM WorkStation session, which will be overlaid by the Customize Communication panel (both are preceded by the IBM logo and a Welcome message).

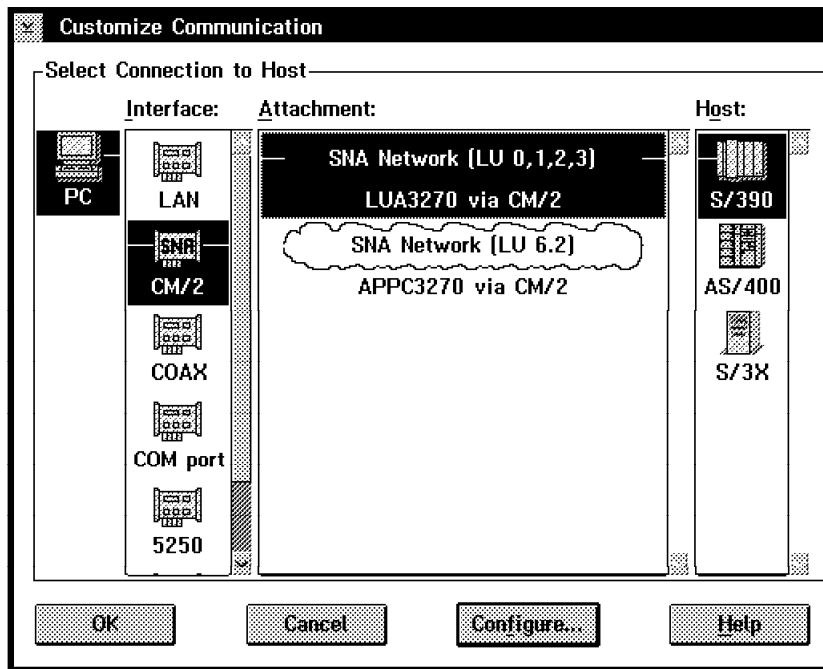


Figure 298. Customize Communication Panel - LUA3270 Attachment

On the Customize Communication panel select the **SNA CM/2 interface** and **LUA3270 via CM/2** attachment. Then double-click on the **LUA3270 via CM/2** attachment type or click on **Configure Link...**. If you are on the Customize Communication panel shown in Figure 3 on page 18, you can specify the Link Parameters as shown in Figure 299 on page 275.

At this time, Personal Communications starts CM/2 with the previous customized profile (MOBILE, in our case). You'll see a message panel telling you that.

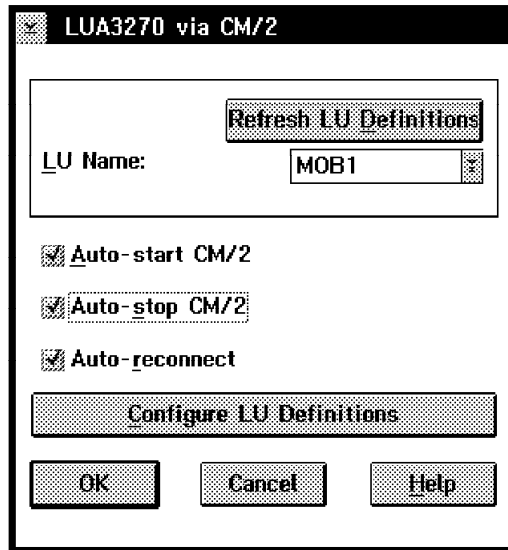


Figure 299. LUA3270 via CM/2 Link Parameters Panel

Select the **LU Name** for this session as defined in the CM/2 configuration (in our example it's **MOB1**) as defined at the LUA definitions (Figure 297 on page 273).

**Auto-start CM/2**

Communications Manager/2 must be running before you can have an active LUA3270-via-CM/2 session. If you want Personal Communications to start CM/2 automatically whenever you start a session, check this box; CM/2 will be started with its default configuration (unless it is already running).

**Auto-stop CM/2**

If this is the last active session that is using Communications Manager/2, Personal Communications can be made to stop CM/2 automatically when the session is terminated; if you want this to happen, check this box. You will get a warning message before CM/2 is stopped.

**Auto-reconnect**

If the session is disconnected from the host, and if this box is checked, you will be reconnected automatically.

If the LU definitions are not already defined or a different LU definition is needed, click on **Configure LU Definitions** to start the CM/2 configuration process (CMSETUP). If a new LU definition was created, click on **Configure LU Definitions** to refresh the LU name and attributes.

Click on **OK** to close the customization. Don't forget to customize the Session Parameters covered in "Customize Communication - 3270 Host" on page 17.

**Note:** Personal Communications does not have a parameter for the number of sessions. If you need some 3270 sessions on your workstation, Personal Communications allows you to customize each workstation session separately. Just repeat the steps in this section and use other LU names.

### 8.1.3 Customize Personal Communications to Use 5250 via CM/2

Our next step is to customize the 5250 via CM/2 attachment to connect to the AS/400 over the asynchronous SNA-A link of CM/2 using APPC.

Double-click on the **Start/Configure Session** icon to start an empty PCOM WorkStation session, which will be overlaid by the Customize Communication panel (both are preceded by the IBM logo and a Welcome message).

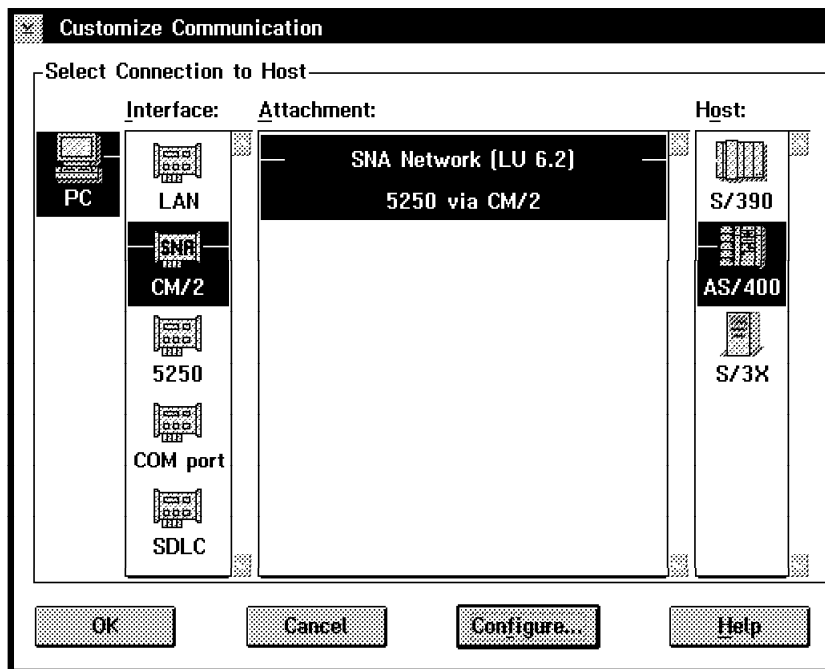


Figure 300. Customize Communication Panel - 5250 via CM/2 Attachment

On the Customize Communication panel select the **SNA CM/2 interface**, the **5250 via CM/2** attachment and the **AS/400** host. Then double-click on the **5250 via CM/2** attachment type or click on **Configure Link...** If you are on the Customize Communication panel shown in Figure 5 on page 19, specify the Link Parameters as shown in Figure 301 on page 277.

At this time, Personal Communications would start CM/2 with the previous customized profile MOBILE, if it is not already active as in our case. You'll see a message panel telling you that.

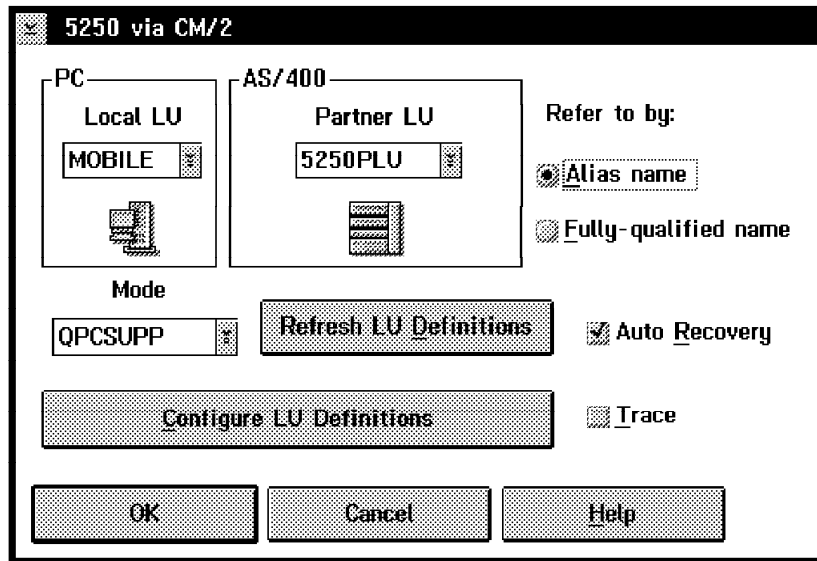


Figure 301. 5250 via CM/2 Link Parameters Panel

On this panel, the following three must be customized:

**1. Local LU**

The local LU is a predefined local LU name or the local node name from the CM/2 configuration file, as customized during the Quick Configuration (see Figure 294 on page 269). In this example, MOBILE is used as the default local LU and as node name.

**2. Partner LU**

This is the default alias name 5250PLU of the partner LU on the AS/400, as customized during the Quick Configuration (see Figure 294 on page 269). It represents the fully qualified LU name of the AS/400 (USIBMRA.RALYAS4A in our case). Click on the **Fully-qualified name** radio button if you want to see it.

**3. Mode**

Select the **QPCSUPP** mode name, as also entered during the Quick Configuration (see Figure 294 on page 269).

If one of the above parameter is missing or you want to change it, just click on **Configure LU Definitions** to start the CM/2 configuration process (CMSETUP). If you have finalized the CM/2 configurations, click on **Refresh LU Definitions** to update the lists in this panel (Figure 301).

Click on **OK** to close the customization. Don't forget to customize the Session Parameters covered in "Customize Communication - 5250 Host" on page 19.

**Note:** Personal Communications does not have a parameter for the number of sessions. If you need more than one, you can simply start the same session again by clicking on the **workstation** session icon. If you need some different sessions on your workstation, Personal Communications allows you to customize each workstation session separately. This is used if you have a printer or router sessions, if entered a specific workstation ID, if you want to communicate with different AS/400 systems, or if there is any other reason to customize separate sessions.

## 8.1.4 Considerations for the Related Configuration Files

After your system has been rebooted, the changes will take effect. As a result of configuring the above profiles, as illustrated in the following figures, the following changes have been made:

### CONFIG.SYS file

A statement for the MAC driver (COMMAC.SYS) and two for the SDLC protocol (SDLCSNET and SDLCVMAC) were added to CONFIG.SYS, in addition to the CMLIB path statements and CMKFMDE.SYS driver.

The following device drivers has been addedn an upper part of CONFIG.SYS file to initialize LAPS and PCM (Phone Connect Manager):

```
DEVICE=C:\IBMCOM\LANMSGDD.OS2 /I:C:\IBMCOM
DEVICE=C:\CMLIB\ROCSDD.SYS
DEVICE=C:\CMLIB\GENMSGDD.OS2
RUN=C:\CMLIB\GENMSGEX.EXE
DEVICE=C:\IBMCOM\PROTMAN.OS2 /I:C:\IBMCOM
DEVICE=C:\CMLIB\ACSVPCM.OS2
```

### NETWORK.INI file

A Phone Connection Manager (PCM) entry (IBMP14) was changed in NETWORK.INI to AUTOSTART=YES by the PCM configuration process.

**Note:** The NETWORK.INI file already contains an entry for all the possible PCMs, which have been configured with AUTOSTART=NO, so that they will not be loaded by the module enabler when CM/2 is started. Configuring a particular PCM changes the NETWORK.INI entry to AUTOSTART=YES so that this particular PCM will be started by the module enabler at CM startup.

If this was the first time that this support was configured, the NETWORK.INI file would also have been created.

### PROTOCOL.INI file

A corresponding PCM entry (IBMP14) was added to PROTOCOL.INI by the PCM configuration process. Notice that this entry contains all the characteristics of the specific modem chosen.

A MAC entry (ADLCMAC\_NIF) was added in PROTOCOL.INI.

A protocol driver entry (SDLC\_SWNET) was added to PROTOCOL.INI by the protocol driver configuration. Notice that this protocol driver has some static bindings to the SDLC virtual MACs (SDLCVMAC0 and SDLCVMAC1).

### MOBILE.NDF file

The MOBILE.NDF shows you all SNA parameters related to our CM/2 configuration (MOBILE is the name of CM/2's configuration files in our example (in Figure 303 on page 280).



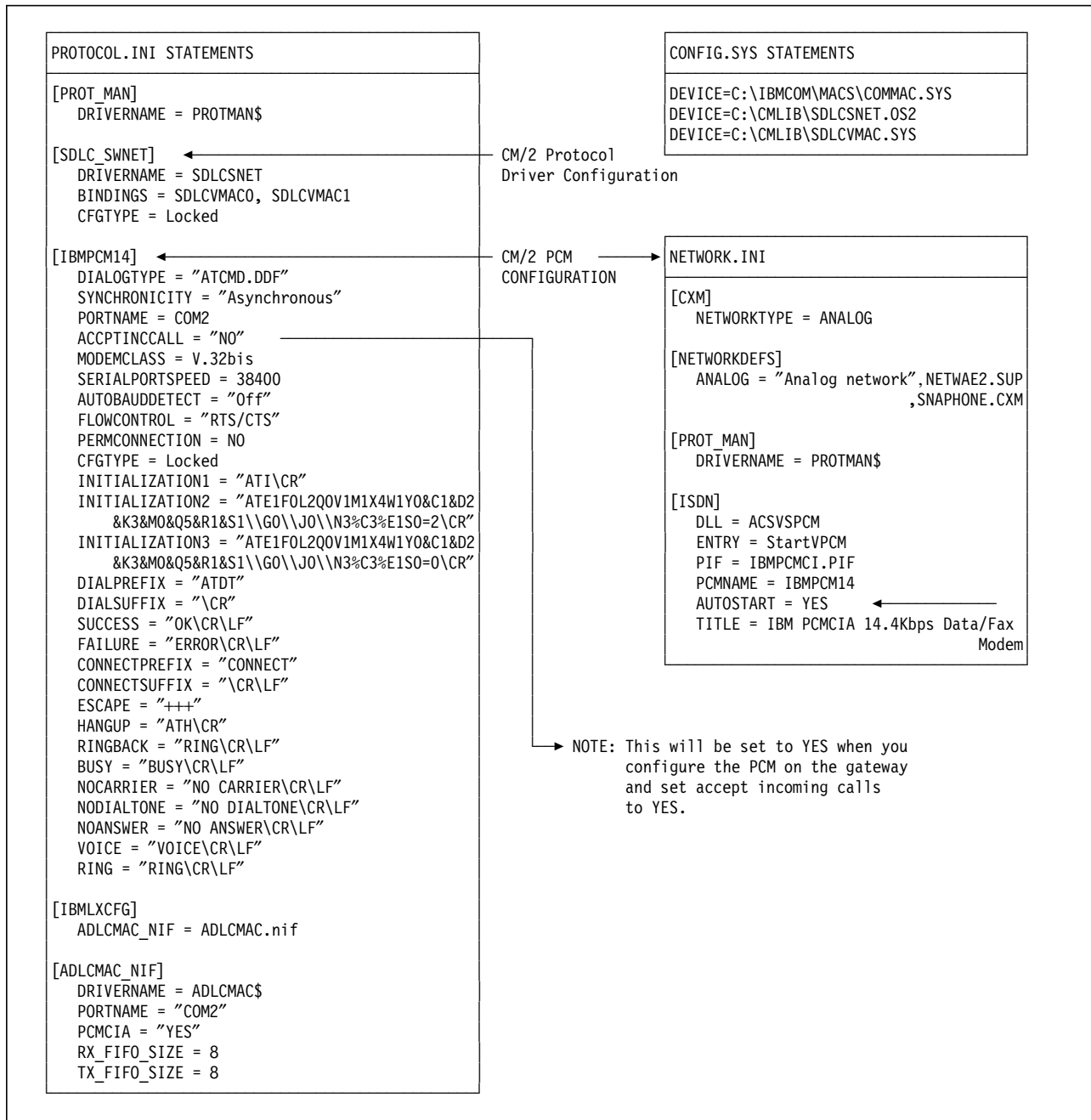


Figure 302. CONFIG.SYS, PROTOCOL.INI and NETWORK.INI for SNA over ASYNCH

```

DEFINE_LOCAL_CP FQ_CP_NAME(USIBMRA.MOBILE )
                CP_ALIAS(MOBILE )
                NAU_ADDRESS(INDEPENDENT_LU)
                NODE_TYPE(EN)
                NODE_ID(X'05D00000')
                NW_FP_SUPPORT(NONE)
                HOST_FP_SUPPORT(YES)
                MAX_COMP_LEVEL(NONE)
                MAX_COMP_TOKENS(0);

DEFINE_LOGICAL_LINK LINK_NAME(LINK0001)
                   ADJACENT_NODE_TYPE(NN)
                   PREFERRED_NN_SERVER(YES)
                   DLC_NAME(SDLC )
                   ADAPTER_NUMBER(2)
                   DESTINATION_ADDRESS(X'FF')
                   OCDT_ENTRY_NAME(MOBILE_1)
                   CP_CP_SESSION_SUPPORT(YES)
                   SOLICIT_SSCP_SESSION(YES)
                   NODE_ID(X'05D00000')
                   ACTIVATE_AT_STARTUP(YES)
                   USE_PUNAME_AS_CPNAME(NO)
                   INIT_WITH_SNRM(NO)
                   LIMITED_RESOURCE(NO)
                   LINK_STATION_ROLE(USE_ADAPTER_DEFINITION)
                   MAX_ACTIVATION_ATTEMPTS(USE_ADAPTER_DEFINITION)
                   EFFECTIVE_CAPACITY(USE_ADAPTER_DEFINITION)
                   COST_PER_CONNECT_TIME(USE_ADAPTER_DEFINITION)
                   COST_PER_BYTE(USE_ADAPTER_DEFINITION)
                   SECURITY(USE_ADAPTER_DEFINITION)
                   PROPAGATION_DELAY(USE_ADAPTER_DEFINITION)
                   USER_DEFINED_1(USE_ADAPTER_DEFINITION)
                   USER_DEFINED_2(USE_ADAPTER_DEFINITION)
                   USER_DEFINED_3(USE_ADAPTER_DEFINITION);

DEFINE_LUA LU_NAME(MOB1 )
          DESCRIPTION(Session A used by PC/3270)
          HOST_LINK_NAME(LINK0001)
          NAU_ADDRESS(2);

DEFINE_LUA LU_NAME(MOB2 )
          DESCRIPTION(Session B used by PC/3270)
          HOST_LINK_NAME(LINK0001)
          NAU_ADDRESS(3);

DEFINE_PARTNER_LU FQ_PARTNER_LU_NAME(USIBMRA.RALYAS4A )
                 DESCRIPTION(AS/400 Partner LU for PC400)
                 PARTNER_LU_ALIAS(5250PLU)
                 MAX_MC_LL_SEND_SIZE(32767)
                 CONV_SECURITY_VERIFICATION(NO)
                 PARALLEL_SESSION_SUPPORT(YES);

DEFINE_MODE MODE_NAME(QPCSUPP )
           DESCRIPTION(Mode for AS/400 connections)
           COS_NAME(#CONNECT)
           DEFAULT_RU_SIZE(NO)
           MAX_RU_SIZE_UPPER_BOUND(1024)
           RECEIVE_PACING_WINDOW(7)
           MAX_NEGOTIABLE_SESSION_LIMIT(32767)
           PLU_MODE_SESSION_LIMIT(64)
           MIN_CONWINNERS_SOURCE(32)
           COMPRESSION_NEED(PROHIBITED)
           PLU_SLU_COMPRESSION(NONE)
           SLU_PLU_COMPRESSION(NONE);

DEFINE_DEFAULTS IMPLICIT_INBOUND_PLU_SUPPORT(YES)
               DEFAULT_MODE_NAME(BLANK)
               MAX_MC_LL_SEND_SIZE(32767)
               DIRECTORY_FOR_INBOUND_ATTACHES(*)
               DEFAULT_TP_OPERATION(NONQUEUED_AM_STARTED)
               DEFAULT_TP_PROGRAM_TYPE(BACKGROUND)
               DEFAULT_TP_CONV_SECURITY_RQD(NO)
               MAX_HELD_ALERTS(10);

START_ATTACH_MANAGER;

```

Figure 303. The MOBILE.NDF File used for Personal Communications AS/400 and 3270

## 8.1.5 CM/2 Gateway and Network Node Configuration

For this section, you should already be familiar with setting up a CM/2 Gateway and Network Node configuration. We recommend that you customize first the upstream host communication and then, if it works, downstream communications for the workstations. We will explain all that is required for our incoming, implicit workstation using an asynchronous link to this CM/2 gateway and network node.

At this time, we will use the advanced configuration process. On the main configuration panel, select the radio button **Additional Definitions** in order to get the following panel, on which you select **SDLC using SNA Phone Connection** as the workstation connection type and **APPC APIs** as the Feature or Application.

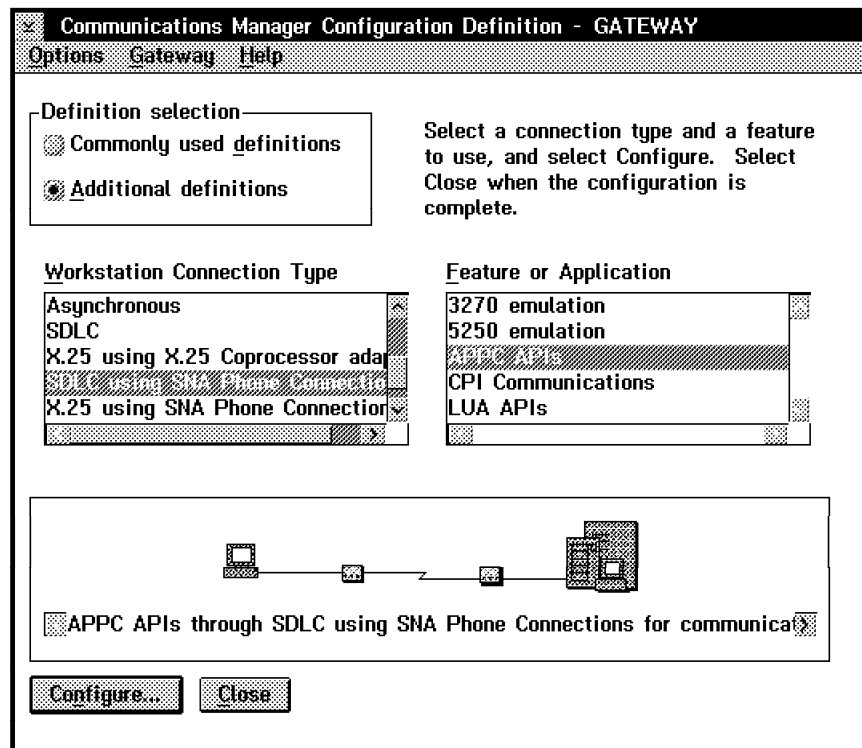


Figure 304. CM/2 Additional Definitions Panel - GATEWAY

Clicking on **Configure** displays the panel below:

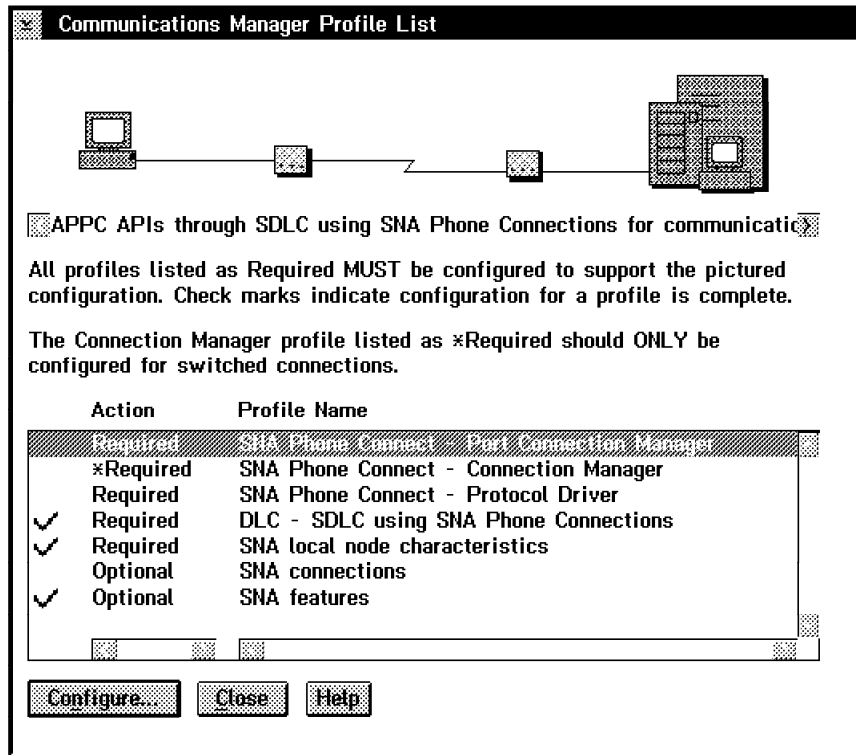


Figure 305. CM/2 Required Profile Name List for SNA Phone Connect

## Port Connection Manager Configuration - Network Node

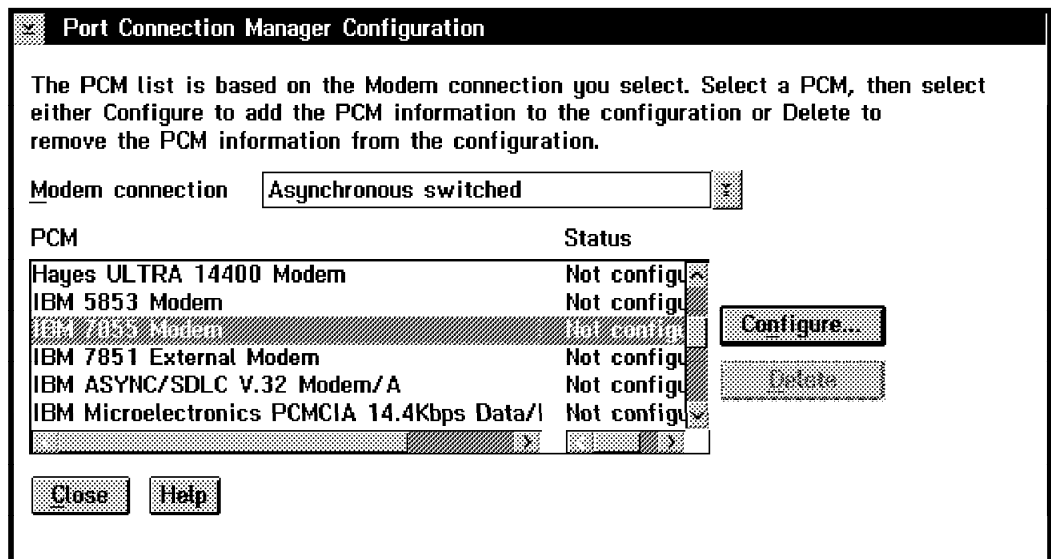
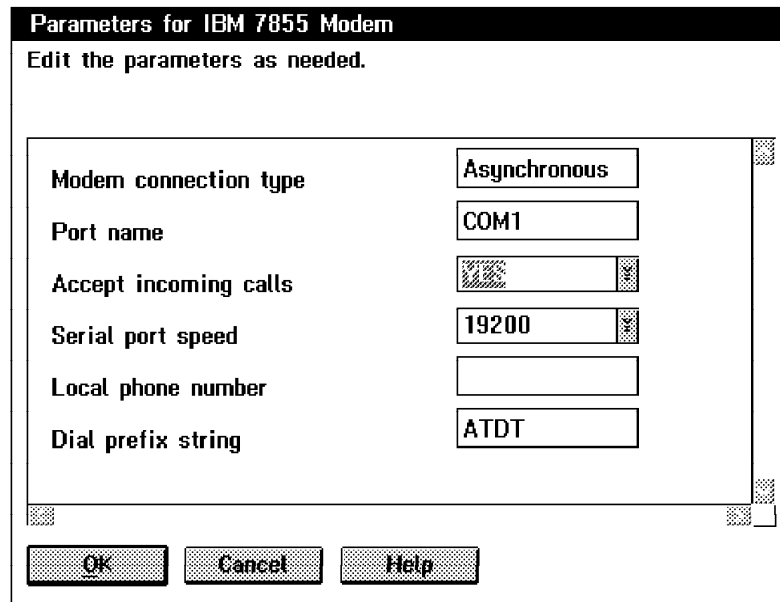


Figure 306. CM/2 Port Connection Manager Configuration Panel

For the Port Connection Manager profile, we select **Asynchronous switched** as the modem connection type, and **IBM 7855 Modem** as the PCM. Click on **Configure...**

The Parameters for IBM 7855 Modem panel will be presented as shown below.



The dialog box titled "Parameters for IBM 7855 Modem" contains the following fields and controls:

- Modem connection type:** A dropdown menu set to "Asynchronous".
- Port name:** A text box containing "COM1".
- Accept incoming calls:** A checkbox that is currently unchecked.
- Serial port speed:** A dropdown menu set to "19200".
- Local phone number:** An empty text box.
- Dial prefix string:** A text box containing "ATDT".

At the bottom of the dialog are three buttons: "Ok", "Cancel", and "Help".

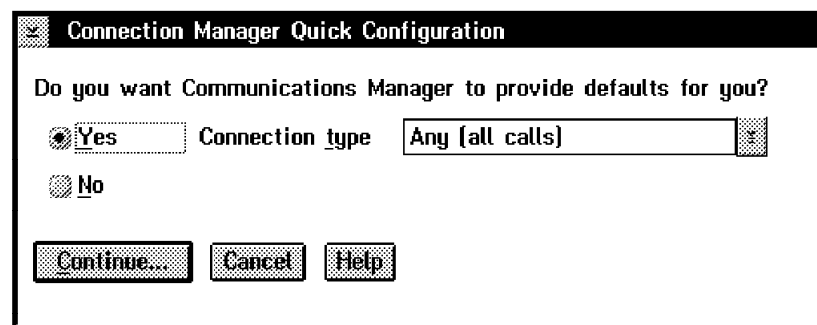
Figure 307. IBM 7855 Modem PCM Configuration Panel

The only important difference from what we have already configured on the end node is that we will want to enable incoming calls by setting our modem for auto-answer. Specify **yes** accept incoming calls, since we want to set up an implicit definition for downstream workstations that will dial-in over an asynchronous link.

### Connection Manager Configuration - Network Node

Since this gateway/network node will be accepting calls from downstream workstations, we require an incoming call directory entry to be configured in the Connection Manager profile.

On the main Connection Manager Configuration panel, click on **Create** in the Incoming Call Directory Entries section, to get the following panel:



The dialog box titled "Connection Manager Quick Configuration" contains the following fields and controls:

- Do you want Communications Manager to provide defaults for you?** A question with two radio buttons: "Yes" (selected) and "No".
- Connection type:** A dropdown menu set to "Any [all calls]".

At the bottom of the dialog are three buttons: "Continue...", "Cancel", and "Help".

Figure 308. Incoming Call Directory Entry - Quick Configuration

Accept the defaults, as shown, so just click on **Continue**.

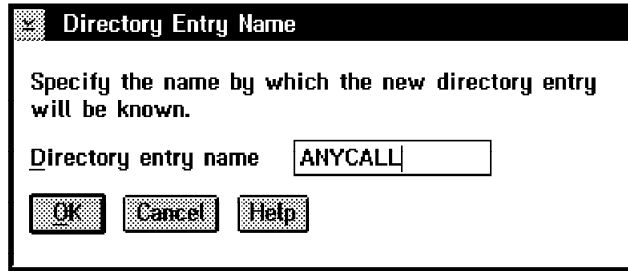


Figure 309. Incoming Call Directory Entry Name

On this panel, we use the name ANYCALL for this incoming call directory entry, and click on **OK**. This brings us back to the main Connection Manager Configuration panel, where we should see the ANYCALL entry appearing under the incoming call entries.

Then close the Connection Manager panel, which takes you back to the profile list.

### Protocol Driver Configuration - Network Node

To setup the Protocol Driver profile, click on **Configure** and then just answer **YES**. This is all that's required on this profile.

### SDLC - DLC Using SNA Phone Connect - Network Node

We are now in a position to configure the DLC for SDLC using the SNA Phone Connect profile, where we specify that this DLC is to accept incoming calls, and it is to use the entry ANYCALL to do so. This ANYCALL entry is selectable from the list box once you check the **Accept incoming calls** check box.

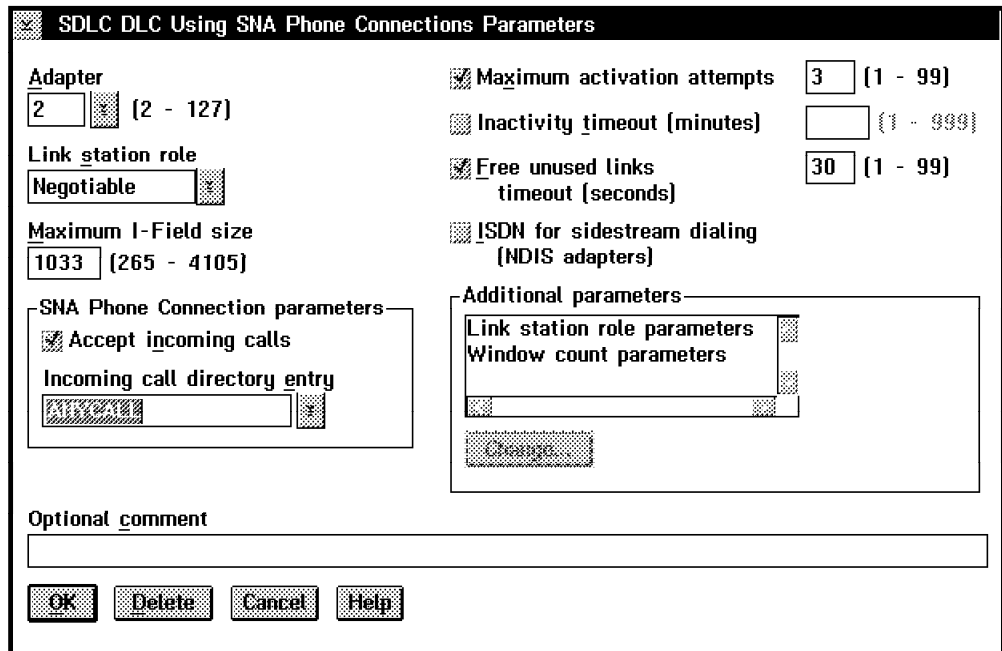


Figure 310. SDLC DLC Using SNA Phone Connections Parameter

At this point, we are pretty well finished with the items related to SNA Phone Connect. You can click on **Close**, on the CM/2 Profiles List panel, in order to come back to the main configuration panel, as shown in Figure 304 on page 281. At that point, click on **Gateway** on the menu bar, and **Configure...**, in order to get a list of the gateway-related profiles.

### Gateway - Hosts and Hosts LU Pools

Remember that you must define here the host connections and the LU pools which are to be used by the downstream workstations. In our example, we have created a host link called HOST0001 and an LU pool called POOLA.

### Implicit Workstation Using the Gateway

We have then used this profile to define the parameters for the implicit workstations to dial-in, over an SNA Phone Connect connection. On the first panel, shown below, select **SDLC using SNA Phone Connections** as the DLC type.

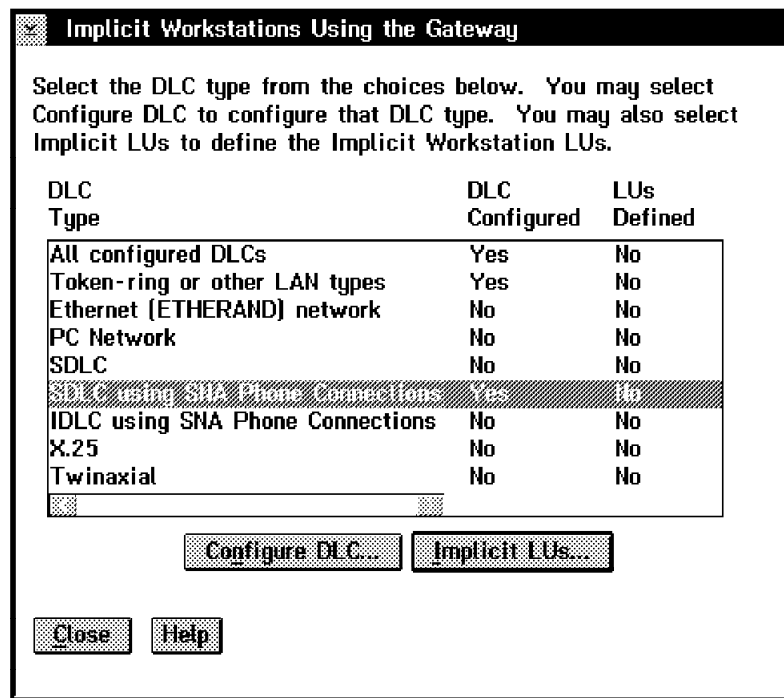


Figure 311. Implicit Workstations using the Gateway Panel

Click on **Implicit LUs...** to define the LUs, which brings you the Implicit Workstations LUs panel where you can click the **Create** button in order to get the Implicit Workstation LU Definition panel, shown below.

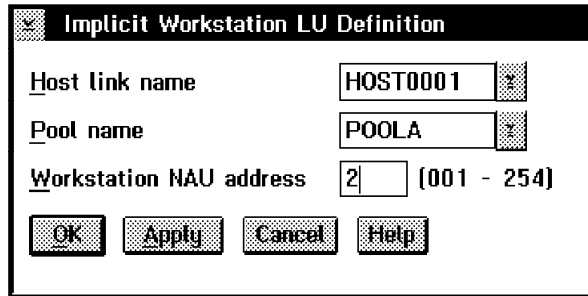


Figure 312. Implicit Workstations LU Definition Panel

Here we configured for any workstation, coming in with an LU with NAU 2 and one with NAU 3, to be assigned to POOLA on HOST0001 link.

So, clicking on **Apply** or click on **OK** at this point to bring you back to the Implicit Workstations LUs panel. There, you'll see the LUs are customized. Clicking on **Close**, twice, takes you back to the Gateway Profile List panel.

Finally click on **Close**, which takes you back to the main configuration panel, where you click on **Close** again to exit the configuration process.

**Note:** For further details on how to configure CM/2 gateway and network nodes, please refer to CM/2's redbooks and product documentations.

## 8.2 Hayes AutoSync with CM/2 and Personal Communications/3270

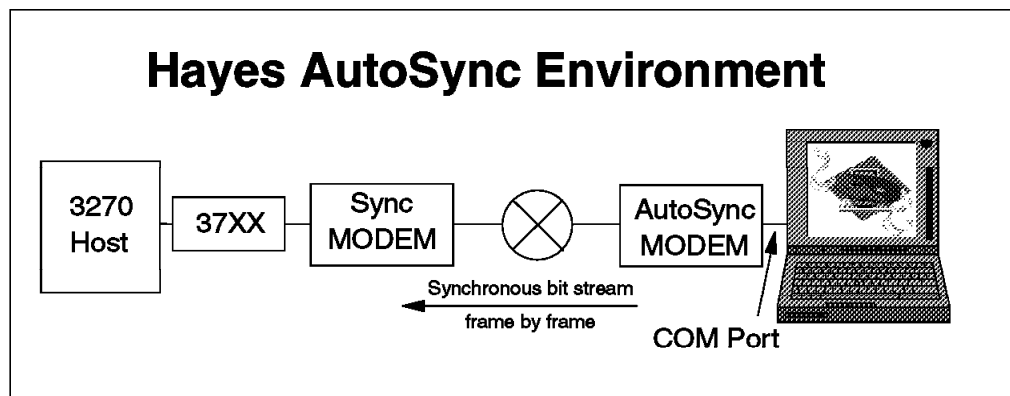


Figure 313. Hayes AutoSync with CM/2 and Personal Communications

In this scenario, we have a CM/2 PU type 2.0 node connected to a 3745 Communication Controller, using an AutoSync connection. Over this link, we are using Personal Communications/3270 Version 4.1 for 3270 emulation session to an S/390 host, using the CM/2 attachments.



On the ThinkPad we have installed CM/2 Version 1.11 in addition to Personal Communications/3270 Version 4.1 for OS/2 acting as a PU type 2.0 node. Since we want to use an AutoSync connection, we use the IBM PCMCIA 14.4/14.4 Data/Fax Modem assigned as COM2 port, which can be configured to operate in a communication mode called Hayes AutoSync, operating at 9600 bps. In this mode, the modem uses synchronous data communication techniques over the telephone line, rather than asynchronous. The interface between the ThinkPad and the modem, however, remains asynchronous.

On the host side, we have a VTAM definition for a switched major node, which defines the PU and all its associated LUs. The NCP definition on the 3745 Communication Controller contains a definition of the line, where an IBM 7855 modem, set for auto-answer in order to listen in for calls from the dial-in workstation.

For this example, we have to do the following:

- Configure CM/2 Version 1.11 as a dial-in workstation using SNA Phone Connect AutoSync functions and LUA to provide an interface for PCOM.
- Configure Personal Communications/3270 Version 4.1 Version 4.1 using the CM/2 attachment LUA3270 for its 3270 workstation sessions.
- Set up the IBM 7855 modem to allow auto-answer for synchronous communications.
- Define the switched link in the NCP definition.
- Define the workstation as a PU with eight LUs in a switched major node in VTAM.

**Note:** Not all of the required configuration, customization or definition panels will be shown; only those that are significant to the example are included.

## 8.2.1 Configuration of CM/2 V1.11 using AutoSync Phone Connections

The easiest way to configure CM/2 is to use the quick configuration panel method. However, for this example, we need to configure LUA API, for which there is no single quick configuration process.

Therefore, we will first use the quick configuration process for 3270 Emulation, and once completed, before exiting the configuration, will then add the LUA API definitions.

**Note**

Make sure that you have installed LAPS level WR07020 or above before configuring SNA Phone Connect.

After starting the configuration process through CMSETUP, and giving a name to our new configuration file (we called it 3270LUA), we get to the main configuration panel, which shows a list of the commonly used definitions.

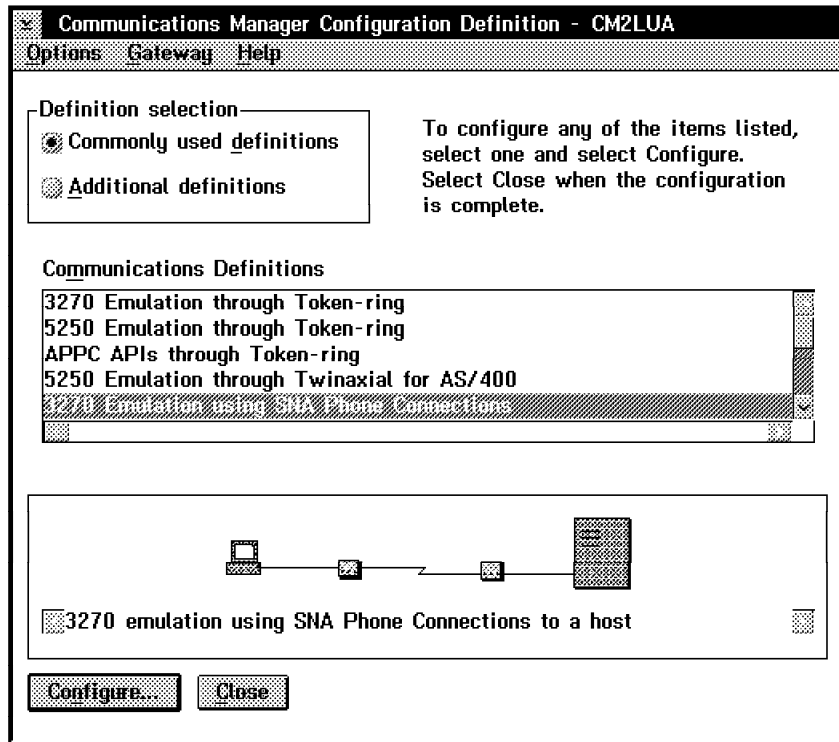


Figure 314. CM/2 Main Configuration Panel - CM2LUA

We then select the **3270 Emulation using SNA Phone Connections** from the Common Definitions list and click the **Configure...** button.

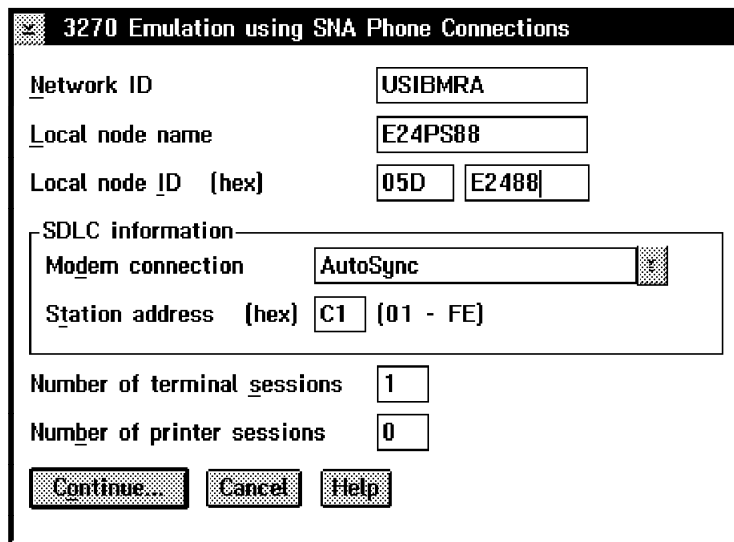


Figure 315. CM/2 3270 SNA Phone Connect Quick Configuration - Panel 1

On the first panel above, you should already be familiar with all of the parameters. But some of them are very important for an AutoSync connection, including the following:

### Network ID

This is the name of the network to which this node belongs. Usually each organization will have a naming convention that needs to be followed. In our environment it's USIBMRA.

### Local node name

This is the PU name of this node, as shown in the VTAM switched major node definition (see 8.2.4, "VTAM Definitions for the AutoSync Workstation" on page 297). Both must match, if you want to use independent LU 6.2 APPC sessions with CM/2. In our definition it's E24PS88.

### Local node ID

For an AutoSync connection, the Local Node ID is required to identify your workstation. It represents block ID and PUID, which must match the IDBLK and IDNUM values in the VTAM switched major node definition. We entered 05D and E2488.

### Modem connection

There are six possible connections in the list box supported by SNA Phone Connect. Select **AutoSync**.

### Station address

SDLC station address must match the PU Address (ADDR) in the VTAM switched major node definition. It is C1 in our example, as shown in Figure 323 on page 297.

Last but not least, one terminal session must be customized by default. But we don't want to use it, so we have to delete it at the end of our quick configuration process.

Clicking on **Continue...** takes you to the second panel of the quick configuration (see Figure 316), where we select the specific modem to be used in our AutoSync connection.

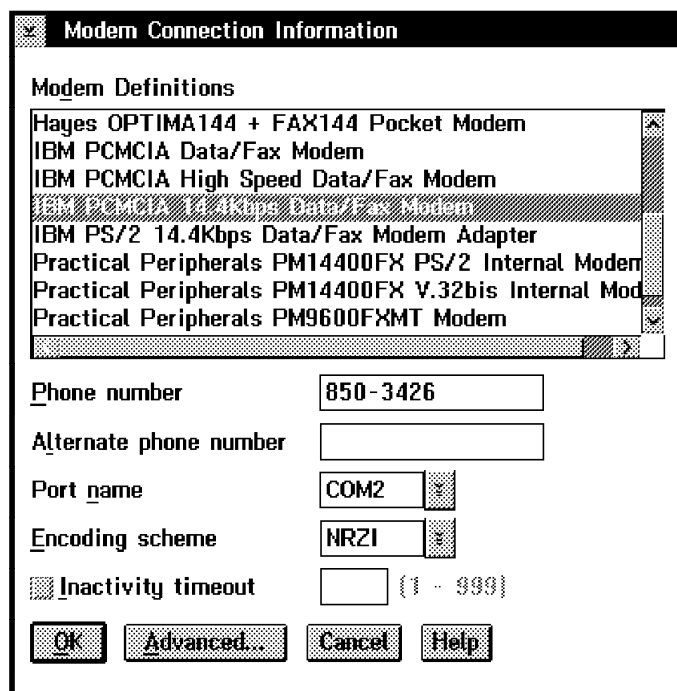


Figure 316. CM/2 SNA Phone Connect Quick Configuration - Panel 2

The IBM PCMCIA 14.4 Kbps Data/Fax Modem matches the modem in our ThinkPad, so we choose that.

**Phone number**

Enter the telephone number required to dial to the 3745.

**Alternate phone number**

This is optional. It is the number that will be dialed when the primary number is busy or not available.

**Port name**

The default value is COM1. Notice that for ThinkPad, COM1 is usually assigned to the built-in serial port; therefore you need to make sure that you use the right COM number. This scenario uses COM2.

**Encoding scheme**

NRZI is used in this scenario since NRZI was defined in the NCP configuration (see 8.2.5, "3745 NCP Switched Line Definition" on page 298).

The default encoding scheme in an NCP configuration is NRZI. It is recommended that you use NRZI, since NRZI is a better encoding scheme than NRZ to avoid the loss of clock synchronization between modems for extended sequences of zero-bit data.

**Inactivity timeout**

Do not select Inactivity timeout unless you want the link to be taken down automatically after a certain period of inactivity.

When the Inactivity timeout field is selected a number should be entered between 1 - 999 (minutes). The inactivity timeout limits the amount of time a link can be unused or idle before it is automatically disconnected.

Clicking on **OK** brings us back to the main configuration panel (Figure 314 on page 288). If all we wanted was 3270 Emulation using AutoSync SNA Phone Connect, our configuration would now be complete and we could exit the configuration process at this time.

However, in this case, we want to use Personal Communications to emulate 3270 sessions and not CM/2, so we then click on **Options** on the menu bar and then on **Configure any profile or feature**. This opens a new panel with a configuration list of all CM/2 profiles. The already customized profiles has a check mark, which means that they have been done.

Search down the list and select **3270 emulation**. Clicking on the **Configure...** button takes you to the 3270 Emulation panel, from which you can delete the customized 3270 session.

Back on the CM/2 Configuration List panel, you see that the check mark for 3270 emulation is gone.

Select **SNA LUA APIs**, and click on **Configure...**, to open the LUA API Definition panel, from which you can create LUA definitions.

**LUA API Parameters**

LU name: E24L8800

Host link name: HOST0001

NAU address: 2 (001 - 254)

Optional comment: Session A used by PC/3270

Buttons: OK, Apply, Cancel, Help

Figure 317. CM/2 LUA API Definition Parameters Panel

**LU name**

An LU name is given in the VTAM switched major node definition, as shown in Figure 323 on page 297, for each LU. It is not a requirement to use these LU names, because the LU name entered here is only used locally for CM/2 and PC/3270. But we recommend these names; it may make it easier to administrate it afterwards.

**Host link name**

This is the default name of the host link, we got from the previous quick configuration. Take it.

**NAU address**

This Network Addressable Unit (NAU) also known as dependent LU address must match the LOCADDR in the VTAM switched major node definition for each defined LU. The first session starts with NAU address/LOCADDR 2, then increase it for following sessions.

Clicking on **Apply** or click on **OK** at this point brings you back to the LUA API Definition panel. There you see now the LUAs customized as shown below.

**LUA API Definitions**

To create LUA definitions, select Create.  
You may select an existing definition from the list to Change or Delete.

LUA definitions

LU Name	Host Link Name	NAU Address	Comment
E24L8801	HOST0001	003	1. Sess
E24L8802	HOST0001	004	2. Sess
E24L8803	HOST0001	005	3. Sess
E24L8804	HOST0001	006	4. Sess
E24L8805	HOST0001	007	5. Sess

Buttons: Create..., Change..., Delete

Buttons: Close, Help

Figure 318. The CM/2 LUA API Definitions for PC/3270

Clicking on **Close**, takes you back to the CM/2 Configuration List panel. A check mark is shown now at the SNA LUA APIs.

Finally click on **Close**, which takes you back to the main configuration panel, where you click on **Close** again to exit the configuration process.

At this point, the file verification will take place and installation activities may take place if this is the first time that this was configured. Most likely, there will be a need to reboot if installation of any component was done and if some of the system files needed to be updated.

## 8.2.2 Customize Personal Communications to Use the CM/2 LUA Attachment

Our next step is to install Personal Communications/3270 Version 4.1 for OS/2, so we can connect to the S/390 host. To install PCOM follow the steps in 2.4, "Install PCOMM for OS/2" on page 14.

To customize a Personal Communications double-click on the **Start/Configure Session** icon to start an empty PCOM WorkStation session, which will be overlaid by the Customize Communication panel (both are preceded by the IBM logo and a Welcome message).

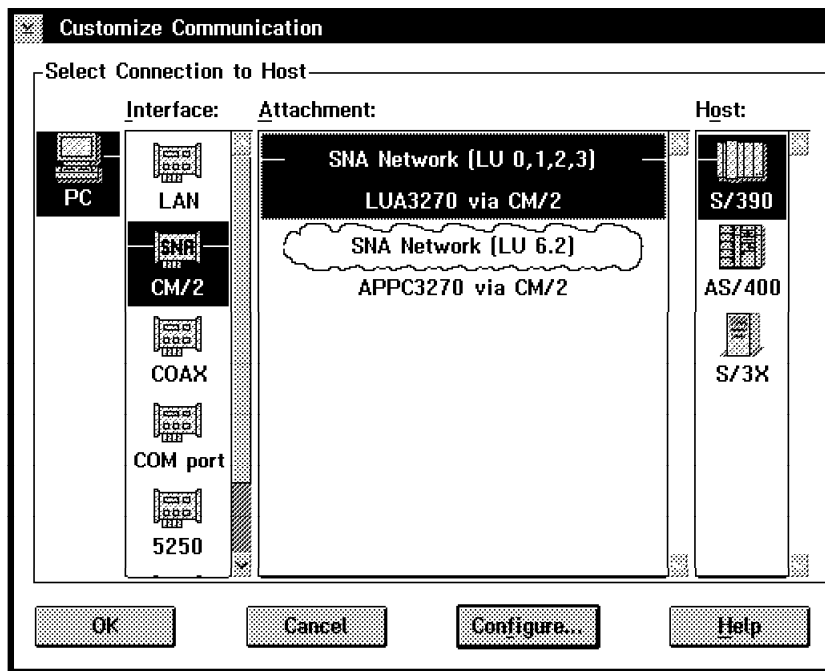


Figure 319. Customize Communication Panel - LUA3270 Attachment

On the Customize Communication panel select the **SNA CM/2 interface** and **LUA3270 via CM/2** attachment. Then double-click on the **LUA3270 via CM/2** attachment type or click on **Configure Link...**. If you are on the Customize Communication panel shown at Figure 3 on page 18, specify the Link Parameters as shown in the Figure 320 on page 293 below.

At this time, Personal Communications starts CM/2 with the previous customized profile CM2LUA, in our case. You'll see a message panel, telling you that.

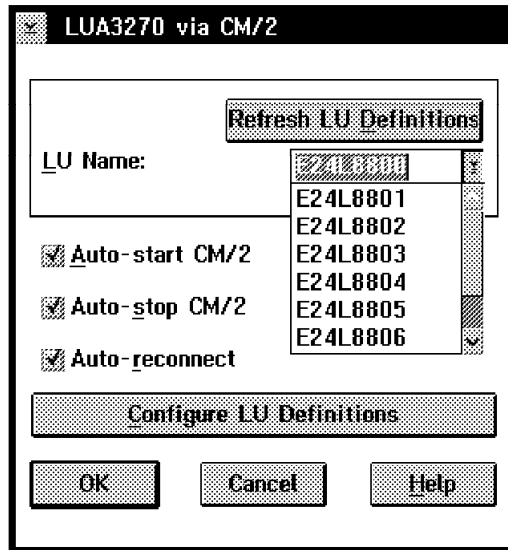


Figure 320. LUA3270 via CM/2 Link Parameters Panel

Select the **LU Name** for the first session as defined in the CM/2 configuration. In our example it's E24L8800, as defined at the LUA definitions Figure 317 on page 291 and in the VTAM switched major node definition, as shown in Figure 323 on page 297.

#### Auto-start CM/2

Communications Manager/2 must be running before you can have an active LUA3270-via-CM/2 session. If you want Personal Communications to start CM/2 automatically whenever you start a session, check this box; CM/2 will be started with its default configuration (unless it is already running).

#### Auto-stop CM/2

If this is the last active session that is using Communications Manager/2, Personal Communications can be made to stop CM/2 automatically when the session is terminated; if you want this to happen, check this box. You will get a warning message before CM/2 is stopped.

#### Auto-reconnect

If the session is disconnected from the host, and if this box is checked, you will be re-connected automatically.

If the LU definitions are not already defined or a different LU definition is needed, click on **Configure LU Definitions** to start the CM/2 configuration process (CMSETUP). If a new LU definition was created, click on **Configure LU Definitions** to refresh the LU name and attributes.

Click on **OK** to close the customization. Don't forget to customize the Session Parameters covered in "Customize Communication - 3270 Host" on page 17.

**Note:** Personal Communications does not have a parameter for the number of sessions. If you need some 3270 sessions on your workstation, Personal Communications allows you to customize each workstation session separately. Just repeat the steps above and use another LU name.

### 8.2.3 Considerations for the Related Configuration Files

After your system has been rebooted, the changes will take effect. As a result of configuring the above profiles, as illustrated in the following figures, the following changes have been made:

#### **CONFIG.SYS file**

A statement for the MAC driver (HAMMAC.SYS) and two for the SDLC protocol (SDLCSNET and SDLCVMAC) were added to CONFIG.SYS, in addition to the CMLIB path statements and CMKFMDE.SYS driver.

The following device drivers has been added in an upper part of CONFIG.SYS file to initialize LAPS and PCM (Phone Connect Manager):

```
DEVICE=C:\IBMCOM\LANMSGDD.OS2 /I:C:\IBMCOM
DEVICE=C:\CMLIB\ROCSDD.SYS
DEVICE=C:\CMLIB\GENMSGDD.OS2
RUN=C:\CMLIB\GENMSGEX.EXE
DEVICE=C:\IBMCOM\PROTMAN.OS2 /I:C:\IBMCOM
DEVICE=C:\CMLIB\ACSVPCM.OS2
```

#### **NETWORK.INI file**

A Phone Connection Manager (PCM) entry (AIBMPCM) was changed in NETWORK.INI to AUTOSTART=YES by the PCM configuration process.

**Note:** The NETWORK.INI file already contains an entry for all the possible PCMs, which have been configured with AUTOSTART=NO, so that they will not be loaded by the module enabler when CM/2 is started. Configuring a particular PCM changes the NETWORK.INI entry to AUTOSTART=YES so that this particular PCM will be started by the module enabler at CM startup.

If this was the first time that this support was configured, the NETWORK.INI file would also have been created.

#### **PROTOCOL.INI file**

A corresponding PCM entry (AIBMPCM) was added to PROTOCOL.INI by the PCM configuration process. Notice that this entry contains all the characteristics of the specific modem chosen.

A MAC entry (HAMMAC\_NIF) was added in PROTOCOL.INI.

A protocol driver entry (SDLC\_SWNET) was added to PROTOCOL.INI by the protocol driver configuration. Notice that this protocol driver has some static bindings to the SDLC virtual MACs (SDLCVMAC0 and SDLCVMAC1).

#### **CM2LUA.NDF file**

The CM2LUA.NDF shows you all SNA parameters related to our CM/2 configuration (CM2LUA is the name of CM/2's configuration files in our example in Figure 322 on page 296).



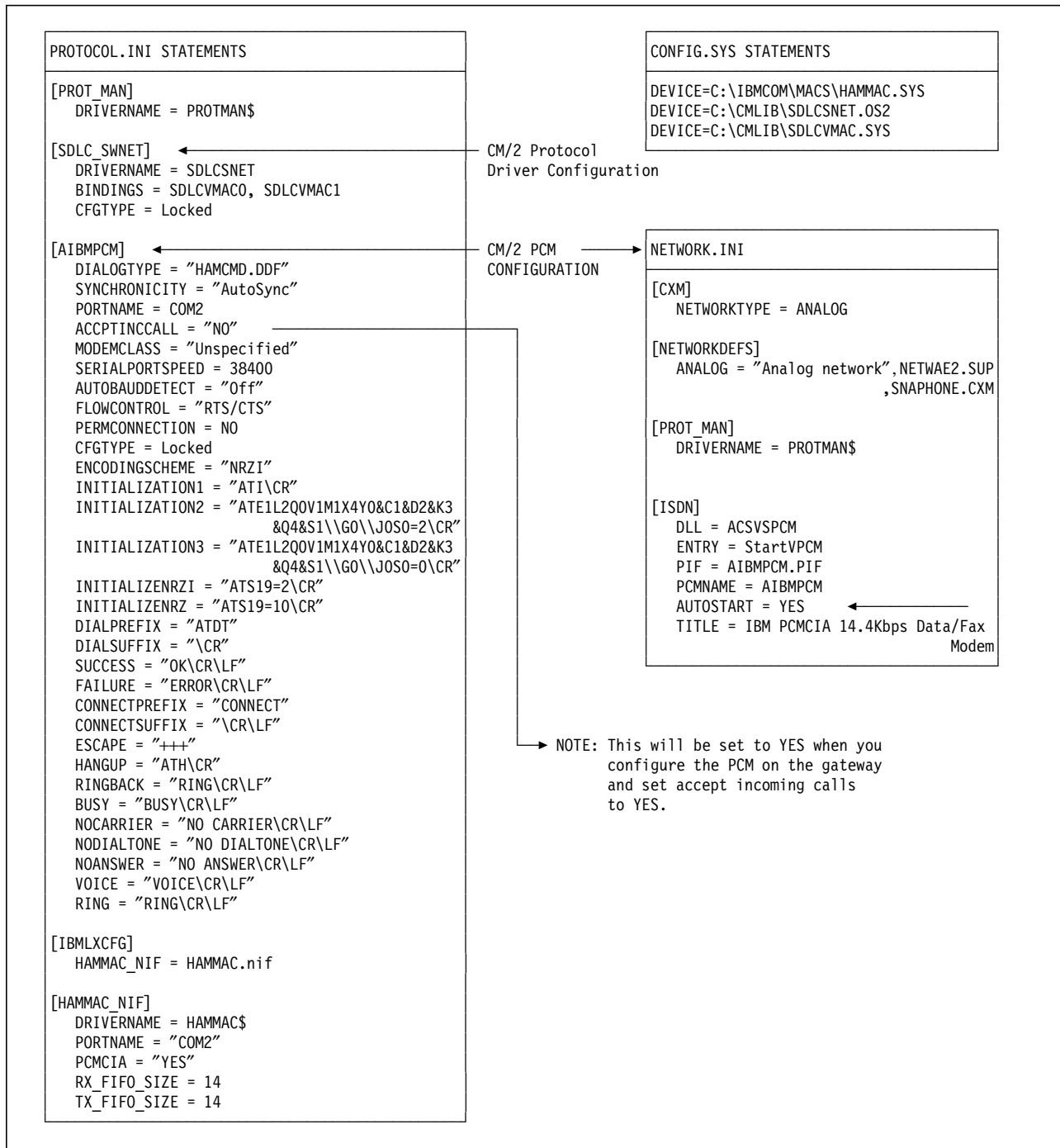


Figure 321. CONFIG.SYS, PROTOCOL.INI and NETWORK.INI for AutoSync

```

DEFINE_LOCAL_CP  FQ_CP_NAME(USIBMRA.E24PS88 )
                  CP_ALIAS(RALPC )
                  NAU_ADDRESS(INDEPENDENT_LU)
                  NODE_TYPE(EN)
                  NODE_ID(X'05DE2488')
                  NW_FP_SUPPORT(NONE)
                  HOST_FP_SUPPORT(YES)
                  MAX_COMP_LEVEL(NONE)
                  MAX_COMP_TOKENS(0);

DEFINE_LOGICAL_LINK LINK_NAME(HOST0001)
                   FQ_ADJACENT_CP_NAME(USIBMRA.WTSCPOK )
                   ADJACENT_NODE_TYPE(LEN)
                   DLC_NAME(SDLC )
                   ADAPTER_NUMBER(2)
                   DESTINATION_ADDRESS(X'FF')
                   OCDT_ENTRY_NAME(CM2LUA_1)
                   CP_CP_SESSION_SUPPORT(NO)
                   SOLICIT_SSCP_SESSION(YES)
                   NODE_ID(X'05DE2488')
                   ACTIVATE_AT_STARTUP(NO)
                   USE_PUNAME_AS_CPNAME(NO)
                   INIT_WITH_SNRM(NO)
                   LIMITED_RESOURCE(USE_ADAPTER_DEFINITION)
                   LINK_STATION_ROLE(USE_ADAPTER_DEFINITION)
                   MAX_ACTIVATION_ATTEMPTS(USE_ADAPTER_DEFINITION)
                   EFFECTIVE_CAPACITY(USE_ADAPTER_DEFINITION)
                   COST_PER_CONNECT_TIME(USE_ADAPTER_DEFINITION)
                   COST_PER_BYTE(USE_ADAPTER_DEFINITION)
                   SECURITY(USE_ADAPTER_DEFINITION)
                   PROPAGATION_DELAY(USE_ADAPTER_DEFINITION)
                   USER_DEFINED_1(USE_ADAPTER_DEFINITION)
                   USER_DEFINED_2(USE_ADAPTER_DEFINITION)
                   USER_DEFINED_3(USE_ADAPTER_DEFINITION);

DEFINE_LUA LU_NAME(E24L8800)
           DESCRIPTION(1. Session A used by PC/3270)
           HOST_LINK_NAME(HOST0001)
           NAU_ADDRESS(2);

DEFINE_LUA LU_NAME(E24L8801)
           DESCRIPTION(2. Session B used by PC/3270)
           HOST_LINK_NAME(HOST0001)
           NAU_ADDRESS(3);

DEFINE_LUA LU_NAME(E24L8802)
           DESCRIPTION(3. Session C used by PC/3270)
           HOST_LINK_NAME(HOST0001)
           NAU_ADDRESS(4);

DEFINE_LUA LU_NAME(E24L8803)
           DESCRIPTION(4. Session D used by PC/3270)
           HOST_LINK_NAME(HOST0001)
           NAU_ADDRESS(5);

:
DEFINE_LUA LU_NAME(E24L8807)
           DESCRIPTION(8. Session H used by PC/3270)
           HOST_LINK_NAME(HOST0001)
           NAU_ADDRESS(9);

DEFINE_DEFAULTS IMPLICIT_INBOUND_PLU_SUPPORT(YES)
                DEFAULT_MODE_NAME(BLANK)
                MAX_MC_LL_SEND_SIZE(32767)
                DIRECTORY_FOR_INBOUND_ATTACHES(*)
                DEFAULT_TP_OPERATION(NONQUEUED_AM_STARTED)
                DEFAULT_TP_PROGRAM_TYPE(BACKGROUND)
                DEFAULT_TP_CONV_SECURITY_RQD(NO)
                MAX_HELD_ALERTS(10);

START_ATTACH_MANAGER;

```

Figure 322. The CM2LUA.NDF File used for PC/3270 and AutoSync

## 8.2.4 VTAM Definitions for the AutoSync Workstation

Figure 323 shows the switched major node in VTAM to define the 3270 workstation over the switched connection using SDLC or AutoSync, as we do.

```

*****
*           VTAM SWITCHED MAJOR NODE FOR SDLC SWITCHED CONNECTION           *
*****

E24SW  VBUILD MAXGRP=5,           REQUIRED X
        MAXNO=12,           REQUIRED X
        TYPE=SWNET           REQUIRED
E24PS88  PU  ADDR=C1,           SDLC STATION ADDRESS X
        IDBLK=05D,           PC/3270 WKSTN X
        IDNUM=E2488,           X
        DISCNT=NO,           X
        MAXOUT=4,           X
        MAXDATA=1929,           X
        MAXPATH=2,           X
        PASSLIM=1,           X
        PUTYPE=2
E24PATH  PATH CALL=INOUT           X
        GRPNM=RAOGSHSO,           X
        GID=1,           X
        PID=1
E24L8800 LU  LOCADDR=2,           3270 TERMINAL MODEL 2 X
        VPACING=7,           X
        PACING=7,           X
        DLOGMOD=D4C32XX3,           X
        USSTAB=US327X
E24L8801 LU  LOCADDR=3,           3270 TERMINAL MODEL 3 X
        LOGAPPL=RAPAN,           X
        VPACING=7,           X
        PACING=7,           X
        DLOGMOD=D4C32XX3,           X
        USSTAB=US327X
:
E24L8807 LU  LOCADDR=9,           3270 TERMINAL MODEL 4 X
        VPACING=7,           X
        PACING=7,           X
        DLOGMOD=D4C32XX3,           X
        USSTAB=US327X

```

Figure 323. VTAM Switched Major Node Definition for SDLC Switched Connection

## 8.2.5 3745 NCP Switched Line Definition

This is just part of an NCP definition showing statements for a switched SDLC line. Note that the GROUP address matches the GRPNM parameter in the VTAM switched major node definition. This ties the VTAM definition to the correct line in the NCP definition.

```

*****
*       SNA SWITCHED LINE GROUP       *
*****

RAOGSHSO GROUP LNCTL=SDLC,                X
                DIAL=YES,                  X
                NEWSYNC=NO,                 X
                NRZI=YES,                   X
                PAUSE=1,                     X
                RETRIES=(7,4,5)             7 RETRY PER SECOND FOR 5 TIMES
RAOL0025 LINE ADDRESS=(25,HALF),          PHONE NUMBER 850-3426           X
                NPACOLL=YES,                X
                OWNER=SA5,                   (V) VTAM                       X
                CLOCKNG=EXT,                 X
                DUPLEX=HALF,                 X
                RETRIES=(5,4,24),            X
                SPEED=2400,                  X
                ANSWER=ON,                   (V) VTAM                       X
                CALL=INOUT,                  (V) VTAM                       X
                ISTATUS=ACTIVE               (V) VTAM                       X
RAOP13  PU PUTYPE=(1,2),                    X
                XID=YES
RAOL0026 LINE ADDRESS=(26,HALF),          PHONE NUMBER                    X
                NPACOLL=YES,                X
                OWNER=RAK,                   (V) VTAM                       X
                CLOCKNG=EXT,                 X
                DUPLEX=HALF,                 X
                SPEED=2400,                  X
                ANSWER=ON,                   (V) VTAM                       X
                CALL=INOUT,                  (V) VTAM                       X
                ISTATUS=INACTIVE             (V) VTAM                       X
RAOP14  PU PUTYPE=(1,2)

```

Figure 324. NCP Definitions - SDLC/AutoSync Switched Connection

**Note:** The NCP parameter SPEED=2400, is used for lines with internal clocks and to calculate the weight of the LIC used. It is also used for problem determination wrap tests, in which case it should match the clock speed of the modem. For all other operational aspects the modem clock will be what determines the speed used.

The speed parameter is used to calculate the line utilization as well.

---

## Chapter 9. TCP/IP Connectivity

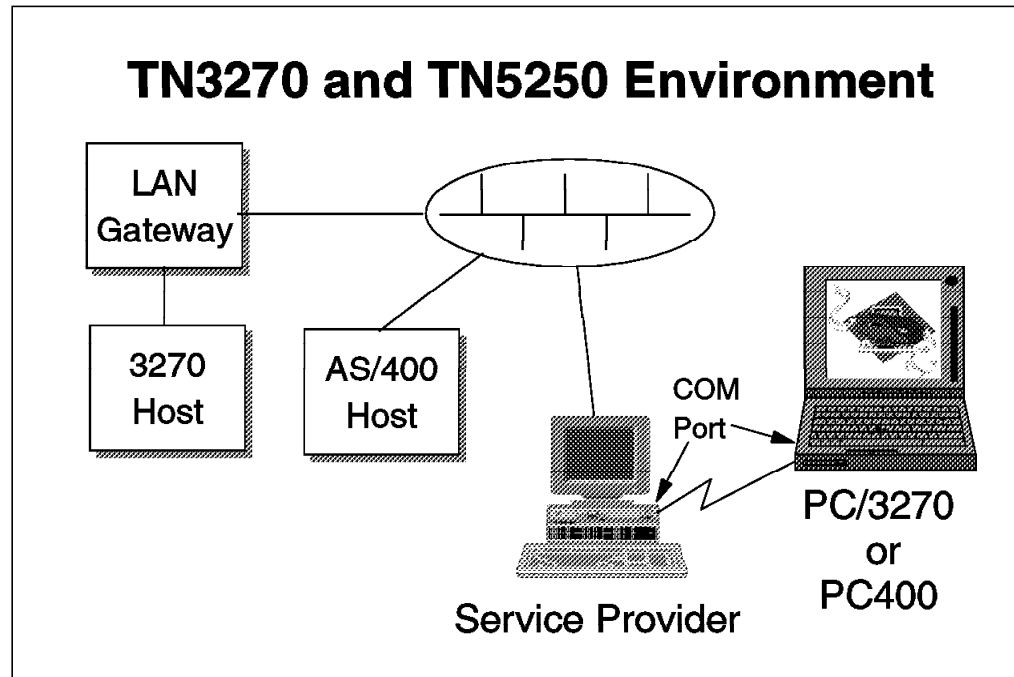


Figure 325. TN3270 and TN5250 via SLIP or PPP

This chapter addresses some configuration setups in order to run Personal Communications over IP serial line connectivity.

The following book provides additional details on TCP/IP V2.1.1 for DOS installation and configuration:

- *IBM TCP/IP for DOS/Windows Interoperability and Coexistence*, GG24-4374.

We set up a SLIP link for a Windows workstation, and a PPP link for an OS/2 Warp Connect-based workstation.

---

### 9.1 Configuration Overview

The following figure is an overview of the SLIP and PPP configurations. Note the IP addressing from the remote workstation and the LAN-attached workstation is different depending on the protocol used (SLIP or PPP).

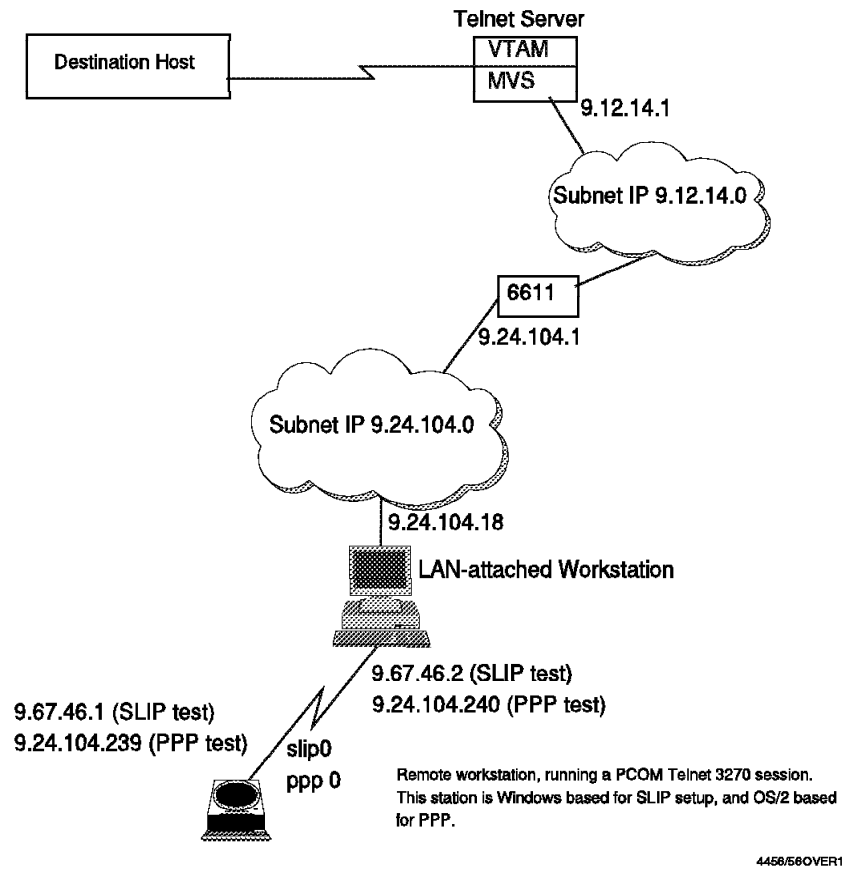


Figure 326. Configuration Overview for SLIP and PPP Tests

For more details about the differences between SLIP and PPP, see 9.3.1, "The Point-to-Point Protocol (PPP)" on page 314.

## 9.2 Personal Communications Session using an SLIP Link

We used the Serial Line IP protocol to support the remote IP base connection, in order to test TN3270/TN5250 Personal Communications sessions via this link.

### 9.2.1 Serial Line IP Protocol (SLIP)

The serial line interface that you are using has to be attached to one of your workstation's serial ports (COM1 through COM4 are supported by DOS).

The SLIP protocol is available with TCP/IP V2.1.1 for DOS. The following figure shows how TCP/IP V2.1.1 uses the serial interface:

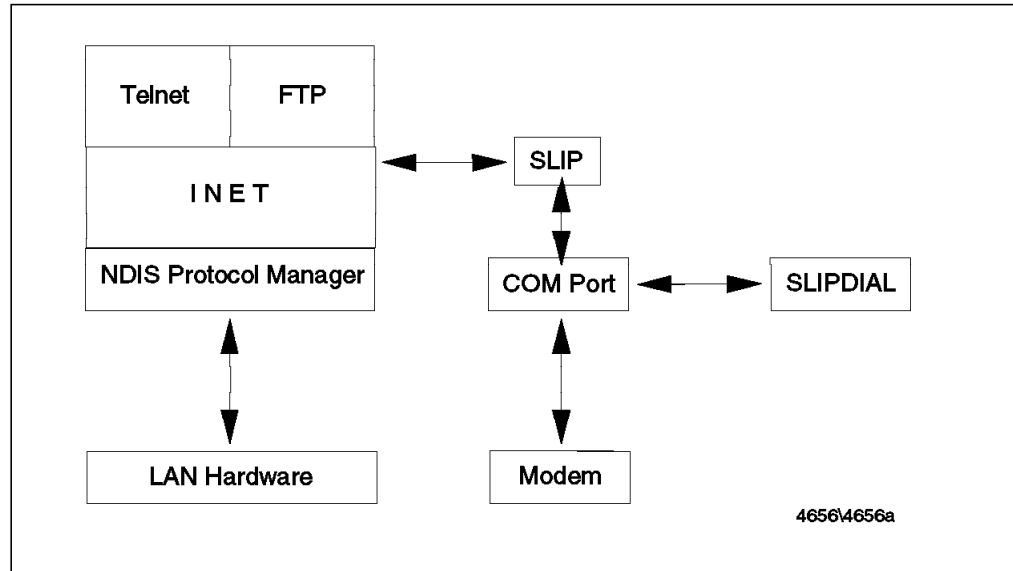


Figure 327. COM Port Usage by TCP/IP for DOS

The SLIP program is part of the TCP/IP V2.1.1 for DOS Base kit, so all the necessary modules are copied over when you run the INSTALL program of TCP/IP. We assume your Windows workstation is properly running TCP/IP.

The configuration of a SLIP link on the side of the Remote Windows workstation is done via the CUSTOM.EXE program. This program is located in the TCP/IP for DOS directory on your workstation.

## 9.2.2 Configuration of SLIP on the Windows Remote Workstation

Once the code is installed you will need to configure the interface. Run the CUSTOM program and from the Configure pull-down menu select the **SLIP Interfaces**. You should see the following panel.

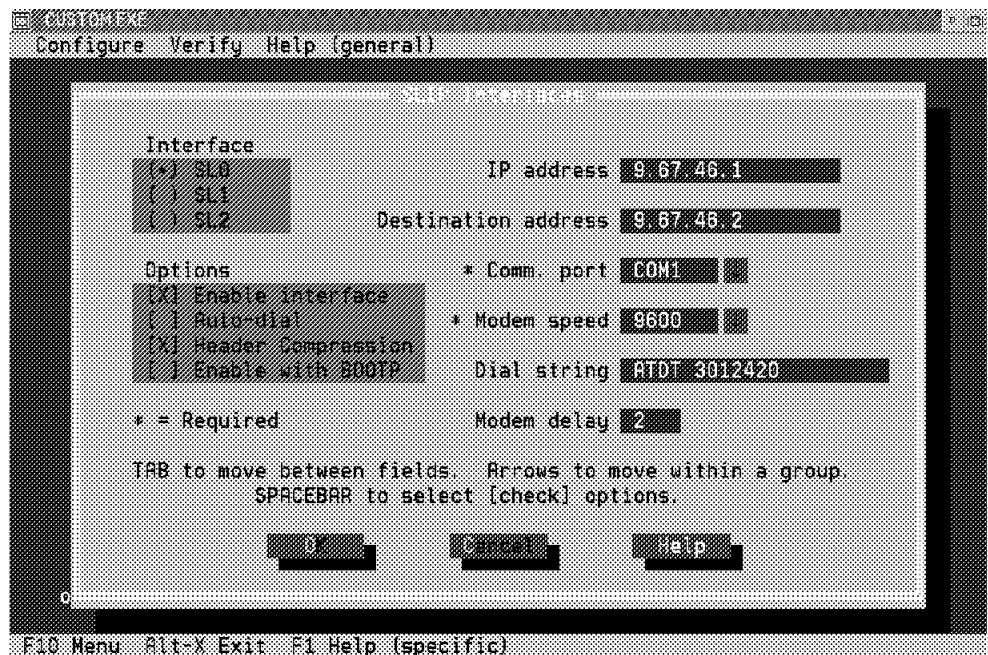


Figure 328. SLIP Interface Panel

The fields on this SLIP Interfaces window are as follows:

<b>Parameter</b>	<b>Description</b>
<b>Interface</b>	This field lists the three SLIP interfaces that you can use for a serial connection. Select the interface that you would like to define.
<b>Enable interface</b>	Selecting this field will enable the communication with the network through this interface.
<b>Auto-dial</b>	Selecting this box will set up the communication port and automatically call the receiving host when TCPSTART executes. We recommend that you select the AUTO DIAL Option because the connection is easier to established. SLIPDIAL comes with an extensive command language that will enable you to write scripts and automate your connection with the host.
<b>Header compression</b>	Van Jacobsen (VJ) header compression will be used. This option is often referred to as CSLIP (compressed SLIP) in the TCP/IP. See 9.3.1, "The Point-to-Point Protocol (PPP)" on page 314 for more details about this compression mode. In order to take advantage of this option, both stations communicating must have the compression turned on. This compression method is fully described in RFC1144. The VJ compression technique will compress the TCP/IP header. For example, in an FTP session you will get a gain in throughput, but the best improvement is in a Telnet session. When you are in an Telnet session using character-based emulations (such as VT100, VT200 or ANSI), every time you type a character, that character is sent with his TCP/IP header to the Telnet server and echoed back to your Telnet client. Using VJ compression will reduce the number of bytes that are being exchanged back and forth between the workstation and the host.
<b>Enable with BootP</b>	Select this option when you want your workstation to retrieve its network information, IP address, netmask, and host name from a BootP server. If you wish to issue the BOOTP command over a SLIP interface, you cannot have any NDIS interfaces configured in your system. To deconfigure your NDIS interfaces, issue the command IFCONFIG ndx down (where ndx is the particular NDIS interface that you are disabling) before issuing the BOOTP command.
<b>IP address</b>	Specify the IP address that this interface will be using. This is a required field.
<b>Destination address</b>	Specify the IP address of the destination host. This is a required field.
<b>Comm. Port</b>	This is the communication port that you would like to use for this connection. COM1 through COM4 is supported.



<b>Modem speed</b>	Specify the modem data rate in bits per second (bps). You can select your speed from the drop-down menu or fill in the blank. The default speed is 2400 but you can go as high as 38,400 bps assuming the relevant speed is supported by the modem and data link used by the interface.
<b>Dial string</b>	Specify the telephone number used to connect with the other station. If you are using a Hayes-compatible modem, precede your phone number with the ATDT command. You could type in, for example: ATDT 9,301-2420
<b>Modem delay</b>	Specify the maximum number of seconds to wait for a response from the modem when using the GETMODEM command.

Some information from this panel will be added to the SLIP configuration file called SLIPDIAL.SLP and some will be in the TCPDOS.INI. The SLIPDIAL.SLP file is located in the TCPDOSETC subdirectory. Your TCPSTART.BAT will also have been modified to include several new lines. SLIPDIAL acts as a terminal emulator and SLIP is the device driver needed to interface with the network adapter.

### 9.2.3 The SLIP Program

The SLIP program is a TSR. To start it you only need to type SLIP at the command prompt and press Enter. To remove SLIP from memory you can type SLIP -d. Make sure that no other TSRs were loaded after SLIP; otherwise you will not be able to unload SLIP until you have removed them. Like all of the TCP/IP for DOS programs if you need online help you can always type SLIP -? or SLIP -?? for detailed help.

### 9.2.4 The SLIPDIAL Program

The SLIPDIAL program enables messages to be sent, received, and interpreted through a point-to-point connection created by either a modem or a null modem cable. SLIPDIAL has an extensive serial communication language command interpreter that will enable you to write complex scripts to automate your connection to Internet, service providers, etc. SLIPDIAL can be started by typing SLIPDIAL at the command prompt. When SLIPDIAL starts it looks for its default command file, SLIPDIAL.SLP. The specified or current directory is searched first, then, if not found, the directory pointed to by the ETC variable is searched. You can specify your own command file by entering:

```
SLIPDIAL -f internet.slp
```

### 9.2.5 Sample SLIPDIAL.SLP

The following sample command file shows some of the different parameters that can be used in a SLIPDIAL.SLP file. This file will dial and connect to a service provider giving you access to a shell account.

Normally most of the product default parameters should get you going; for demonstration purposes we have included more entries than you would require to establish a Personal Communications session. The SLIPDIAL file is not case sensitive.

```

REM
REM Command file for connection to INTERNET. If the line is busy, we
REM will try to connect 10 times. Once we have a connection we will
REM send down our user ID and password then return control to the
REM TCPSTART.BAT batch file to start the SLIP program.
REM
ECHO "Establishing connection for SL0..."
MAXWAIT 30
DATABIT 8
STOPBIT 1
PARITY 0
BAUD 9600
COMINIT 1
COMPORT 1
SENDMODEM "ATDT3012420\r\n"
WAITMODEM "CONNECT" 60
IF (ERRNO = 0)
    THEN ECHO "Connection established"
    ELSE ECHO "ERROR: modem not responding correctly"

ASSIGN userid "PHIL\r\n"
ASSIGN password "PHIL\r\n"

ECHO " Waiting for Login prompt..."
WAITMODEM "login:>" 20
IF (ERRNO = 0) then begin
    ECHO "Login name prompt received..."
    SENDMODEM userid
END
ELSE BEGIN
    ECHO "Login name prompt not received from peer..."
    QUIT 2
END

ECHO " Waiting for Password prompt..."
WAITMODEM "Password:" 20
IF (ERRNO = 0) then begin
    ECHO "Password prompt received..."
    SENDMODEM password
END
ELSE BEGIN
    ECHO "Password prompt not received from peer.."
    QUIT 2
END

EXIT

```

Figure 329. SLIPDIAL.SLP File

In the above scenario, we initialize the communication port 1 with 9600 baud, and set the communications parameters: no parity, 8 data bits and 1 stop bit. The "ATDT301242\r\n" is being sent to the modem which waits 60 seconds at most for the response CONNECT. If it receives the correct response we wait for the LOGIN prompt and then send user ID and password. If the line is busy we will redial up to 10 times before exiting.

The parameters used in this SLIPDIAL.SLP have the following meanings:

**MAXWAIT** This field will change the default amount of time, in seconds, to wait for a response from the modem using the GETMODEM statement. The default is 30 seconds.

**DATABIT** This field will set the default number of data bits. This can be either 7 or 8 bits. Will define the number of data bits used in each character that is to be sent or received.

**STOPBIT** The stop bit value can be 1 or 2; the stop bit is used to identify the last element of a character in an asynchronous transmission.

**PARITY** The parity flag can be Odd (O), Even (E) or None (N); both the receiving and sending modem must use the same parity checking flag.

**BAUD** This is the comport speed; this field will set the default baud rate used by the comport.

**COMINIT** The COMINIT command will initialize the communication port number you specified. If no other parameters were changed before the COMINIT command is found, the default initialization is set to 2400 baud, 1 stop bit, 8 data bits, and no parity. Therefore, if you issue a COMINIT, and then you change the variables, the change will not take effect. COMINIT must be found after any settings you want to be changed. Its placement in the SLIPDIAL script is very important, as you could set all your variables but never initialize the comport with those values. All further communications are done through this comport until changed either by another COMINIT command or by the COMPORT command.

**COMPORT** Will enable you to switch communications to the specified communications port.

**SENDMODEM** The SENDMODEM command will send a message to the modem. In many cases the modem expects a carriage return and a line feed character, or both, to end the transmission. Use r for a carriage return and n for a line feed. The message is sent to the default communication port. At least a COMINIT should have been executed before this statement. String information should be included between double quotes (" ").

**WAITMODEM** The WAITMODEM gets either single or multiple string responses within a specified number of seconds from the modem. If requesting multiple string responses, the multiple search strings must each be separated by logical or (|) symbols. In our scenario we will wait up to 60 seconds for a CONNECT response from the modem.

If that string is found, WAITMODEM will set errno to 0. If multiple response strings are requested (for example CONNECT|BUSY), and if those strings are found, WAITMODEM will set errno to 10+n (where n represents the position of the string in the list of multiple search strings). The first string in the list has a position 0, and the list can include a maximum of 10 strings at one time. Using the ERRNO value within your script file gives you the ability to control the flow of events that will take place.

For detailed information on all the SLIPDIAL parameters please refer to chapter 7 of the *TCP/IP V2.1.1 for DOS: User Guide*, SC31-7045.

## 9.2.6 SLIP Parameters in the TCPDOS.INI

Like many TCP/IP for DOS components SLIP will use some entries found in the TCPDOS.INI file. Let's look at some of those SLIP parameters. Please notice that some of the entries in the TCPDOS.INI are identical to those found in the SLIPDIAL.SLP file, you have the choice of configuring your environment via the SLIPDIAL.SLP or TCPDOS.INI file. In all cases the information found in both these files should match when you are using SLIP and SLIPDIAL.

```
[slip]
slip.0.port=1
slip.0.speed=9600
slip.0.mtu=1006
slip.0.irq=3
slip.0.data=8
slip.0.addr=3F8
slip.0.vj=on
slip.0.parity=N
slip.0.stop=1
slip.0.fifo=14
```

**slip.0.port** Indicates which communication port you will be using; the valid range is from 1 to 8.

**slip.0.speed** This is the modem speed.

**slip.0.mtu** MTU - The maximum transmission unit. This indicates the largest possible unit of data that can be sent on a given physical medium in a single frame. Make sure that both stations are using the same MTU value.

**slip.0.irq** IRQ - Indicates the interrupt request numbered by the adapter. The default is 3 for an even-numbered communications port and 4 for an odd-numbered communications port.

**slip.0.data** This defines the number of data bits used in each character that is to be sent or received.

**slip.0.addr** This is the hardware communication port address. Slip will automatically determine the address. It is possible to override it if you wish. The default is 3F8 for COM1, 3E8 for COM3, 2F8 for COM2 and 2E8 for COM4.

**slip.0.vj** VJ - This field will enable the Van Jacobsen header compression (CSLIP). Both stations must set this flag on in order to take advantage of the header compression technique.

**slip.0.parity** The parity flag can be odd (O), even (E) or none (N). Both receiving and sending modems must use the same parity checking flag; otherwise you will not be able to establish a valid connection.

**slip.0.stop** The stop bit value can be 1 or 2. The stop bit is used to identify the last element of a character in an asynchronous transmission. Both receiving and sending modems must use the same stop bit value, otherwise you will not be able to establish a valid connection.

**slip.0.fifo** It is used to set the SLIP transmit and receive buffer threshold. This parameter is only valid for a type 2 UART. The valid values are 1, 4, 8, or 14. If you take the default, specify an invalid value, or if a type 1 UART is detected, the value 1 is used. This threshold value is used to determine the number of characters that can be stored in the transmit or receive buffers in the UART chip on the adapter. When the transmit or receive buffer reaches its threshold value, the UART signals the SLIP program to read or write the buffer.

For example, if you specify a value of 14, the UART will cause an interrupt after it has transmitted or received 14 characters. You can improve the performance of some workstations by setting this value high enough to reduce the number of serial communication interrupts.

## 9.2.7 The TCPSTART.BAT File

We recommend you that you choose the **AutoDial** option when configuring the SLIP interface (see Figure 328 on page 301). The startup of the SLIP interface is then included into the startup of TCP/IP.

After using CUSTOM and editing the SLIPDIAL.SLP file, this is what you should expect to find in your TCPSTART.BAT file:

```

.....
route -fnq
arp -dan
slipdial
slip
ifconfig s10 9.67.46.1 9.67.46.2
route add default 9.67.46.2    PING -c1 9.24.104.1>nul
.....

```

Figure 330. TCPSTART.BAT File

The SLIPDIAL program will look for its script file SLIPDIAL.SLP and dial your host machine. Once the connection is established and user ID and password have been transmitted, control is passed over to SLIP.

The slip TSR command loads and initialize the communication port as per the information you have supplied in the TCPDOS.INI and SLIPDIAL.SLP files. After successful completion you will see the following screen:

**IBM TCP/IP Version 2.1.1 for DOS**  
 (c) Copyright IBM Corp. 1992, 1994

**SLIP - Serial Line Internet Protocol**  
 Version: 2.1.1.2

sl?	Port	Add	Baud	Par	Data	Stop	MTU	IRQ	UART	FIFO	VJ
s10	COM1	3f8	9600	N	8	1	1006	4	2	1	ON

4456/4456b

Figure 331. Output from the SLIP Command

The ifconfig command allows you to assign the address you want to use to the s10 interface.

The rest of the batch takes its normal course, and you should now be able to communicate with the remote workstation.

Note the ROUTE ADD statement is necessary to connect other hosts located on the LAN behind the LAN-attached SLIP station (9.67.46.2).

As we plan to use SLIP in Windows, some changes need to be done to your SYSTEM.INI file. You will have to manually add the following statements to the to the [386Enh] stanza:

```
ComxAutoAssign=0  
ComxBase=0  
ComxIRQ=-1
```

where x is the communication port number.

This will enable you to use Personal Communications for Windows over your SLIP connection.

See "Mobile Considerations" on page 331 for more details on how to use the station in LAN-attached mode as well as in remote mode.

## 9.2.8 Configuration of SLIP on the LAN-Attached Workstation

To configure the LAN-attached side of the SLIP connection, start from the main panel of TCP/IP Dial-Up as shown in Figure 343 on page 318, and create a new entry by clicking on the **Add Entry** button.

Follow the steps below:

The screenshot shows the 'Add Entries' dialog box in IBM Dial-Up for TCP/IP OS/2. The 'Login Info' panel is active, displaying the following fields and options:

- \*Name:
- Description:
- Login ID:
- Password:   Required
- Phone Number:
- Login Sequence:
- Connection Type:  SLIP  PPP
- Inactivity Timeout Options:

At the bottom of the dialog, there is a 'Help' button and a note: '[\* = required field]'. The page number 'Page 1 of 4' is visible in the bottom right corner.

Figure 332. IBM Dial-Up for TCP/IP OS/2 - Login Info Panel for SLIP

Fill in the **Login Info** panel as shown in Figure 347 on page 321.

Note that the login ID and the password are not mandatory but strongly recommended. Then a login ID/password defined on the LAN-attached station (the station that will receive the call) will be compared to a login ID/password sent by the remote station (the station that dials). If you don't set up a login ID/password on the LAN-attached station for the SLIP link, that means the SLIP link you are defining will be accessible by any remote workstation that will dial in this entry point.

If you set a login/password here, you have to do the same on the other side of the SLIP link. See the SLIPDIAL.SLP file on the remote station in Figure 329 on page 304.

Choose **SLIP** instead of PPP.

Click on the **Connect Info** tab to pursue the configuration of the SLIP link.

The Entries panel then appears, as shown in Figure 333.

The screenshot shows a window titled "Add Entries" with a "Connect Info" tab selected. The form contains the following fields and values:

- \*Your IP Address: 9.67.46.2
- \*Destination IP Address: 9.67.46.1
- Netmask: (empty)
- \*MTU Size: 1006
- VJ Compression
- \*Domain Nameserver: 9.24.104.108
- Your Host Name: (empty)
- \*Your Domain Name: itsa.ral.ibm.com

At the bottom, there is a "Help" button and a note "[\* = required field]". The page number "Page 2 of 4" is visible in the bottom right corner.

Figure 333. IBM Dial-Up for TCP/IP OS/2 - Connect Info Panel for SLIP

Fill in the information related to the IP addressing you plan to use for the serial line based subnet. Here we will use 9.67.46.2 as the address of the LAN-attached station and 9.67.46.1 for the Windows remote station address.

Select the **VJ compression** button to enable the Van Jacobsen IP and TCP Headers compression. Note that this compression mode is not a standard in SLIP; it depends on the implementation of SLIP. As SLIP in TCP/IP for OS/2 as well as in TCP/IP for DOS provides this compression standard, we are able to use it at both ends. For more details about the Van Jacobsen TCP header compression, refer to the information given on page 302.

The domain name server must be reachable from the LAN-attached station (check it before with a ping command).

Hostname and domain name must be the ones related to the address of the LAN-attached station on the LAN side (here the LAN-attached station we are configuring is known as 9.24.104.18 in the domain itso.ral.ibm.com). See Figure 326 on page 300.

Click on the **Modem Info** tab to pursue the configuration.

The following panel then appears:

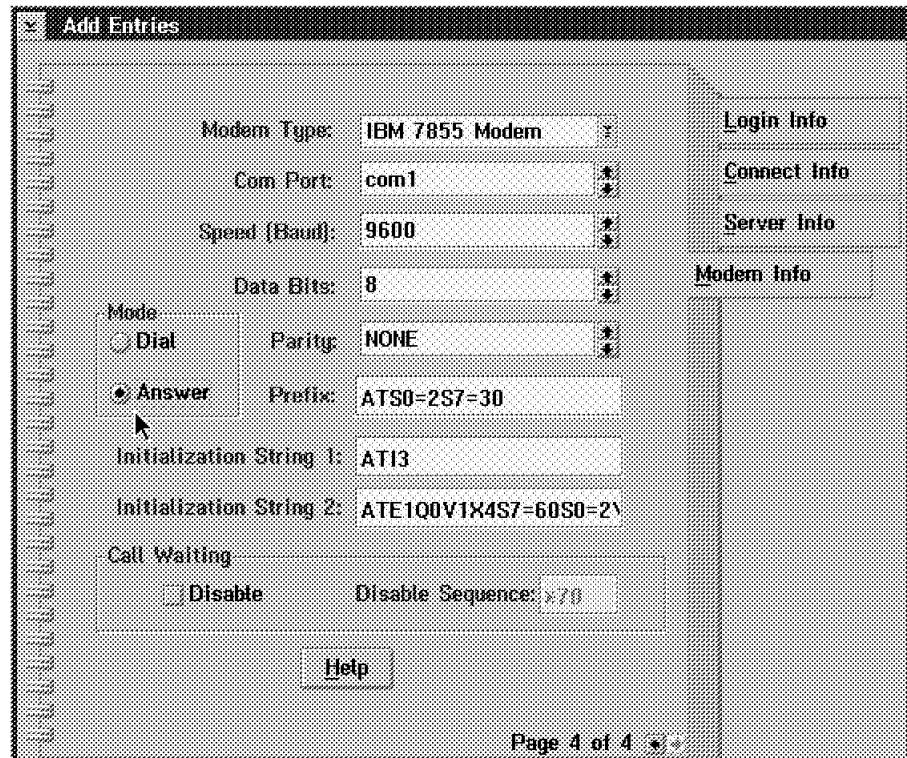


Figure 334. IBM Dial-Up for TCP/IP OS/2 - Modem Info Panel for SLIP

Select the modem you plan to use on the LAN-attached station. We will use an IBM 7855 modem.

Select the port where this modem will be attached, and the baud rate for the modem.

Click on the **Answer** button. That defines this station to wait for incoming call for this PPP link.

Close the Add Entries panel (double click on the top left corner), and save your SLIP link definition.

Your SLIP definition on the LAN-attached station is now complete.



## 9.2.9 Configuring and Testing the TN3270 Session

To configure a TN3270 session refer to 9.3.5, “Configuring the TN3270 Session in Personal Communications” on page 323.

For more information about configuring the Telnet Server (our has the 9.12.14.1 address) refer to 5.6, “Configuration of the TELNET Server on TCP/IP v3.1 on MVS” on page 178. (See Figure 326 on page 300 to locate the Telnet Server.)

We are now ready to run the entire configuration and test the session.

### Step-by-Step Connection

- First start the SLIP link on the LAN-attached side. To do so click on the **Dial** button in the TCP/IP Dial-Up window while the line of the **tstslip** is selected. The LAN-attached workstation starts the link as defined in 9.2.8, “Configuration of SLIP on the LAN-Attached Workstation” on page 308. It should then be ready to receive an incoming call, as shown in Figure 335.

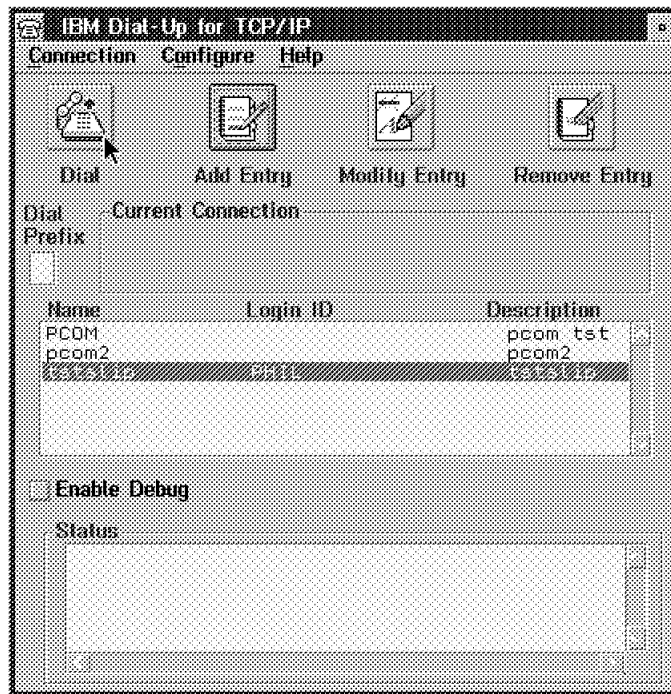


Figure 335. TCP/IP Dial-UP - Ready to receive Incoming Call for SLIP

The commands issued to start the SLIP link on the LAN-attached side are shown in Figure 336 on page 312.

```

SL/IP    OS/2 TCP/IP Multiple Interface SLIP Driver
2.00    Copyright(c) IBM Corp. 1993, 1994
Revision: 1.27  12 July 1995 16:04:48

Priority class set to 3
s10 <-> com1
s10 speed = 9600
s10 MTU = 1006
s10 modem hangup command is 'ATH'
Using RTS/CTS hardware flow control
Set proxy ARP
s10 VJ header compression enabled
Connection command: slattach ATI3 OK ATE1Q0V1X4S7=60S0=2\\R2\\Q2\\X0
\\N3\\V1&D2&S1&R0&C1&I0 OK ATSO=2S7=30 OK

Current bit rate is 9600
slattach Version 2.0 Revision:  1.6 10 July 1995 11:50:48
ATI3

V7.000-001

OK
ATE1Q0V 1X4S7=60S0=2\\R2\\Q2\\X0\\N3\\V1&D2&S1&R0&C1&I0

OK
ATSO=2S7=30

OK
Configuring s10: 9.67.46.2 -> 9.67.46.1
proxy ARP link level address= 40:00:52:00:51:95
[MON] SLIP Driver Running. Exit with Ctrl-C or Ctrl-Break

```

Figure 336. TCP/IP Dial-UP - Starting the SLIP Link on the LAN-Attached Station

- Now start the SLIP link on the remote workstation. To do so start TCP/IP. We assume you have configured the SLIP interface to be started during TCPIP startup (see 9.2.2, "Configuration of SLIP on the Windows Remote Workstation" on page 301).
- Then start TCP/IP (by typing TCPSTART.BAT).  
You will see the following message:  
Establishing connection for SL0...  
Then your modem will dial the LAN-attached station. When connected, the following will appear:  
Connection established  
Then the information as shown in Figure 331 on page 307 should appear on your screen. Finally the last message should be:  
TCP/IP Enabled.  
If you don't already have this statement in your TCPSTART.BAT file (see Figure 330 on page 307), you need to add a default route via the LAN-attached station involved in the setup of this SLIP link. Type the following:  
ROUTE ADD default 9.67.46.2

In order to verify the status of a SLIP connection once it has been started, you can use such commands as Netstat, ifconfig. Note that contrary to the ODI and NDIS interfaces, when using SLIP you cannot PING your own IP address. The following highlighted examples show the SLIP-related information.

- The netstat -ian command will give you a report on all configured interface and network addresses.

The following is an example:

```
C:>netstat -ian
Name Mtu Network Address Ipkts Ierrs Opkts Oerrs Coll
s10 1006 <Link> 0 0 1 0 0
media type = Slip
media speed = 9600 (bps)
s10 1006 9 9.67.46.1 0 0 1 0 0
```

Figure 337. NETSTAT -ian Command Result

- The netstat -rn command will display the routing tables and the network addresses.

The following is an example:

```
C:>netstat -rn
Routing tables
Destination Gateway Flags Refs Use Interface
Netmasks:
(root node)
(0) 0 0 ff ff ff 0
(root node)

Route Tree for Protocol Family 2:
(root node) =>
default 9.67.46.2 UG 0 38 s10
9.67.46.2 9.67.46.1 UH 1 0 s10
(root node)
C:\>
```

Figure 338. NETSTAT -rn Command Result

- The ifconfig s10 command will display the status of the interface, (up or down), and the kind of connection you are using, etc.

The following is an example:

```
C:>ifconfig s10
s10: flags=8d1<UP,POINTOPOINT,RUNNING,NOARP,SIMPLEX>
inet 9.67.46.1 --> 9.67.46.2 netmask ff000000
C:\>
```

Figure 339. IFCONFIG s10 Command Result

Test a PING to the LAN-attached station (9.67.46.2).

Test a PING to another station on the LAN, located in the same subnet as the LAN-attached station involved in the SLIP connection.

Test a PING to your Telnet server resource.

**Note:** You can experience some timeout results for the PING command. If so try to PING using the PING program provided in Windows. This seems to be more reliable regarding timeouts.

Finally start Windows, and open your TN3270 session (or TN5250) under Personal Communications.

## 9.2.10 Resolving Problems

The main problems you could have are the ones related to the DOS memory management. If you experience some system hanging while starting Windows or while starting Personal Communications, then we recommend that you look at the way the devices are loaded in memory, and try to optimize DOS memory settings.

If you can't PING your LAN-attached workstation, check your routing table (NETSTAT). See Figure 338 on page 313. If the problem persists check your modem physical attachment, check your login ID/password on both sides of the connection, or power off the modem and reboot the station. You may have to change your telephone wire (between the modem and the phone plug) as we had to do during the tests.

If you can PING the LAN-attached station but no other station on the LAN, then check your routing table on the remote workstation (see Figure 338 on page 313) to be sure your default route is using the LAN-attached station. Check the PING from the LAN-attached station the resources you are trying to contact from the remote. If it fails, solve the routing problem located on your LAN-attached station first.

---

## 9.3 Personal Communications Session using a PPP Link

We will use OS/2 Warp Connect as the base to set up some tests running Personal Communications on an OS/2 mobile workstation through a remote IP connection.

OS/2 Warp Connect provides TCPIP for OS/2 Version 3.0. Related to serial line-based IP connectivity, this implementation of TCPIP provides two protocols:

- Serial Line IP protocol (SLIP)
- Point-to-Point protocol (PPP)

We will use PPP protocol to support the remote IP-based connection; then we will test TN3270/TN5250 Personal Communications sessions via this link.

See Figure 326 on page 300 to understand the PPP configuration we will set up.

### 9.3.1 The Point-to-Point Protocol (PPP)

We decided to use PPP instead of SLIP for several reasons.

The TCP/IP protocol family runs over a variety of network media (IEEE 802.3/802.5, LANs, X.25, serial line, etc...). Standards for encapsulation of IP have been defined for many of these networks, but there is no standard for serial lines. SLIP is currently a de facto standard. SLIP protocol is actually used very much for point-to-point serial connections running IP, but it is not an Internet standard.

PPP is a network-specific standard protocol with STD number 51. PPP is described in RFC 1661 and RFC 1662.

PPP addresses some drawbacks that SLIP has:

- SLIP doesn't manage the handshaking step nor the link control; it defines only the encapsulation protocol.
- SLIP is only defined for asynchronous links.
- SLIP cannot support multiple protocols across a single link. The only one supported is IP.
- SLIP does not detect errors nor manage re-transmission by higher level protocols in case of noisy lines.
- SLIP does not provide a compression mode for the IP header fields (note that this is not a strong argument regarding some implementations today of the Van Jacobsen Header compression in SLIP, such as IBM TCPIP for DOS and OS/2 implementations).

The PPP protocol addresses these problems by:

- Controlling the link as well as defining the IP encapsulation
- Supporting synchronous links as well as asynchronous ones
- Allowing simultaneous use of different network-layer protocols
- Managing the detection of transmission errors with the higher layers
- Providing Van Jacobsen Header Compression, which is used to reduce the size of the combined IP and TCP headers from 40 bytes to approximately 4 bytes.

This compression mode is described in RFC 1144.

PPP is preferred because it was developed as an Internet standard. Additionally PPP has more features and is more robust than SLIP. So PPP appears to be a good choice as a nonproprietary protocol to use IP over serial lines. SLIP remains the most frequently used protocol to route IP over serial lines, but PPP is clearly the serial protocol of the future. Actually little documentation is provided for PPP. Thus testing Personal Communications sessions over PPP appears to be a relevant choice.

### **PPP Components**

PPP has three main components:

- Data Link Layer Protocol

This is the method for encapsulating datagrams over serial lines.

PPP implements an HDLC-based protocol, but with an added protocol field that allows PPP to manage traffic for multiple network layer protocols. High Data Link Control is an international protocol for sending data over synchronous lines in a reliable way.

PPP also uses a proposed standard for HDLC transmission over asynchronous lines. PPP can guarantee reliability of data delivery over any type of serial line.

- Link Control Protocol

This is the method for establishing, negotiating configuration parameters, testing the quality of the line, and closing the data-link connection.

- Network Control Protocols

This is a family of protocols, each one of which provides the correct establishment and configuration for a specific network layer protocol. This allows PPP to transmit data for multiple network protocols (IP, DECNET, etc.).

### 9.3.2 Installation of TCPIP for OS/2 V3.0

If you plan to use the OS/2 WARP Connect package, the only thing you need is the CD-ROM of Warp Connect. Then to start the installation of TCP/IP for OS/2, insert the CD-ROM and execute the PRODINST.EXE program located in the root.

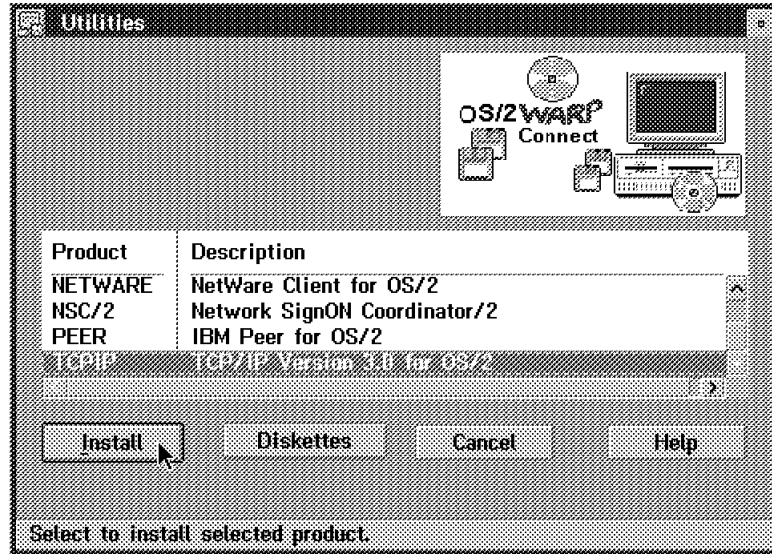


Figure 340. TCP/IP for OS/2 V3.0 Installation with Warp Connect Package

Select the TCP/IP for OS/2 product and click on **Install**.

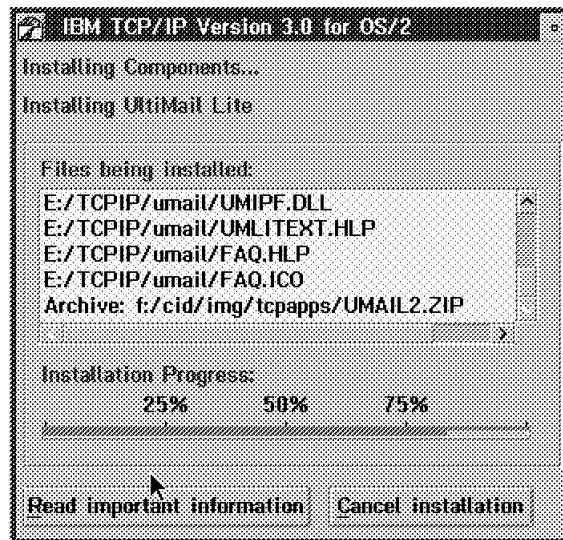


Figure 341. TCP/IP for OS/2 V3.0 Installation Main Panel

When the installation is completed, configure your workstation via the TCP/IP configuration program located in the TCP/IP for OS/2 folder.

### 9.3.3 Configuration of PPP on the LAN-Attached OS/2 Workstation

To use PPP we need to set up a workstation located on the LAN. This workstation will be called via modem by the remote workstation. This workstation is identified as the LAN attached workstation in Figure 326 on page 300.

This workstation will be able to hold several PPP links simultaneously. Each PPP link will use a modem connection. A pppx interface will then be defined (for example, ppp0 interface is the one that will be defined for the first PPP link that you will configure, ppp1 will be the second one, etc.).

We will configure this workstation only for one PPP link (only one modem attached to it).

We assume TCP/IP is installed and running properly on the workstation.

To define the PPP link perform the following steps:

1. Open the TCP/IP folder and double click on the **Network Dialer** icon (see Figure 342).

This starts the **IBM Dial-Up for TCP/IP OS/2** as shown in Figure 343 on page 318.

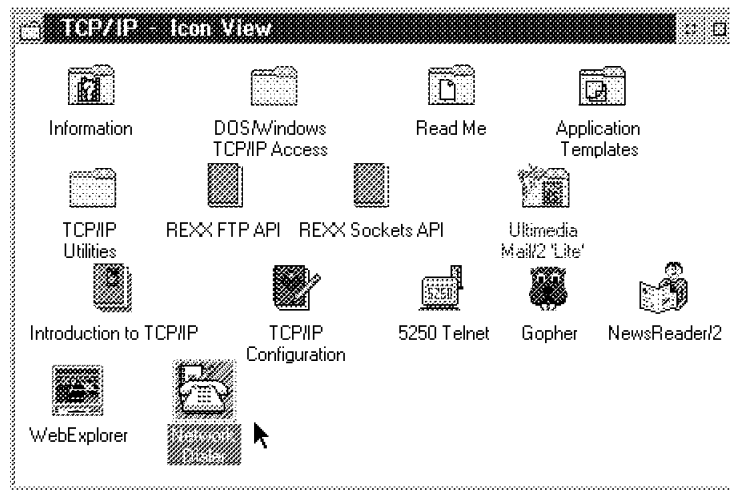


Figure 342. TCP/IP Folder

2. Click on the **Add Entry** button on the IBM Dial-Up for TCP/IP panel.

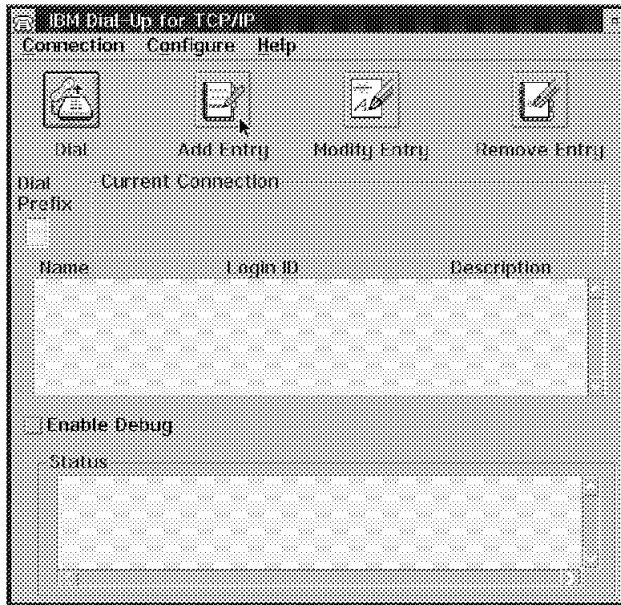


Figure 343. IBM Dial-Up for TCP/IP OS/2 - Main Panel

The configuration panel appears as shown in Figure 344.

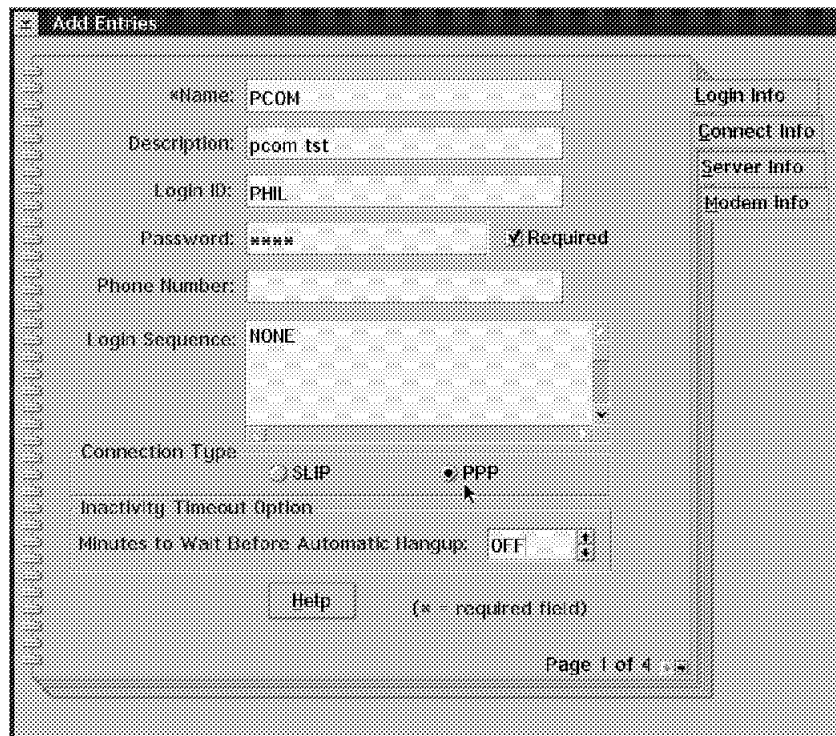


Figure 344. IBM Dial-Up for TCP/IP OS/2 - Login Info Panel



3. Fill in the Login Info panel. Note that the login ID and the password are not mandatory but strongly recommended. Then a login ID/password defined on the LAN-attached station (the station that will receive the call) will be compared to a login ID/password sent by the remote workstation (the station that dials). If no login ID/password is set on the LAN-attached station for the PPP link, then the PPP link you are defining will be accessible by any remote workstation that will dial in this entry point.
  4. Choose **PPP** instead of SLIP.
  5. Click on the **Connect Info** tab to pursue the configuration of this PPP link.
- Another panel then appears as shown in Figure 345.

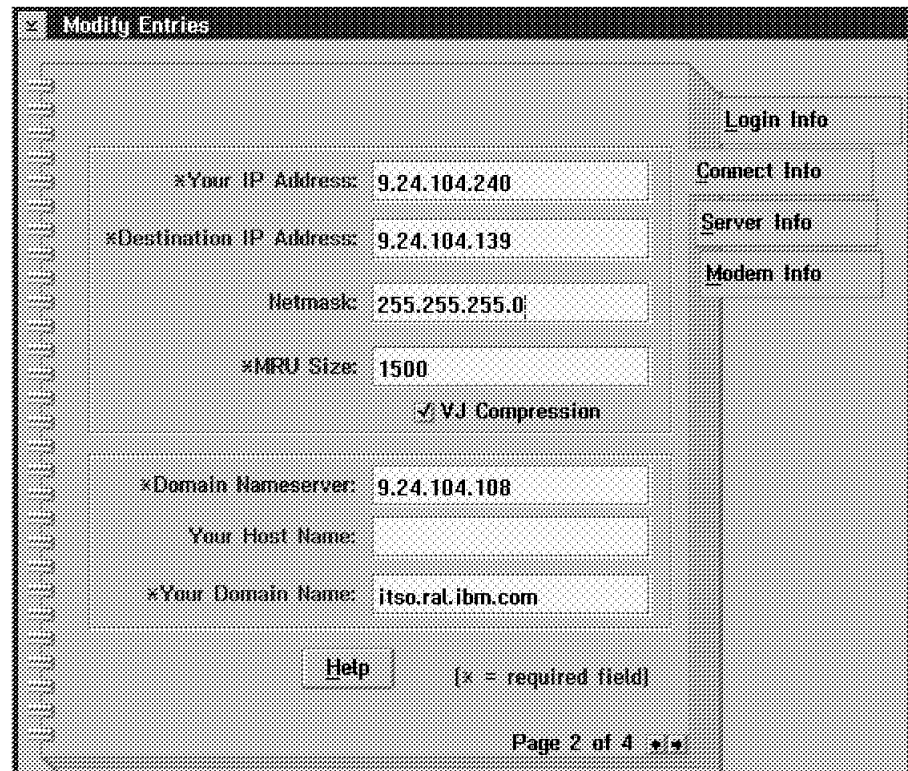


Figure 345. IBM Dial-Up for TCP/IP OS/2 - Connect Info Panel

Fill in the information related to the IP addressing you plan to use for the serial line based subnet. Here we will use 9.24.104.240 as the address of the LAN-attached station and 9.24.104.139 for the remote station address (see Figure 326 on page 300).

Select **VJ compression** to enable the Van Jacobsen IP and TCP Headers compression.

The domain name server must be reachable from the LAN-attached station (check it before with a PING command).

Host name and domain name must be the ones related to the address of the LAN-attached station on the LAN side (here the LAN-attached station we are configuring is known as 9.24.104.18 in the domain itso.ral.ibm.com). See Figure 326 on page 300.

Click on the **Modem Info** tab to pursue the configuration.

The following panel then appears as shown in Figure 346 on page 320.

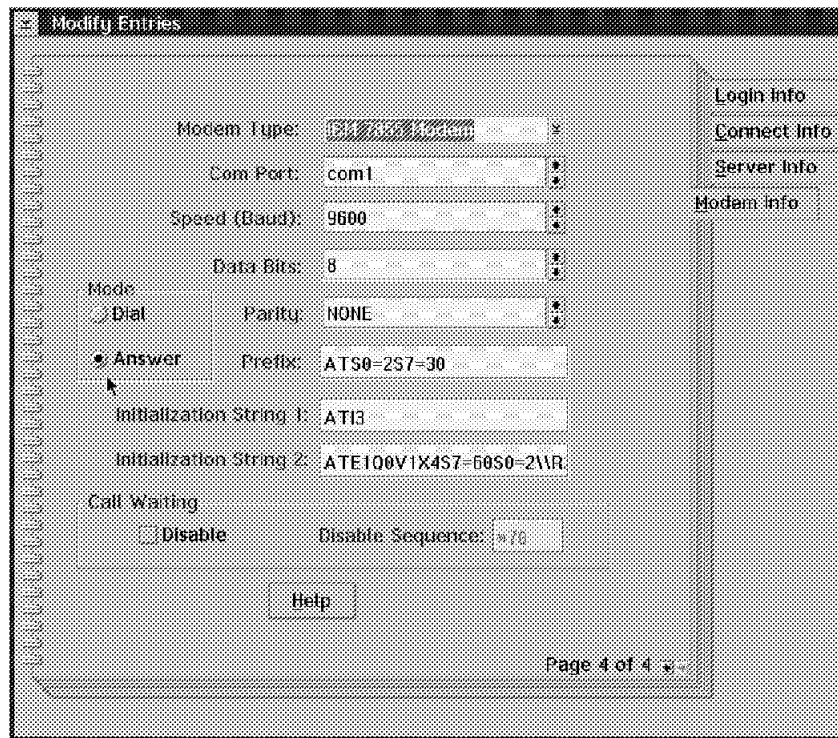


Figure 346. IBM Dial-Up for TCP/IP OS/2 - Modem Info Panel

Select the modem you plan to use on the LAN-attached station. We will use an IBM 7855 modem.

Select the port where this modem will be attached, and the baud rate for the modem.

Click on the **Answer** button. That defines that this station will wait for an incoming call for this SLIP link.

Close the Add Entries panel (double click on the top left corner), and save your PPP link definition.

Your PPP definition on the LAN-attached station is now complete, the Dial-Up window panel that appears is similar to the one shown in Figure 350 on page 323. Both panels differ only in the Description field: pcom tst instead of PCOM via PPP.

### 9.3.4 Configuration of PPP on the Remote OS/2 Workstation

Once the receiving side of the PPP link is configured (see 9.3.3, "Configuration of PPP on the LAN-Attached OS/2 Workstation" on page 317), you need to define the PPP link on the Remote side. This workstation is identified as the remote workstation in Figure 326 on page 300.

We assume TCP/IP is installed and running properly on the workstation.

To define the PPP link perform the following steps:

Open the TCP/IP folder and double click on the **Network Dialer** icon (see Figure 342 on page 317).

This starts the **IBM Dial-Up for TCP/IP OS/2** as shown in Figure 343 on page 318.

Click on the **Add Entry** button. The configuration panel appears as shown in Figure 347.

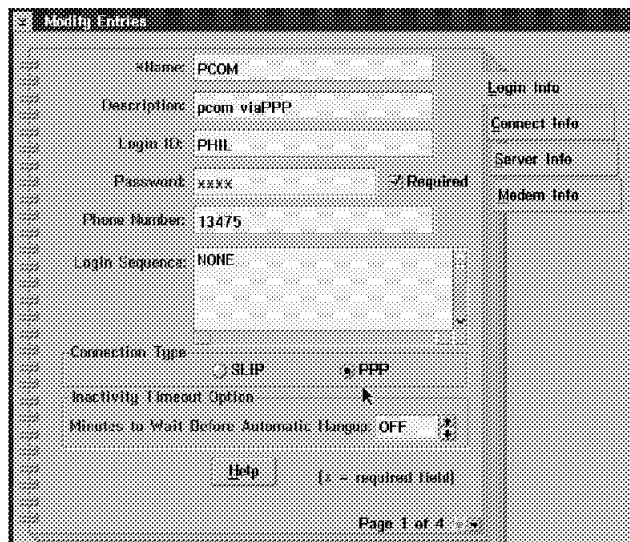


Figure 347. IBM Dial-Up on the Remote - Login Info Panel

Fill in the Login Info panel. Note that the login ID and the password are mandatory if you have defined them on the LAN-attached station side (as strongly recommended). For more details see the security discussion on page 319). If the login ID/password you fill in here are different from the ones set up at the LAN-attached side of the PPP link, you will not be able to establish the connection.

Fill in the phone number to dial-in to connect to the modem attached to the LAN-attached station.

Choose **PPP** instead of SLIP.

Click on the **Connect Info** tab to pursue the configuration of this PPP link.

Another panel then appears as shown in Figure 348 on page 322.

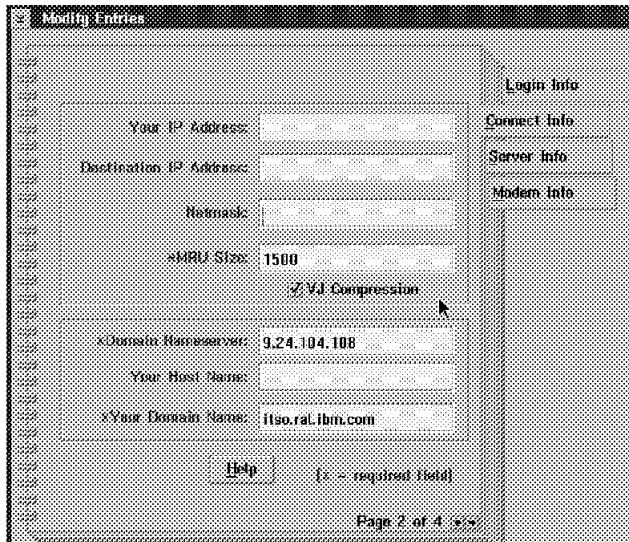


Figure 348. IBM Dial-Up on the Remote - Connect Info Panel

As we have already defined in the LAN-attached station PPP definition the addresses to be used on the PPP connection, it is useless to define them on the remote side, because during the establishment of the connection, the LCP layer of PPP (see “PPP Components” on page 315 for more details) negotiates this kind of information. We could have left blank those definitions on the LAN-attached side and then you would have needed to give them now on the remote side of the link definition.

Select **VJ compression** to enable the Van Jacobsen IP and TCP Headers compression.

The host name is not mandatory, and the domain name must be the one related to the address of the LAN-attached station on the LAN side (itso.ral.ibm.com).

Click on the **Modem Info** tab to pursue the configuration of this PPP link.

The other panel shown in Figure 349 appears.

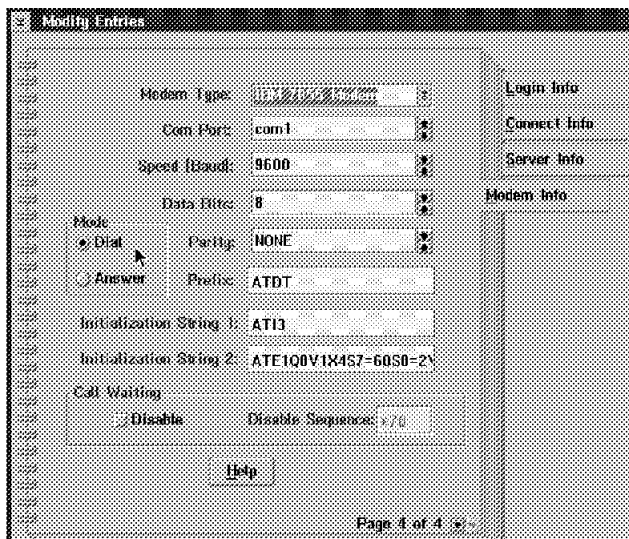


Figure 349. IBM Dial-Up on the Remote - Modem Info Panel

Select the modem you plan to use on the LAN-attached station. We will use an IBM 7855 modem.

Select the port where this modem will be attached, and the baud rate for the modem.

Click on the **DIAL** button. That defines this station to dial when starting the PPP link.

Close the **Add Entries** panel (double click on the top left corner), and save your PPP link definition.

Your PPP definition on the remote workstation is now complete. The Dial-Up window now appears as shown in Figure 350.

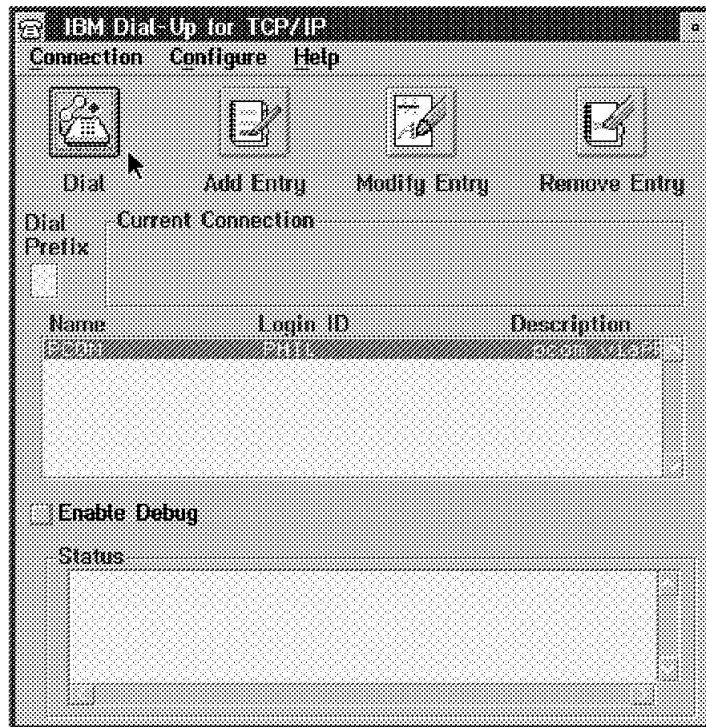


Figure 350. IBM Dial-Up Remote - Main Panel after PPP Link Defined

### 9.3.5 Configuring the TN3270 Session in Personal Communications

To configure a TN3270 session perform the following steps, starting from the configuration panel, as shown in Figure 351 on page 324.

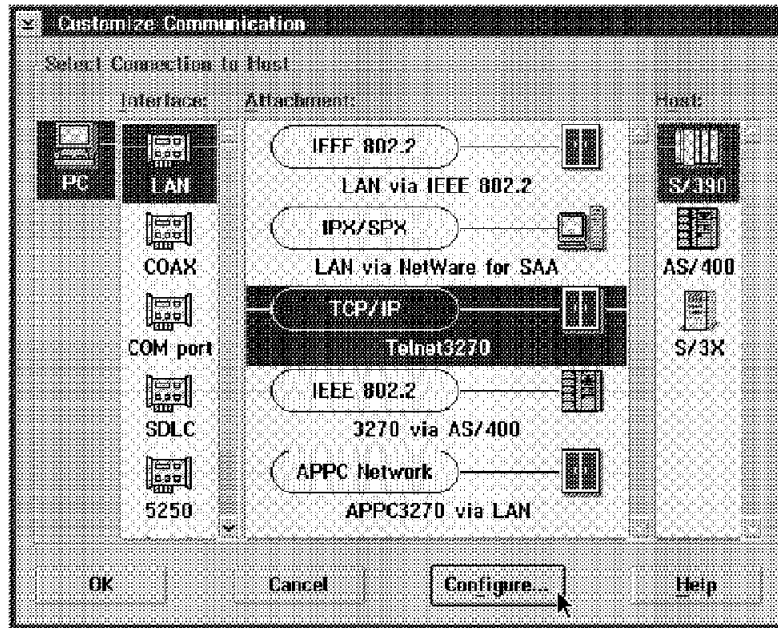


Figure 351. Personal Communications Configuration Main Panel

Click on **Configure** button. The following panel then appears:

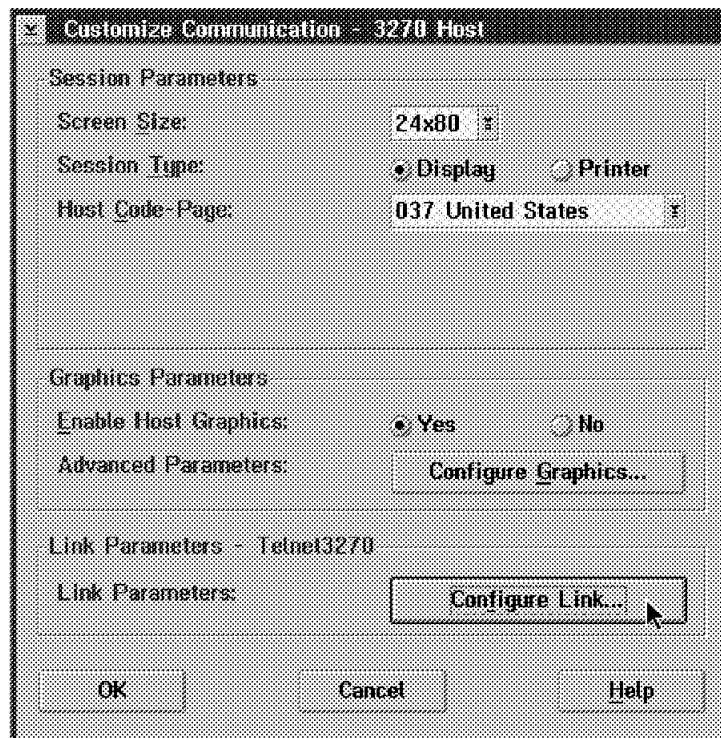


Figure 352. TN3270 Session Configuration Panel

Click on **Configure Link**, then the following panel prompts you for some Telnet related information, as shown in Figure 353 on page 325.

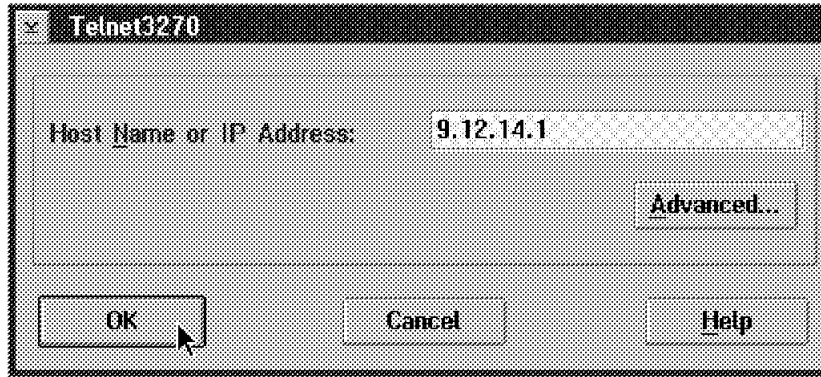


Figure 353. TN3270 Information Panel

You can see here that our Telnet Server has the address 9.12.14.1 (see Figure 326 on page 300 to locate the Telnet Server).

For more details about the configuration running on the Telnet server refer to 5.6, "Configuration of the TELNET Server on TCP/IP v3.1 on MVS" on page 178.

You can save your configuration. It is ready to be used.

### 9.3.6 Testing the TN3270 Session in Personal Communications on OS/2 via PPP Connectivity

We are now ready to run the entire configuration.

#### Step-by-Step Connection

- First start the PPP link on the LAN-attached side. To do so click on the **DIAL** button in the TCP/IP Dial-Up window (see Figure 354). The LAN-attached workstation starts the link as defined in 9.3.3, "Configuration of PPP on the LAN-Attached OS/2 Workstation" on page 317. It should then be ready to receive an incoming call, as shown in Figure 354.

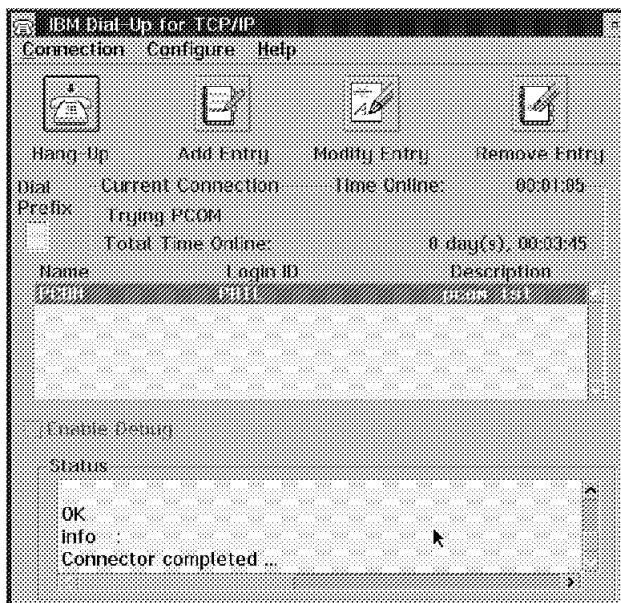


Figure 354. TCP/IP Dial-UP - Ready to Receive Incoming Call

The commands issued to start the PPP link on the LAN-attached side are shown in Figure 355 on page 326.

```
PPP OS/2 TCP/IP Point-to-Point Protocol Driver
2.00 Copyright(c) IBM Corp. 1994, 1995
Revision: 1.8 15 Mar 1995 13:57:56

notice : OS/2 ppp 2.00 revision: 1.8 started by OS/2, pid 117
info : Using interface ppp0
info : Setting line characteristics
info : Setting port baud rate to 9600
notice : Linking: ppp0 <--> com1
info : Time critical priority level 1
info : Connecting with <slattach AT13 OK ATE1Q0V1X4S7=60S0=2\R2\Q2
\\X0\N3\V1&D2&S1&R0&C1&I0 OK ATSO=2S7=30 OK>
slattach Version 2.0 Revision: 1.4a 01 Feb 1995 11:50:48
AT13

V7.000-001

OK
ATE1Q0V 1X4S7=60S0=2\R2\Q2\X0\N3\V1&D2&S1&R0&C1&I0

OK
ATSO=2S7=30

OK
info :
Connector completed ...
```

Figure 355. TCP/IP Dial-UP - Starting the Link on the LAN-Attached Station

- Now start the PPP link on the remote station. To do so click on the **DIAL** button in the TCP/IP Dial-Up window (see Figure 356). The remote workstation starts the link as defined in 9.3.4, "Configuration of PPP on the Remote OS/2 Workstation" on page 321.

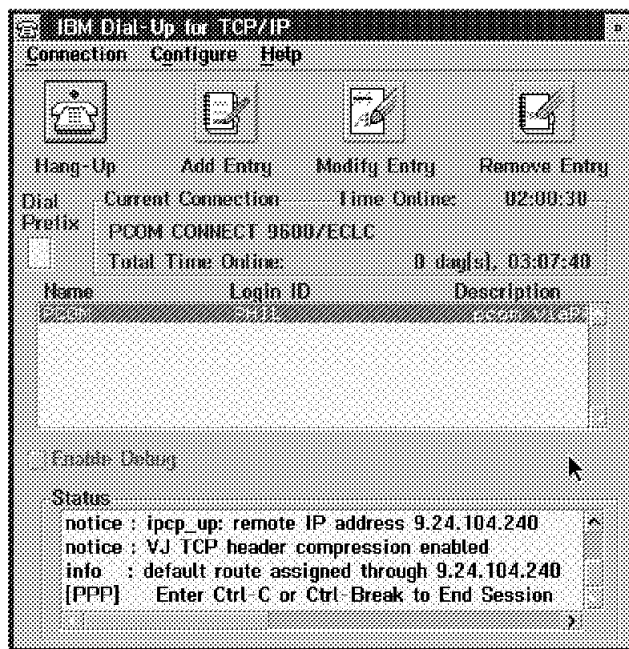


Figure 356. TCP/IP Dial-UP - Connected on the Remote Workstation

The commands issued to start the PPP link on the LAN-attached side are shown in Figure 357 on page 327.



```

PPP   OS/2 TCP/IP Point-to_Point Protocol Driver
2.00  Copyright(c) IBM Corp. 1994, 1995
Revision: 1.8  15 Mar 1995 13:57:56

notice : OS/2 ppp 2.00 revision:  1.8  started by OS/2, pid 92
info   : [main] couldn't determine host name

info   : Using interface ppp0
info   : Setting line characteristics
info   : Setting port baud rate to 9600
notice : Linking: ppp0 <--> com1
info   : Time critical priority level 1
info   : Connecting with <slattach ATI3 OK ATE1Q0V 1X4S7=60S0=2\\R2\\Q2
        \\X0\\N3\\çV1&D2&S1&R0&C1&IO OK ATDT13475 NNECT>
slattach Version 2.0 Revision:  1.4a 01 Feb 1995 11:50:48
ATI3

V7.000-001

OK
ATE1Q0V 1X4S7=60S0=2\\R2\\Q2\\X0\\N3\\V1&D2&S1&R0&C1&IO

OK
ATDT13475

RING

CONNECT 9600/ECLC
info   :
Connector completed ...
info   : Remote message: CHAP -> Welcome to eamon.
notice : ipcp_up: local IP address 9.24.104.139
notice : ipcp_up: remote IP address 9.24.104.240
notice : VJ TCP Header compression enabled
info   : default route assigned through 9.24.104.240
[PPP]  Enter Ctrl-C or Ctrl-Break to End Session

```

Figure 357. TCP/IP Dial-UP - Starting the Link on the Remote Station

The connection should be successful, as shown in Figure 356 on page 326; if you encounter problems, see 9.3.7, “Resolving Problems Running PCOMM Sessions through PPP” on page 331.

- Try first to PING the LAN-attached station from the remote, and the remote station from the LAN-attached.
- Try to PING the Telnet server from the remote (9.12.14.1 in our configuration).
- Finally start your Personal Communications session.

### Routing Considerations

Once connected, you will find on the LAN-attached station some information related to routing that should be similar to the following:

```

result of the netstat -r command:

destination      router      refcnt      use flags      snmp intrf
                  metric
9.24.104.139     9.24.104.240  0           43 U             -1 ppp0
  default        9.24.104.1   0           60 U             -1 lan0
9.24.104.0       9.24.104.18  1           92945 U            -1 lan0

```

Figure 358. Routing Table on the LAN-Attached Station

- The first line defines a routing path to access the remote station from the LAN.
- The second line defines a routing path to access resources located out of subnet 9.24.104.0, using the router 9.24.104.1 (see Figure 326 on page 300).
- The third line defines a routing path to access resources located on the same subnet than the LAN-attached host.

Note the interface **ppp0** used to route datagrams to the remote station (over the serial line).

On the remote station side, the routing setup is similar to the following:

```

result of the netstat -r command:

```

destination	router	refcnt	use	flags	snmp metric	intrf
9.24.104.240	9.24.104.139	0	0	U	-1	ppp0
default	9.24.104.240	1	79	U	-1	ppp0

Figure 359. Routing Table on the Remote Station

- The first line defines a routing path to access the LAN-attached workstation, through the ppp0 interface which is the serial line.
- The second line defines a routing path to access any resources via the LAN-attached host; this one is seen from the remote station as a router.

### Address Resolution Consideration via ARP and proxyARP

The Address Resolution Protocol (ARP) is responsible for converting the higher level protocol addresses (IP addresses) to physical network addresses.

On the IBM token-ring LAN, the method used to encapsulate ARP frames is based on the use of the IEE 802.2 network layer. This is described in RFC 1042 "Standard for the Transmission of IP Datagrams over IEEE 802.2 Networks".

On a single physical network, individual hosts are known by their physical address. But higher protocols use different and more symbolic addressing concepts than physical addresses. Those higher layers don't understand the physical address of a host, and the 802.2 layer doesn't understand, for example, an IP address. ARP is provided to translate IP addresses to physical ones so that the datagrams could finally reach the physical host destination address. Then in the case of our LAN-attached station, the IP address 9.24.104.18 is associated with the physical address 400052005113. This association resides in the ARP cache table. You can query the ARP table using the command `ARP -a`. You will see a lot of lines; each one defines an association between the IP address and the physical address of a host.

When the address of a destination host is not found in the ARP cache then a broadcast frame is sent across the network by the ARP module running in the sender host. If one machine recognizes the IP address broadcasted as its own, then it replies to the sender, giving its physical address. Thus the sender memorize this information in its ARP cache and is able to send datagrams to the destination host.

The way the IP address is translated to the physical address is done by requesting the physical address to the IEE 802.2 layer.

When implementing a PPP connection, we have defined a subnet where the remote workstation resides once connected, and that is only reachable from the LAN-attached station. This works as if the LAN-attached station was a router between the LAN subnet and the subnet of the remote station. Then if a host located on the LAN tries to send a datagram to the remote station, it will fail looking for the physical address of the remote, because the remote have no physical address on the network. The ProxyARP is a method (described in *RFC 925 - Multi-LAN Address Resolution*) that provides a way to make the Remote station visible from a physical point of view from all the LAN located hosts. The mechanism consists of associating the IP address of the remote station with the physical address of the LAN-attached workstation (the one involved in the establishment of the PPP link). Then when a host on the LAN asks (broadcasts) for the physical address of the remote station, the LAN-attached station will reply and give its own physical address. The other LAN host will then send the datagrams to the LAN-attached workstation, believing that it is the remote station. No host located on the LAN will know that the Remote station is connected via a serial line. The only station located on the LAN that will know is the LAN-attached station we have configured to be the PPP LAN side of the connection (see 9.3.3, "Configuration of PPP on the LAN-Attached OS/2 Workstation" on page 317).

When the PPP connection is being established, the association remote-IP-address / LAN-attached-physical-address is added in the ARP cache on the LAN-attached station:

ARP table contents:			
interface	hardware address	IP address	minutes since last use
0	10005aa8d769	9.24.104.108	2
0	10005ab1abed	9.24.104.119	0
0	10005ab1c42c	9.24.104.209	0
0	10005ac92ceb	9.24.104.60	0
0	10005ab1afe9	9.24.104.109	1
0	10005ab155da	9.24.104.25	0
0	10005ab1d731	9.24.104.215	0
0	10005ab1b51a	9.24.104.123	0
0	400052005011	9.24.104.1	5
<b>0</b>	<b>400052005113</b>	<b>9.24.104.139</b>	<b>0</b>
0	10005ab195ad	9.24.104.23	0
0	10005ab1ac7d	9.24.104.15	0
0	10005a4f58ce	9.24.104.26	0
0	10005ab14fcb	9.24.104.124	0

Figure 360. ARP Cache on the LAN-Attached Station

The physical address must be defined in the IEEE 802.2 configuration (MPTS) on the LAN-attached station. Otherwise the ProxyARP mechanism will fail and the PPP connection will not be established. Check for the following statements in the PROTOCOL.INI file as shown in Figure 361.

```
[PROT_MAN]
  DRIVERNAME = PROTMAN$

[IBMLXCFG]
  LANDD_nif = LANDD.NIF
  NETBEUI_nif = NETBEUI.NIF
  ODI2NDI_nif = ODI2NDI.NIF
  TCPIP_nif = TCPIP.NIF
  IBMTOK_nif = IBMTOK.NIF

[NETBIOS]
  DriverName = netbios$
  ADAPTER0 = netbeui$,0

[LANDD_nif]

  DriverName = LANDD$
  Bindings = IBMTOK_nif
  NETADDRESS = "T400052005113"
  ETHERAND_TYPE = "I"
  SYSTEM_KEY = 0x0
  ...

[NETBEUI_nif]
  ...

[ODI2NDI_nif]
  ...

[TCPIP_nif]
  DriverName = TCPIP$
  Bindings = IBMTOK_nif

[IBMTOK_nif]
  DriverName = IBMTOK$
  ADAPTER = "PRIMARY"
  NETADDRESS = "400052005113"
  MAXTRANSMITS = 6
  RECVBUFS = 20
  RECVBUFSIZE = 2040
  XMITBUFS = 2
  XMITBUFSIZE = 4096
```

Figure 361. PROTOCOL.INI File on the LAN-Attached Station

Note that the ARP cache on the remote is empty, because all the traffic sent from the remote station is routed via ppp0 interface to the LAN-attached station. The transparent subnetting implemented by the ProxyARP mechanism is then used on the LAN-attached station. Then it is the LAN-attached station that finds the physical address of the destination host for the datagrams coming from the remote station; it is not the Remote station itself. So no ARP cache is needed on the remote.

### Mobile Considerations

A major advantage of using Personal Communications through a PPP link from a mobile is that you do not need to switch between a LAN-attached configuration and a remote one. You can work connected to the LAN at your office and remotely connected via PPP with the same set of configuration files. Note that LAN Distance and 8235 connectivity are based on switched configurations.

## 9.3.7 Resolving Problems Running PCOMM Sessions through PPP

If you experience problems starting a TN3270/TN5250 Personal Communications session via PPP connectivity, go through the following problem determination:

- If you can not establish the PPP connection:
  1. Check the userID and passwords are the same on both ends (remote and LAN-attached workstations). See Figure 344 on page 318 and Figure 347 on page 321.
  2. Check your modems attachments and configuration on both side (see Figure 346 on page 320 and Figure 349 on page 322).
  3. Check your MPTS configuration related to the LLC 802.2 protocol.

For more details see the discussion about the use of IEEE 802.2 layer in ARP and ProxyARP mechanisms in “Address Resolution Consideration via ARP and proxyARP” on page 328. You must have your MAC Address declared for this protocol (see Figure 361 on page 330).

4. Check in your MPTS configuration that you have left blank the field named NetWork Interface Type in the TCPIP protocol definition.

If you get the following message at the LAN-attached side during the establishment of the connection:

```
[sifproxyarp] Cannot find hardware address for proxy ARP.
```

Check that you have a correct entry in the ARP table of the LAN-attached station. Check for the line associating the IP remote station address and the MAC address of the LAN-attached station (use **ARP -a** command). See “Address Resolution Consideration via ARP and proxyARP” on page 328 for more details, and Figure 360 on page 329.

Look at the routing table on the LAN-attached workstation (use the NETSTAT -r command). The routing table must be similar to the one shown in Figure 358 on page 327. For more details about routing using Point-to-Point protocol refer to "Routing Considerations" on page 327. If it is not similar, check the IP addresses in the PPP configuration (see Figure 345 on page 319).

5. Look at the routing table on the remote workstation (obtained with the NETSTAT -r command). The routing table must be similar to the one shown in Figure 359 on page 328. If this is not the case, check the IP addresses in the PPP configuration (see Figure 348 on page 322).
  6. Try to remove the Van Jacobsen Header Compression mode at the remote side.
- If you cannot PING an address located in the same subnet as your LAN-attached workstation:
    1. Check the routing table at the PPP remote side. You must have the same table as the one shown in Figure 359 on page 328.
  - If you can not PING an address located in a different subnet from your LAN-attached workstation:
    1. Try to PING this address from your LAN-attached workstation. If unsuccessful then check the routing table at the PPP remote side, you must have the same table as the one shown in Figure 358 on page 327. Contact your Network support in charge of the router between the subnet where your LAN-attached workstation is located and the other subnets of your network.
  - If you can not start the Personal Communications TN3270/TN5250 session:
    1. Check the configuration of this session (refer to 9.3.5, "Configuring the TN3270 Session in Personal Communications" on page 323).
    2. Check if you can PING the Telnet server address from the remote (9.12.14.1 in our configuration).
    3. If you can't PING it try from your LAN-attached workstation. If it still fails, contact your network support.
    4. If you can't PING it from your LAN-attached workstation, then check your routing table on the remote side (see Figure 359 on page 328).

---

## Part 4. Appendixes

The last part of the book includes:

- Appendix A, "Special Considerations for PCMCIA"
- Appendix B, "Communications Terminology and Tutorial"
- Appendix C, "The Hayes AT Command Set"





---

## Appendix A. Special Considerations for PCMCIA

Most mobile computers, such as the IBM ThinkPad, use PCMCIA credit-card-sized adapters. To use such an adapter, known as a PC Card, you need to install all the device drivers that are required for it.

---

### A.1 Installing PCMCIA Device Drivers for DOS/Windows

This section provides the information you need to install the PCMCIA device drivers in a DOS and Windows environment on an 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 instruction 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.

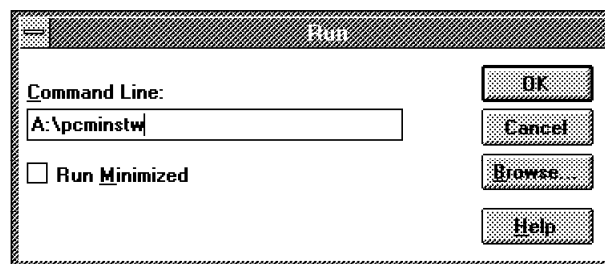


Figure 362. Windows Program Manager Run Panel

Type A:\pcminstw as shown and click on **OK**. At the IBM EasyPlaying logo panel click on **Continue**, which takes you to the IBM EasyPlaying Installation Program panel, as shown below.

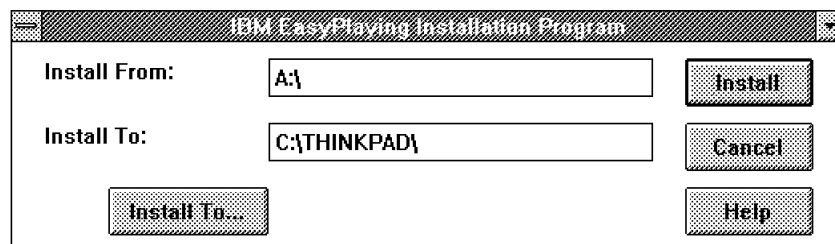


Figure 363. IBM EasyPlaying Installation Program Panel

Follow the instruction on the panel and make your selections, then click the **Install** button.

After all the files are copied, you can follow it, a question panel will be presented, which ask you to modify CONFIG.SYS and SYSTEM.INI files.

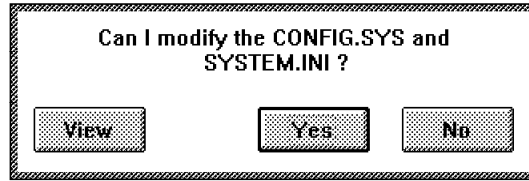


Figure 364. IBM EasyPlaying Installation Program Modify Panel

Let the installation program do the changes for you, click on **Yes**.

When, the installation of EasyPlaying has been successfully completed, exit Windows and restart your system, so 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 365 on page 337 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 relates to your hardware. Use RAMSETUP of DOS 7.0 to do the inclusion and exclusion. **/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 optimizer
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 365. 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; 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 decide to change the IRQ used by the system or by the Wireless application.

Once 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 of 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 for the loud speaker.

---

## A.2 Installing PCMCIA Device Drivers for OS/2

This section provides 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 should look like this:

```
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, 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 into the operating system.

In our mobile communication scenarios, a IBM ThinkPad 750C was 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 device drivers may need to be installed, and in a certain order, 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 into 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, a super-client modem device driver which supports 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 your 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.

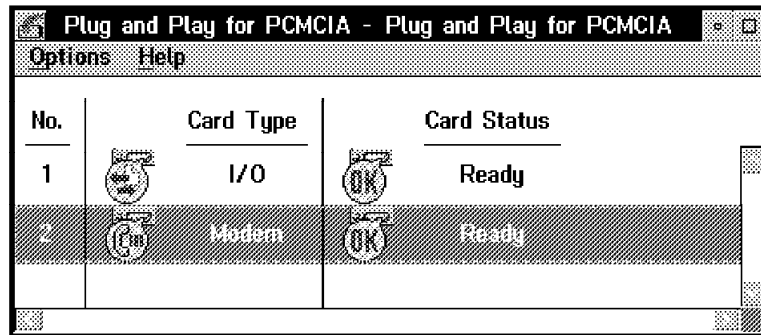


Figure 366. Plug-and-Play for PCMCIA - OS/2 Warp

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 it is ready to use, as it is.

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.

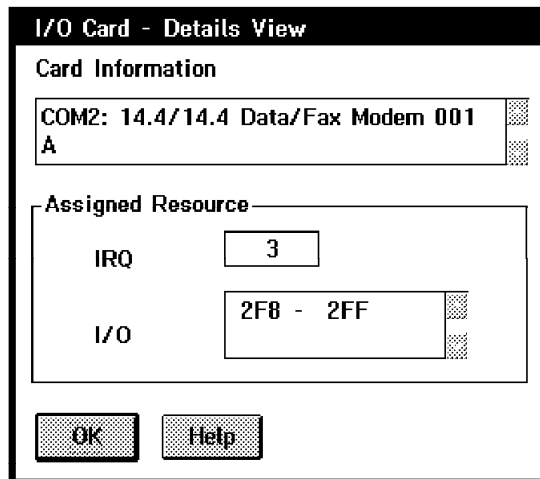


Figure 367. Plug-and-Play for PCMCIA Details - OS/2 Warp

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.



## Appendix B. Communications Terminology and Tutorial

Since the SNA Phone Connect feature deals with many types of telephone lines, modems, synchronous and asynchronous circuits, etc., we thought that a brief high-level tutorial on some of the basic communications concepts involved might be appropriate. This is mainly for the benefit of those readers for whom this may be totally new or for those who might need a refresh on some long-forgotten terminology.

designed to transmit the digital data signals produced by computers, but only to transmit voice signals, which are analog signals.

Therefore, the digital signals that computers use must be modified in such a way as to be carried over analog lines.

The way in which this is accomplished is through the use of a special piece of equipment that converts digital signals into analog signals, and then back into digital signals at the other end of the connection. This equipment is called a MODEM, which stands for MODulator/DEModulator, in the sense that it modulates a digital signal onto an analog waveform and demodulates a digital signal from an analog waveform.

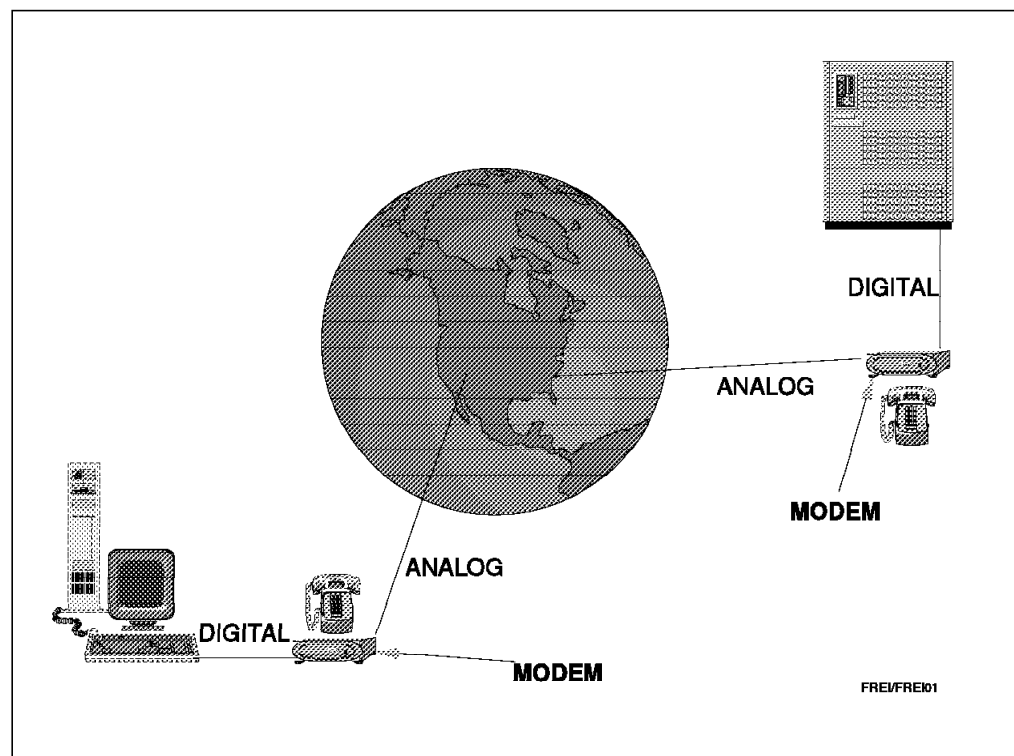


Figure 368. Digital/Analog Communications and the Role of the Modem

## B.1 Half-Duplex/Full-Duplex Transmissions

What about half-duplex and full-duplex?

**Half-Duplex** Half-duplex is a transmission between two stations in both directions but not simultaneously, as illustrated by the following analogy of trucks crossing a one-lane bridge.

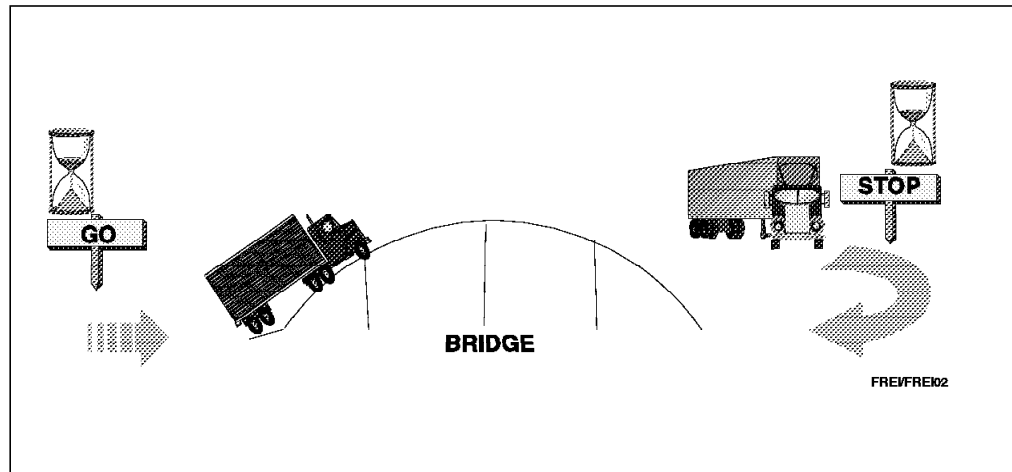


Figure 369. Half-Duplex

In half-duplex communications, when a station changes from transmit to receive or from receive to transmit, there is a delay called the "line turnaround time". This delay is necessary to allow modems and network components to switch the direction of transmission on the line.

The total line turnaround time can increase significantly when using short interactive transactions, since the line will be turned around on each transaction.

**Full-Duplex** Full-duplex or duplex transmission is a transmission between two stations in both directions simultaneously. A duplex line, as illustrated in Figure 370 on page 343, can transmit in both directions simultaneously. If a duplex line is used, the modems and network equipment are always ready to transmit and receive and the line turnaround is minimal.

When referring to full and half-duplex communication, keep the following in mind:

- Some equipment only works in half-duplex mode (3174 for example) while other equipment can operate in both (3745 for example).
- Some line protocols are half-duplex (BSC for example) and others full-duplex (HDLC for example).



- The terms full-duplex and half-duplex are sometimes erroneously used to mean "4 wires" and "2 wires"; this is an error because the number of wires used in the communication line is not really related to half-duplex or full-duplex capabilities.

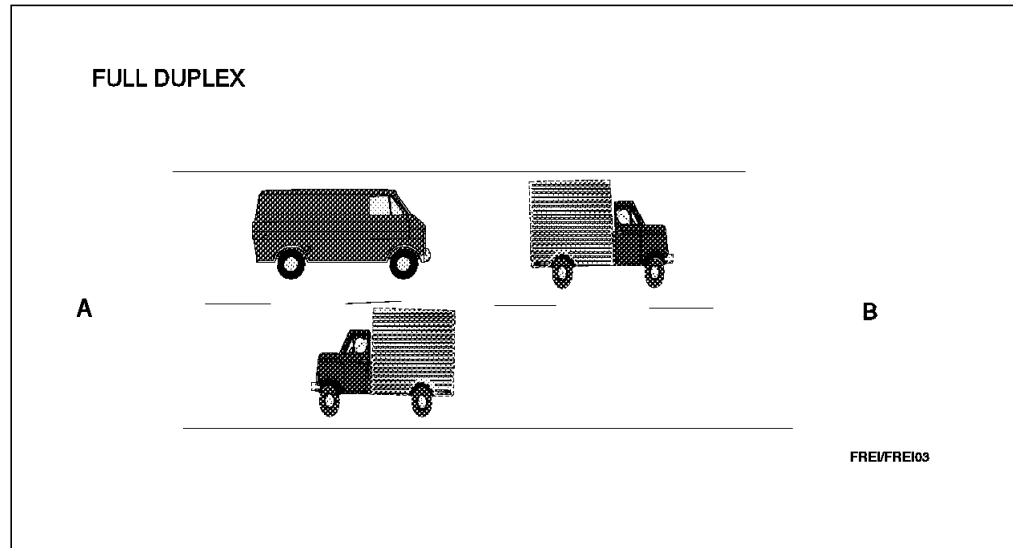


Figure 370. Full-Duplex

## B.2 Point-to-Point and Multipoint

When a line connects only two stations, as shown in the following example, it is called a point-to-point line.

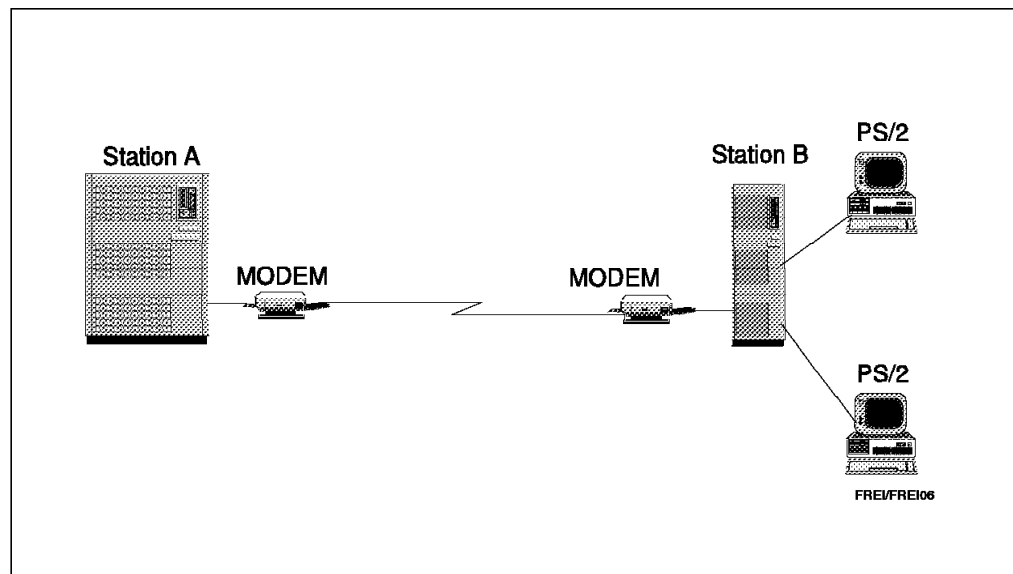


Figure 371. A Point-to-Point Line

When a line connects one station to more than one other station, as shown in the following example, it is called a multipoint or multidrop line:

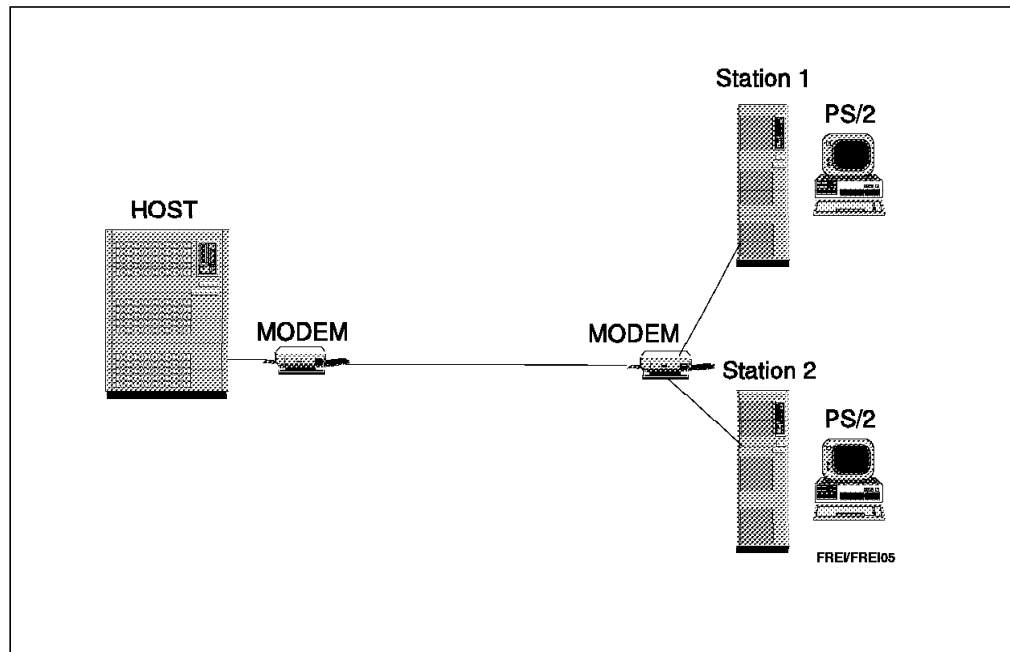


Figure 372. A Multipoint Line

Controlling a point-to-point line is much easier than controlling a multipoint line because it is not necessary to use addressing in a point-to-point line. That is, since all data leaving one station is destined for the station at the other end of the line, there is no possible confusion as to the intended destination of the data. However, on a multipoint line, the data leaving one station is indeed destined for one of the stations on the line and must therefore be identified as such.

However, use of multipoint lines can represent, in many cases, shorter network distances and therefore reduced network costs.

Switched lines are point-to-point lines only (that is, they cannot be multipoint) and leased lines can be either point-to-point or multipoint lines.

---

## B.3 Asynchronous and Synchronous

To establish any type of communication, it is necessary to have some synchronism between the elements involved in the communications process. That is, it is necessary for the components at both ends of a circuit to synchronize their actions.

### B.3.1 Asynchronous Communications

In asynchronous communications circuits (also called START/STOP), the modems on each side of the line maintain synchronization with each other by inserting start bits and stop bits with each transmitted character, as illustrated in Figure 373 on page 345.

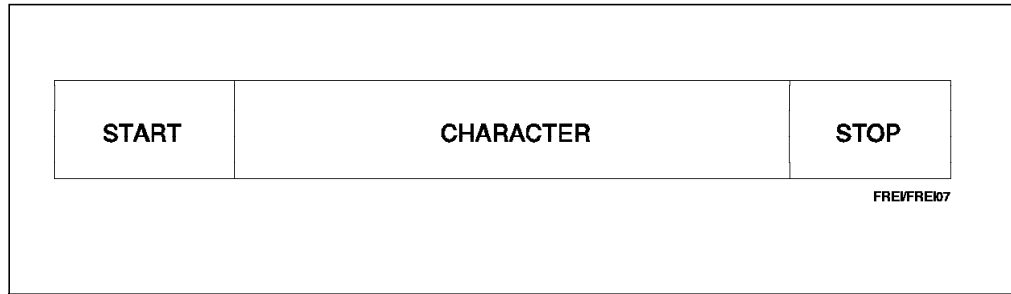


Figure 373. Asynchronous Character

In asynchronous communications, the character length used by your system should match the character length of the remote system, by varying the following parameters:

Start bit + Data bit + Parity bit + Stop bit = Character Length

1	7	Even	1	10
1	7	None	2	10
1	7	Odd	1	10
1	8	None	1	10

### B.3.2 Synchronous Communications

Synchronous communications uses clocking to synchronize the communication and inserts sync bytes at the start and at the end of a block of characters (instead of start bits and stop bits with each character as used in asynchronous communications).

You can define the clock as "Internal Clocking" meaning that the clocking will be generated by your own DCE (modem), "External Clocking" meaning that the clocking will be provided by the DTE (terminal), or "Regenerated Clocking" meaning that the clocking will be provided by the remote DCE (modem).

### B.3.3 Comparing Synchronous and Asynchronous Communications

- Synchronous communications use protocols such as HDLC, SDLC, and BSC which all use a CRC (Cyclic Redundancy Check) type of error checking, which is an efficient method of error control.
- Asynchronous communications on the other hand use parity as an error checking method, which is not very efficient. This is why asynchronous communications need modems with better error correction protocols, such as V.42 or MNP 1-4, to be able to adapt better to analog line noise conditions.
- Asynchronous communications have a low transmission efficiency, meaning that they have to transmit a greater number of control bits for every information bit. These control bits are the start bits, stop bits and parity bits, which are all non-information bits considered to be overhead bits.
- Synchronous communications have a much higher transmission efficiency because fewer control bits are required for the same number of information bits. Synchronous communications insert control bits at the end of groups of characters instead of each character.

Characteristics	Synchronous	Asynchronous
Needs Buffers/Clocking	Yes	No
Transmission Efficiency (Information/Control)	High (More than 90%)	Low (Less than 80%)
Equipment	More Expensive	Less Expensive
Error Control	CRC	Parity

## B.4 Analog vs Digital

In the figure below, there are two ways to go from A to B.

1. In the first case (analog), it is impossible to know how many steps it will take to get to B.
2. In the second case, however, you are either at A or B. In other words there are just two steps, A and B.

This analogy can be used for electrical signals transmitted on a communications line, for example by varying the value of the voltage. On a digital signal, it is possible to count the number of different variations of voltage in an interval of time.

On an analog signal, it is impossible to know how many values the signal has assumed between a high and a low value.

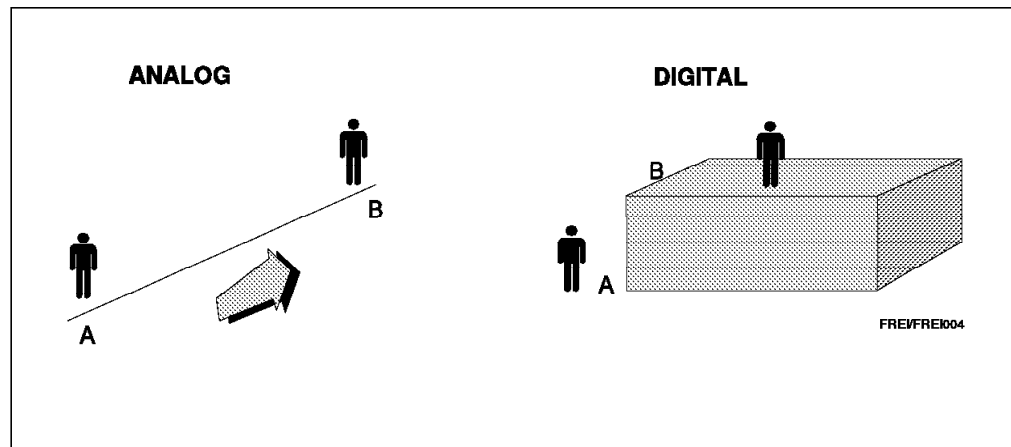


Figure 374. Analog and Digital

## B.5 Modulation

In data communications, modulation is the process of using a digital data signal to vary the amplitude, the frequency, or the phase of an analog carrier signal. The modulated carrier signal contains or carries the data transmitted on the communication line. The carrier signal is an analog signal, already adapted to the transmission line in order to minimize the effects of noise and distortion on the digital data signal being carried.

The modulation process and methods are always used between two modems.

## B.5.1 Modulation Methods

The following is a brief description of some of the methods used by modems to modulate a carrier signal. All modems on the same communications line must use the same modulation method at the same time.

### Amplitude Modulation (AM)

Modifies the peak-to-peak amplitude of the carrier signal, as illustrated in the following example.

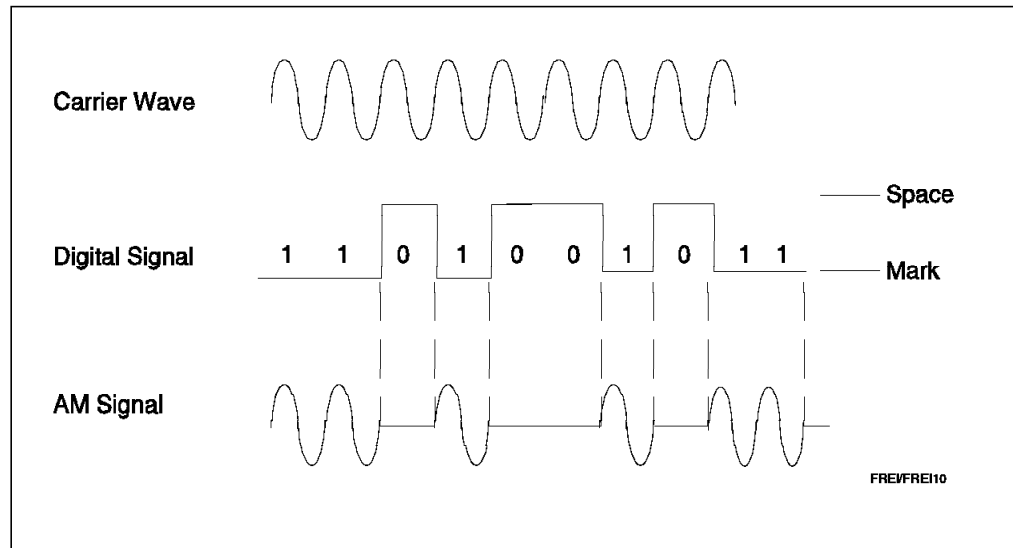


Figure 375. Amplitude Modulation

### Frequency Modulation (FM)

Also called frequency shift keying (FSK), it modifies the frequency of the carrier to indicate bit-1 or bit-0, as shown in the following example:

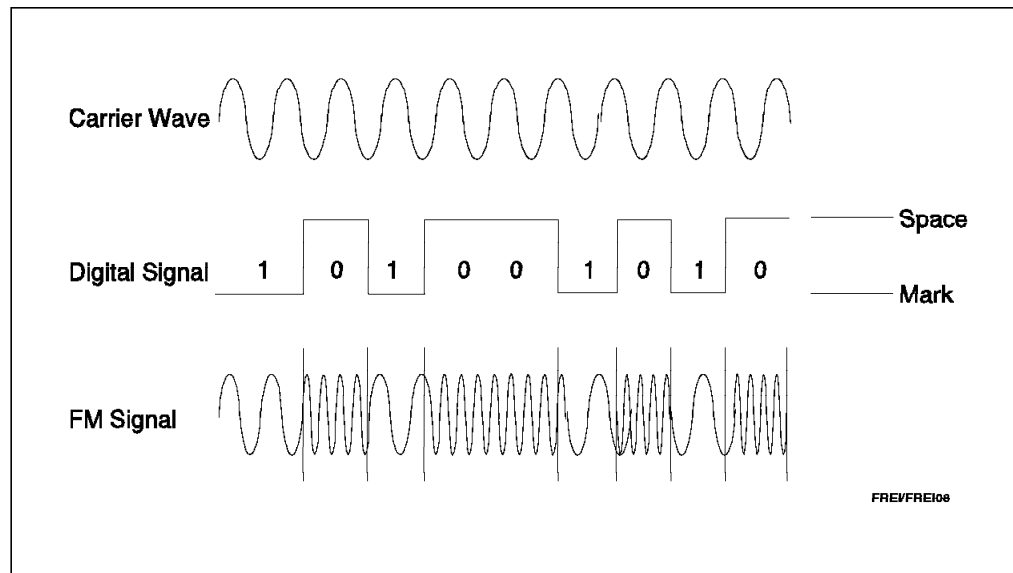


Figure 376. Frequency Modulation

## Phase Modulation

This method varies the phase of the carrier. Phase modulation is also called phase shift keying (PSK) or differential phase shift keying (DPSK). The following example shows a carrier that is phase modulated.

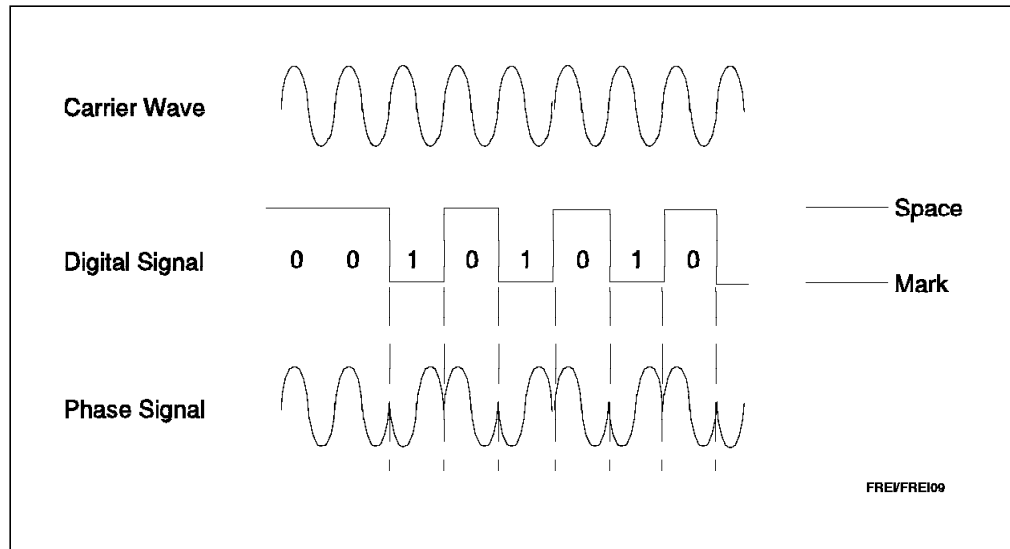


Figure 377. Phase Modulation

## Example of CCITT Defined Modulation Methods

To increase data transmission speeds and match different modems, the CCITT has defined V.x modulation methods, as shown in the following descriptions:

### Note

To connect one modem to another modem, both must use the same modulation method.

- **CCITT V.32bis**

A modulation method defined to support up to 14.4 Kbps of data transmission on an analog line.

Using a data compression method such as V.42bis, a DTE speed of up to 57.6 kbps can be supported, thereby increasing the throughput by up to 4 times.

This modulation method varies the amplitude and phase of the carrier at the same time and uses Trellis Code (a method that increases the number of possible variations of amplitude and phase of a carrier) to increase the line speed up to 14.4 Kbps.

Modems that support this modulation method usually support the following modulation methods as well.

- **CCITT V.32**

A modulation method defined to support up to 9.6 kbps of data transmission on an analog line.

Using a data compression method such as V.42bis, DTE speeds of up to 38.4 Kbps can be supported, thereby increasing the throughput by up to 4 times.

This modulation method varies amplitude and phase of the carrier at the same time and can use (or not) Trellis Code. If Trellis Code is available, then it is recommended for use by both modems.

- **CCITT V.22bis**

A modulation method defined to support up to 2.4 kbps of data transmission on an analog line.

Using a data compression method such as V.42bis, DTE speeds of up to 9.6 kbps can be supported, thereby increasing the throughput by up to 4 times.

This modulation method varies the amplitude and phase of the carrier at the same time. As with the other methods, it can use full-duplex transmission centering one carrier at 1200 Hz and the other carrier at 2400 Hz, transmitting and receiving at the same time without the necessity of a line turnaround.

- **CCITT V.22**

A modulation method defined to support up to 1.2 kbps of data transmission on an analog line.

Using a data compression method such as V.42bis, DTE speeds of up to 4.8 kbps can be supported, thereby increasing the throughput by up to 4 times.

This modulation method varies the frequency of the carrier as described in the FSK modulation method. Selecting a DTE speed of 1200 bps, you normally would select FSK modulation as the most reliable method described in this chapter. It is recommended to do so when you have bad analog line conditions, that is, when the line is frequently dropping and when other modulation methods are not providing a reliable connection. The response time, however, will be degraded, but this might be a better condition than no connection at all.

The following figure summarizes the terms and standards normally used in an analog communications environment. Note that some of these V.xx terms are used to describe either a modulation method, a compression method, an error correction method or an electrical interface.

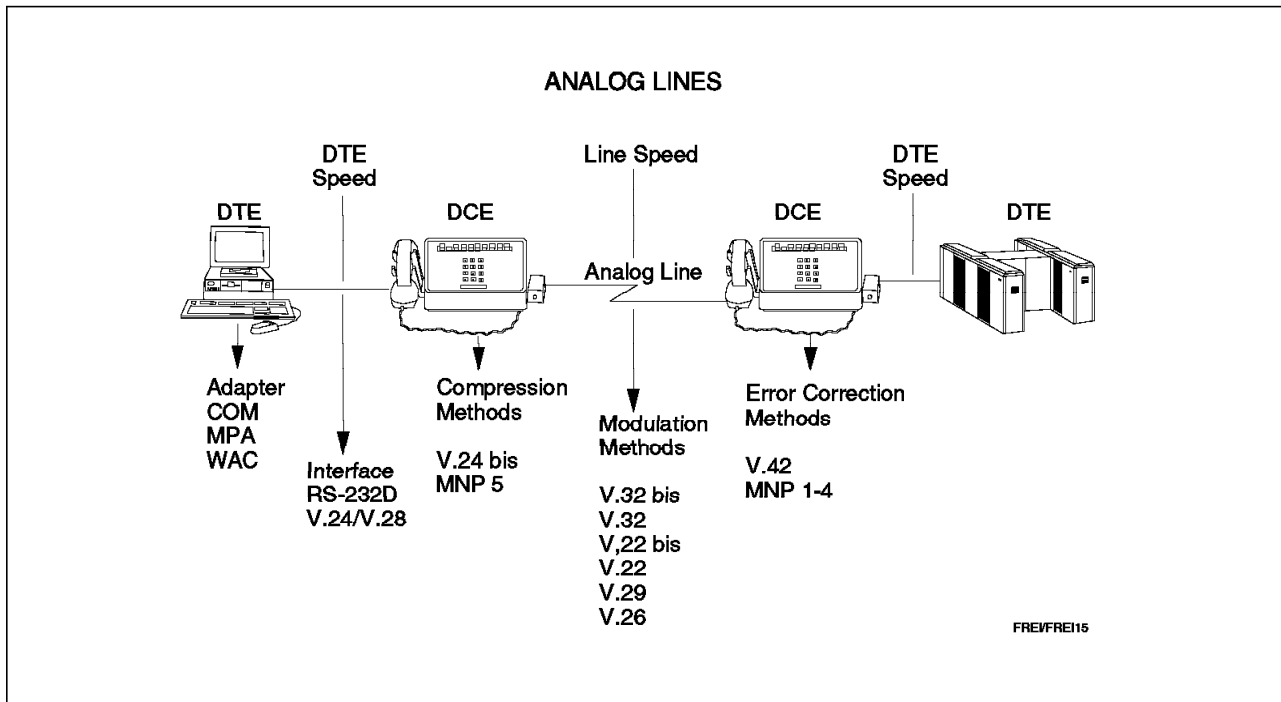


Figure 378. Analog Environment - Summary of Terms and Standards

## B.6 Interfaces

The connection between a terminal (Data Terminal Equipment or DTE) and a modem (Data Communications Equipment or DCE) is described as a DTE-to-DCE interface. This interface must be compatible; that is, both the DTE and the DCE must use the same interface, with the same specifications, in order for communications to take place. Otherwise, special cables and/or special electronic circuits would be required each time a DTE was connected to a DCE.

Cables, circuits and lines to connect a DTE to a DCE are defined by the EIA or CCITT standards.

EIA Standards are labeled RS-x (Recommended Standards-x) where x is the number of the standard, and CCITT standards are labeled V.x or X.x where x is the number of the standard.

For purposes of this discussion, and to simplify matters, you can assume generally that there is a sort of standard equivalency between the CCITT and EIA interfaces.

On the following pages, we give a brief explanation of some of these interfaces supported by CM/2 1.11.

### B.6.1 EIA RS-232D or CCITT V.24/V.28

The RS-232D interface is the default serial interface for most types of equipment. It is an interface defined to support low speeds (up to 20 kbps) and is used for data transmission on analog lines.



Some analog modems, using data compression methods, can support DTE speeds up to 57.6 kbps. However, modems of this type use up to 14.4 kbps in the analog line.

**Note**

The CCITT V.28 standard defines the physical specifications of the interface (such as electrical signals and connectors) whereas the CCITT V.24 standard defines the data signal specifications of the interface. The combination of these two standards (V.28 and V.24) define the same interface as the EIA RS-232D interface (which is a follow-on to the RS-232C standard).

The following illustration shows how the DTE is connected to a DCE using connections defined by the RS-232D or CCITT V.24/V.28 interface:

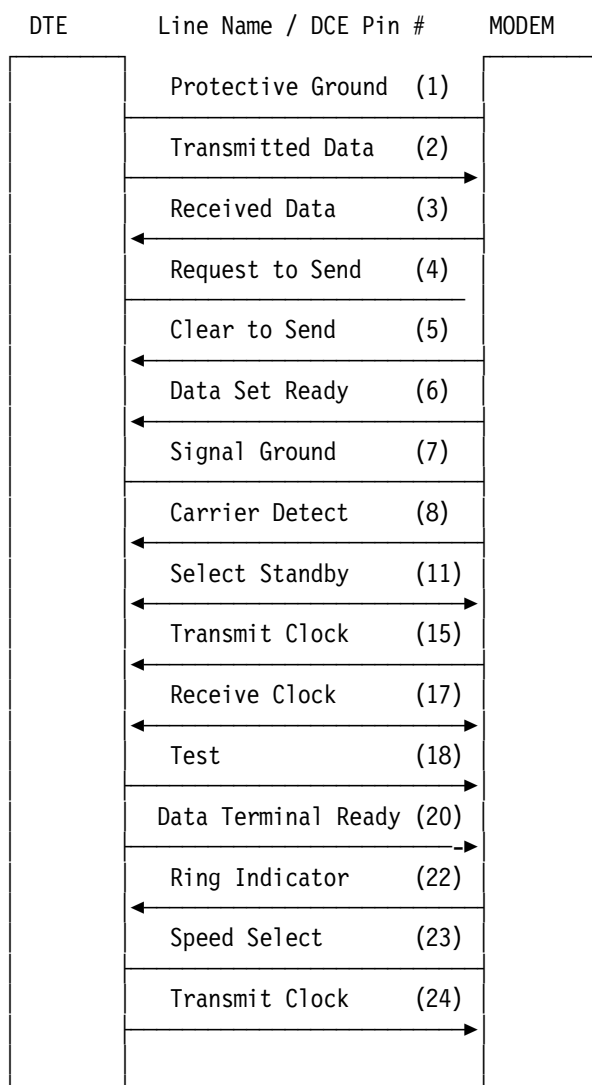


Figure 379. RS-232D Connector Pins

The DCE cable connector is called a DB-25 connector. It has 25 pins and appears physically as shown in the following figure.

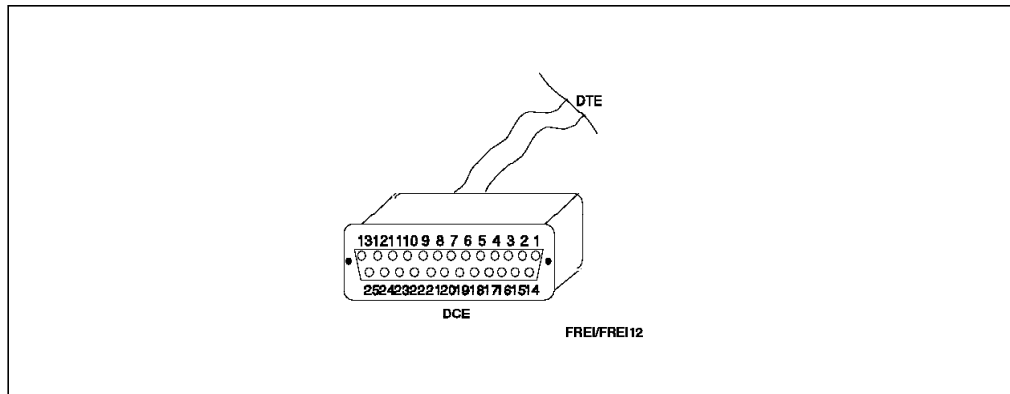


Figure 380. RS-232 DCE Connector

The DTE connector (on the PC side) is not standardized and can vary from machine to machine. However, on the DCE (modem) side, the connector is a DB-25 connector and the sequence of the pins is usually the same as defined by the standard when talking about DCE-to-DTE connections.

If you are planning to connect two machines back-to-back, with a cable, and without using modems, the sequence of the pins should be inverted to match the handshaking process. This type of cable is called a crossover cable.

**Note**

The RS-232D interface is defined for speeds up to 20 kbps with a maximum cable length of 15 meters between DTE and DCE. However, if you are using lower speeds or a special cable with low attenuation, you can use cable distances above 15 meters, but it is not recommended.

The RS-232D voltage level specifications are shown as follows:

**Active Control Signal or 0-bit Data** To represent an active control signal, for example a DTR, or 0-bit data, the RS-232D interface defines voltage levels between +3V and +25V for a valid signal.

$$+3V \text{ ————— } +25V \\ \text{DTR on or 0-bit}$$

**Inactive Control Signal or 1-bit Data** To represent an inactive control signal, or 1-bit data, the RS-232D interface defines voltage levels between -3V and -25V for a valid signal.

$$-3V \text{ ————— } -25V \\ \text{DTR off or 1-bit}$$

In other words, when you initially connect an RS-232D cable between the COM port on your PC and the modem, the pins on the COM port interface will have a negative level of voltage for DTR, RTS, etc.

When you start your communications program, the COM port changes the DTR and the RTS pins to positive voltages and the modem answers by changing its own signals, for example CTS, to positive voltages.

## B.6.2 CCITT V.35

The CCITT V.35 interface standard is used to support speeds above 20 kbps and up to 2.048 Mbps. To do this, the V.35 interface duplicates some of the signal leads (the most important ones) identifying if the signal is active or inactive by the voltage difference between A and B. This is called balanced differential signals and its advantage over non-balanced signals is that it permits longer cables with higher speeds.

The important signals described above are the Transmit Data A and B, Receive Data A and B, Transmit Clock A and B and Receive Clock A and B.

The control signals such as DTR, RTS, CTS, etc., operate the same way as in the RS-232D interface standard (non-balanced).

### Note

For balanced differential signals, the voltage difference between the signal A and the signal B, for example Transmit Data A and B, should be  $-0.55V$  to represent active and  $+0.55V$  to represent inactive. The maximum tolerance is plus or minus 20%.

The DCE cable connector is called an M34 connector. It has 34 pins and its physical appearance is illustrated below.

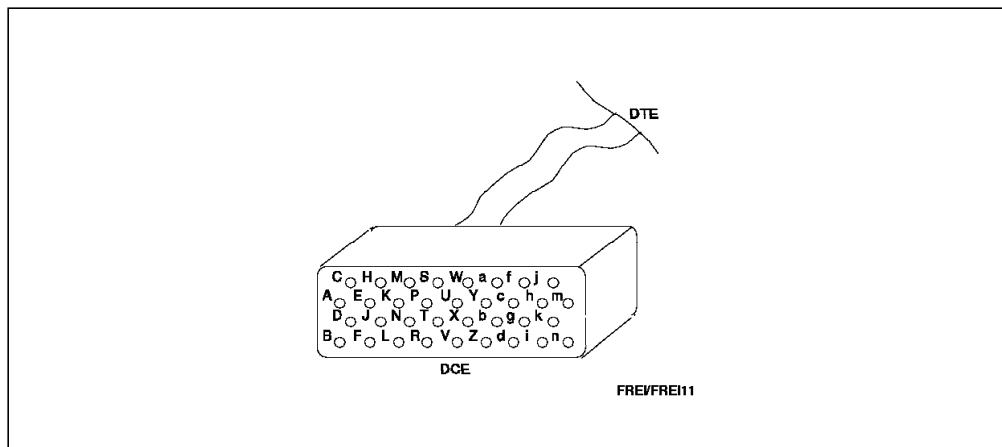


Figure 381. V.35 DCE Connector

The following diagram illustrates how a DTE is connected to a DCE using connections defined by the CCITT V.35 interface:

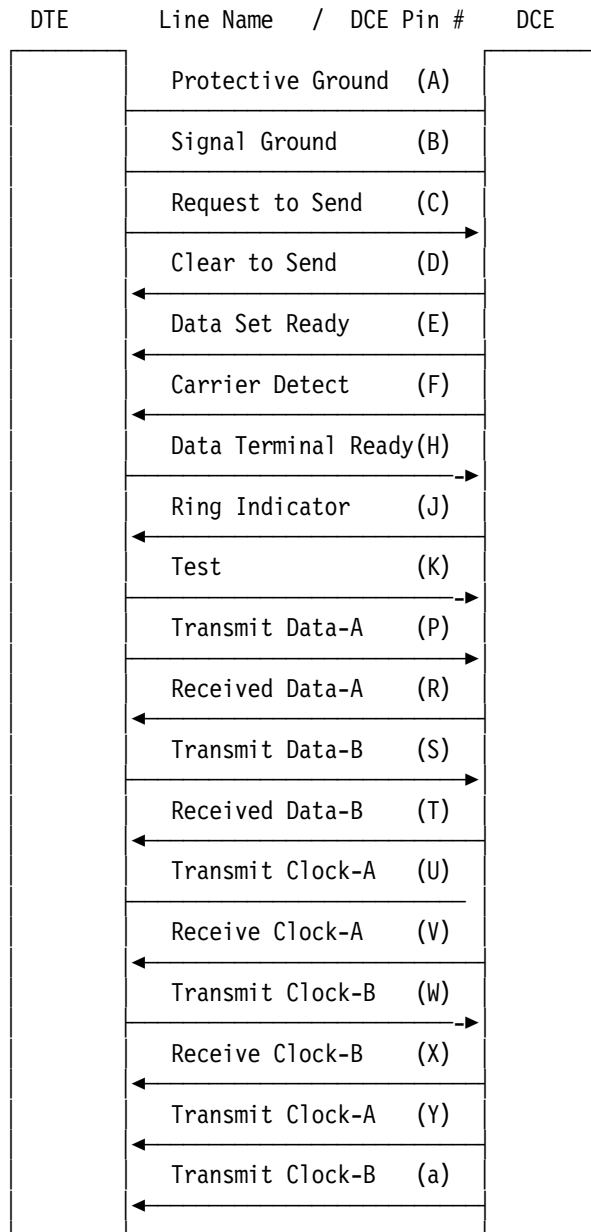


Figure 382. V.35 Connector Pins

### B.6.3 RS-422/449 or CCITT V.36(V.11)

The RS-422/449 interface standard is defined to support speeds up to 1.544 Mbps. It uses balanced differential signals to allow longer cables and higher speeds.

**Note**

The RS-422/449 interface is defined to support speeds up to 1.544 Mbps (T1 channel) and the V.36 interface is defined to support up to 2.048 Mbps (E1 channel).

The DCE cable connector is called a DB-37 connector. It has 37 pins, and appears physically as shown in the following figure.

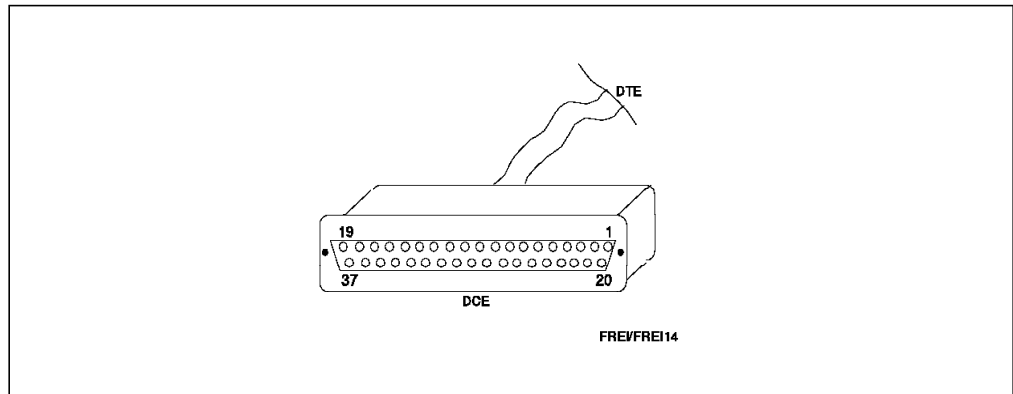


Figure 383. RS-422 DCE Connector

The following diagram illustrates how a DTE is connected to a DCE using connections defined by the RS-422 interface:

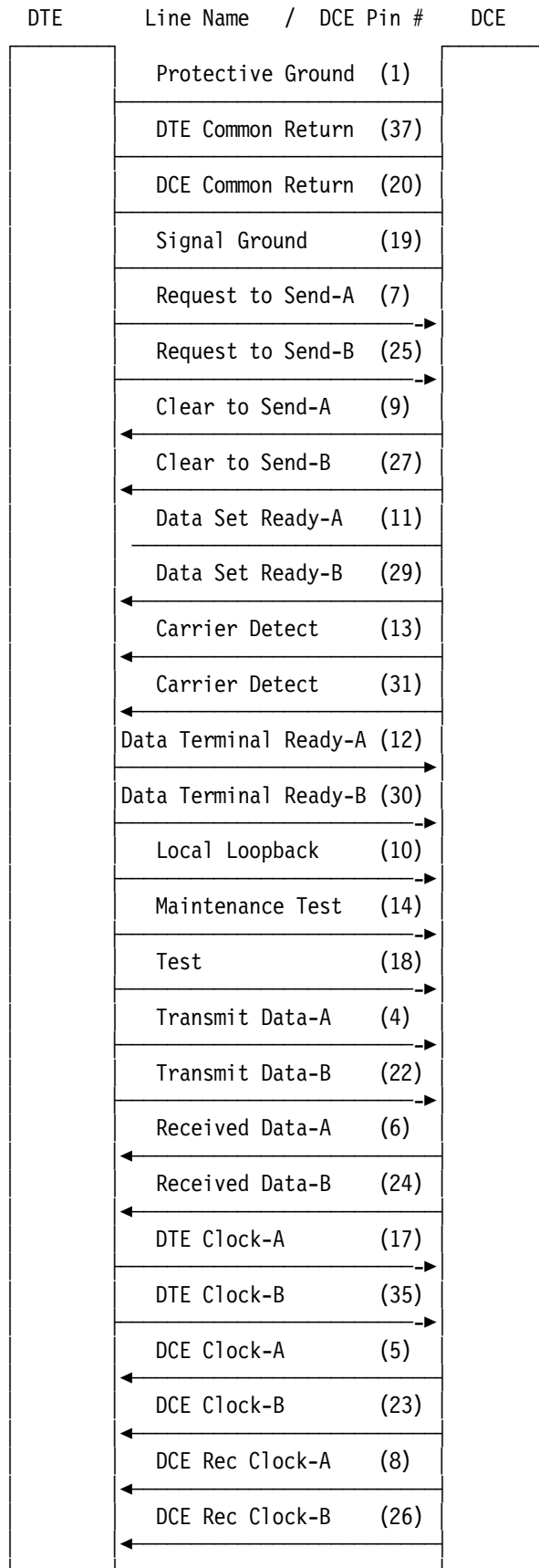


Figure 384. RS-422 Connector Pins

## B.6.4 CCITT X.21

The CCITT X.21 interface standard defines the connection of a DTE to synchronous digital public switched data networks.

The following diagram illustrates a DTE connected to a DCE using connections defined by the CCITT X.21 interface:

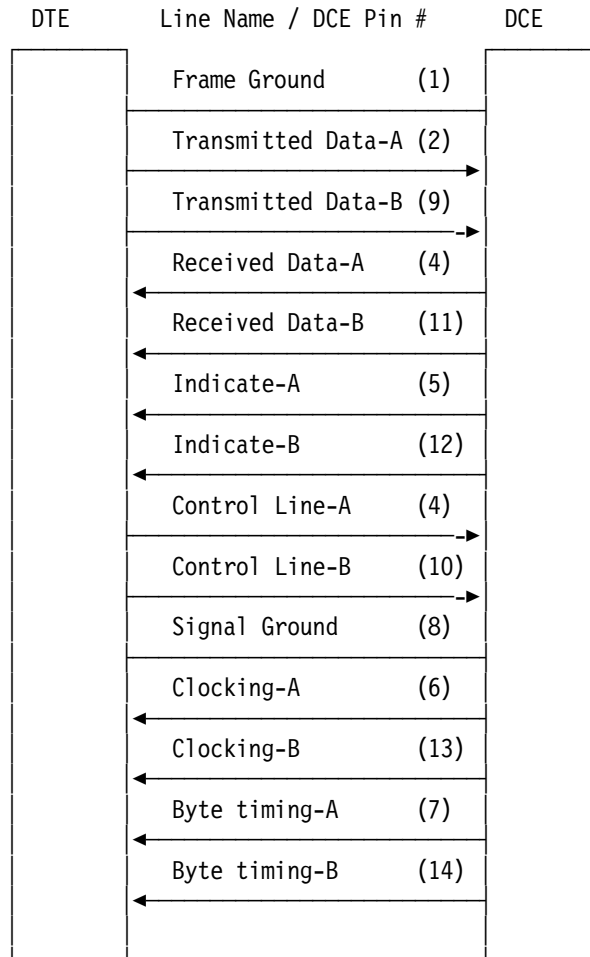


Figure 385. X.21 Connector Pins

The DCE cable connector is called a DB-15 connector. It has 15 pins and its physical appearance is shown below.

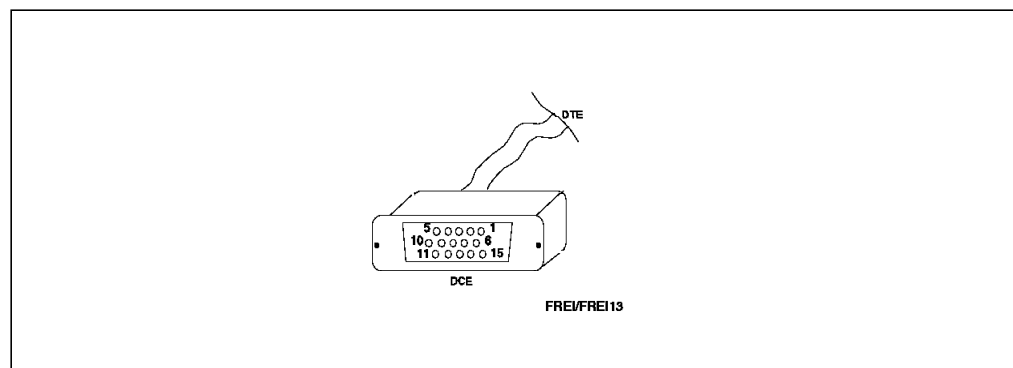


Figure 386. X.21 DCE Connector

The following diagram illustrates the communication process that takes place between a DCE and a DTE when establishing a call in an X.21 environment:

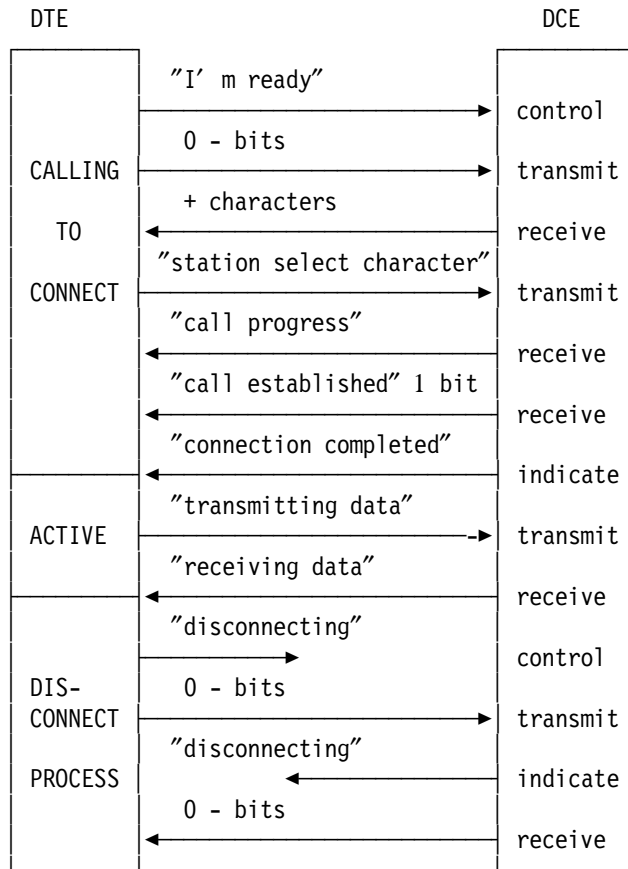


Figure 387. X.21 Communications Establishment

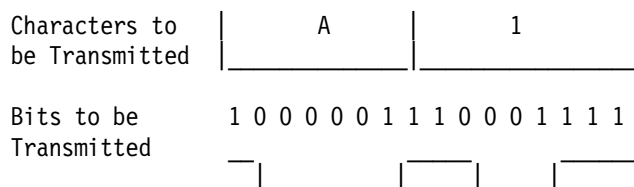
## B.7 Comparing NRZI Encoding Scheme to NRZ

### NRZI (Nonreturn to Zero Inverted)

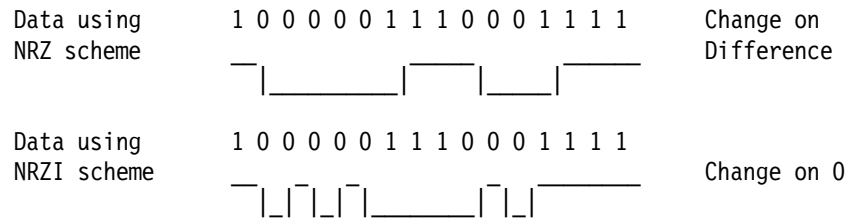
Data clocking that relies on bit transitions in the data to maintain synchronization might not stay in sync if too many consecutive 0-bits or 1-bits are transmitted.

Because SDLC uses 0-bit insertion and deletion, long series of 1-bits will not occur. However, long series of 0-bits are possible and can be transmitted. As shown below, when a series of 0-bits is transmitted, the Nonreturn to Zero Inverted (NRZI) option ensures that there are enough transitions in the transmitted signal to maintain synchronization.

Transitions are maintained by changing the voltage level of the transmitted data for each 0-bit and maintaining the existing level for each 1-bit.







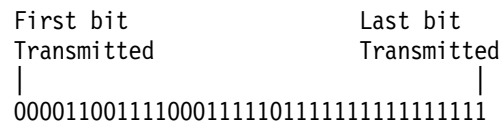
Because 0-bit insertion and deletion ensures that the data can never be all 1-bits, and NRZI ensures that the signal on the line changes level for each zero, the receiving modem or station will receive a sufficient number of transitions to maintain proper synchronization.

In summary, the NRZI option is used to minimize the possibility of losing modem synchronization. It is important to use the same encoding scheme on both sides of the communications line.

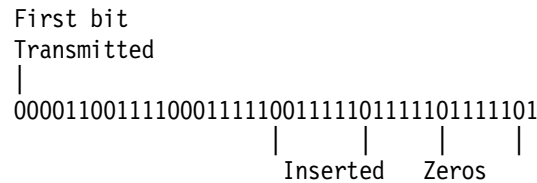
## B.8 SDLC Zero-Bit Insertion and Deletion

More than five contiguous 1-bits are allowed on the communications line only when an SDLC flag or an abort sequence is transmitted. Otherwise, some data characters could have the same bit configuration as a flag.

To ensure that more than five contiguous 1-bits are not transmitted between flags, the transmitting station inserts a 0-bit after every five contiguous 1-bits. For example, if the transmitting station is transmitting the following bits:



Zeros are inserted and the actual transmitted data would be:



The receiving station deletes the inserted zeros when receiving the data. Zero-bit insertion and deletion is active for the address, control, information and CRC fields of the SDLC protocol. However, the inserted zeros are not included in the CRC computation.

Because zero-bit insertion and deletion is performed for all bits except the flag bits, all 256-character codes can be transmitted as data. This allows a user to transmit data, such as object code programs, without the concern that the data could be interpreted as a flag.



---

## Appendix C. The Hayes AT Command Set

Communication programs control your modem by issuing modem instructions called AT commands. While it's usually easiest to let the communications software handle the task of issuing AT commands, there may be occasions when you want to control a series of commands yourself. The information in this appendix is included to allow you to tailor your modem's operation for specific needs.

---

### C.1 Modem Attention Command Set (AT Command)

The AT command set is a group of commands that allow the DTE (terminal) to communicate with a DCE (modem) for setting up the modem's operational environment and controlling the modem's operation. These commands can be loaded in volatile or non-volatile memory.

The AT command set can be divided into three types:

- AT commands
- S registers
- Result codes

---

### C.2 AT Commands

AT commands are machine instructions, or commands, that are used to activate a modem's features.

**IMPORTANT**

Please be aware the examples of AT commands given in this section may not apply to your particular modem. There are hundreds of AT commands, and there are hundreds of types of modems, and they do not all support the same commands in the same fashion.

Therefore, it is possible that some examples of commands given in this section do not apply to your own particular modem. Please refer to your modem documentation to find out which AT command it supports and in which fashion.

Most communications software programs provide menus which can be utilized by the end user to configure and test a modem as required by the communications program.

However, this is not always the case, and some communications software may not support certain modem configuration parameters or may require you to issue commands to the modem directly.

In other words, for you to issue AT commands to any modem, your communications software must provide user access to a command line or have a direct-connect mode, from which you can issue AT commands.

#### Note

To use the modem, with or without AT commands, some type of program (communications software or terminal emulation software) is required to configure the modem. AT commands normally cannot be issued from your computer's operating system prompt. However, you do have limited capabilities by using the command `COPY CON COM1<enter>` from an OS/2 window, followed by AT commands, but you will not receive command responses.

There are lots of tools on the market that allow you to send commands to modems. One such tool is the PM Terminal application, which is supplied with the base OS/2 system. It does not have any special features or functions but it is handy simply because it is supplied with the base system.

An example of using PM Terminal is illustrated later in this chapter.

To enter an AT command, the characters AT (uppercase or lowercase but not aT or At) must prefix the command line on which the AT command is issued.

---

### C.3 S-register

S-registers are special memory locations in the modem for storing specific configuration and operating parameters. S-registers typically hold some type of counter, timer, ASCII character, or feature negotiation value.

The format of the command to change a register is `Sr=n`; for example `ATSr=n<enter>` where `r` is the S-register to be changed, and `n` is the value to be assigned to the S-register. Note, however, that most S-registers can't be written to.

To read the value currently stored in an S-register, use the command `ATSr?<enter>` where `r` is the S-register to be read.

---

### C.4 Result Codes

When you issue an AT command, the modem responds with a result code (usually OK or ERROR) to indicate that it does or does not understand the command. Result codes are also sent to report on the progress of a connection.

The V command option determines whether result codes are returned by the modem as words or numbers. The modem is normally factory-set to return result codes as words (V1), but can be changed (V0) to return numbers.

A special set of result codes can be enabled to monitor error-control negotiation (the W1 command), if your modem supports it. The W1 option can be very useful for monitoring things such as line speed, DTE speed, data compression used, etc. Refer to examples of AT commands later in this section for a list of the result codes supported.

The memory of the modem is used to store the settings of AT commands and S registers in the following configurations:

**Active Configuration** The active configuration stores the configuration settings for the current (active) communications. This storage location is temporary, which means it is valid until you issue a command to change a setting, or reset the modem.

**Stored Configurations** Most modems will allow three stored configuration profiles; two of these are user-defined profiles (which can be modified by the user) and the third one is a factory pre-set configuration profile which cannot be changed. Any one of these three stored configuration profiles can be recalled to become the active configuration when you reset the modem or power up the modem.

**User Profiles** Different combinations of AT command options and S-register settings can be defined in either of the two user-defined profiles.

After you determine the communications requirements of the remote system that you will contact using a modem, you can specify the AT command options and S-register settings that will customize a configuration to communicate with that system. When you recall a user profile, its settings replace the corresponding settings in the current active configuration.

Some factory settings cannot be saved in memory and recalled as part of a user profile (for example, the command that defines the carriage return character). These settings, which cannot be saved, automatically return to their factory-set value when the modem is reset. However, you can set the non-storable settings in your active configuration by using AT commands from the DTE which can be used in conjunction with a user profile.

The following diagram illustrates some of these concepts.

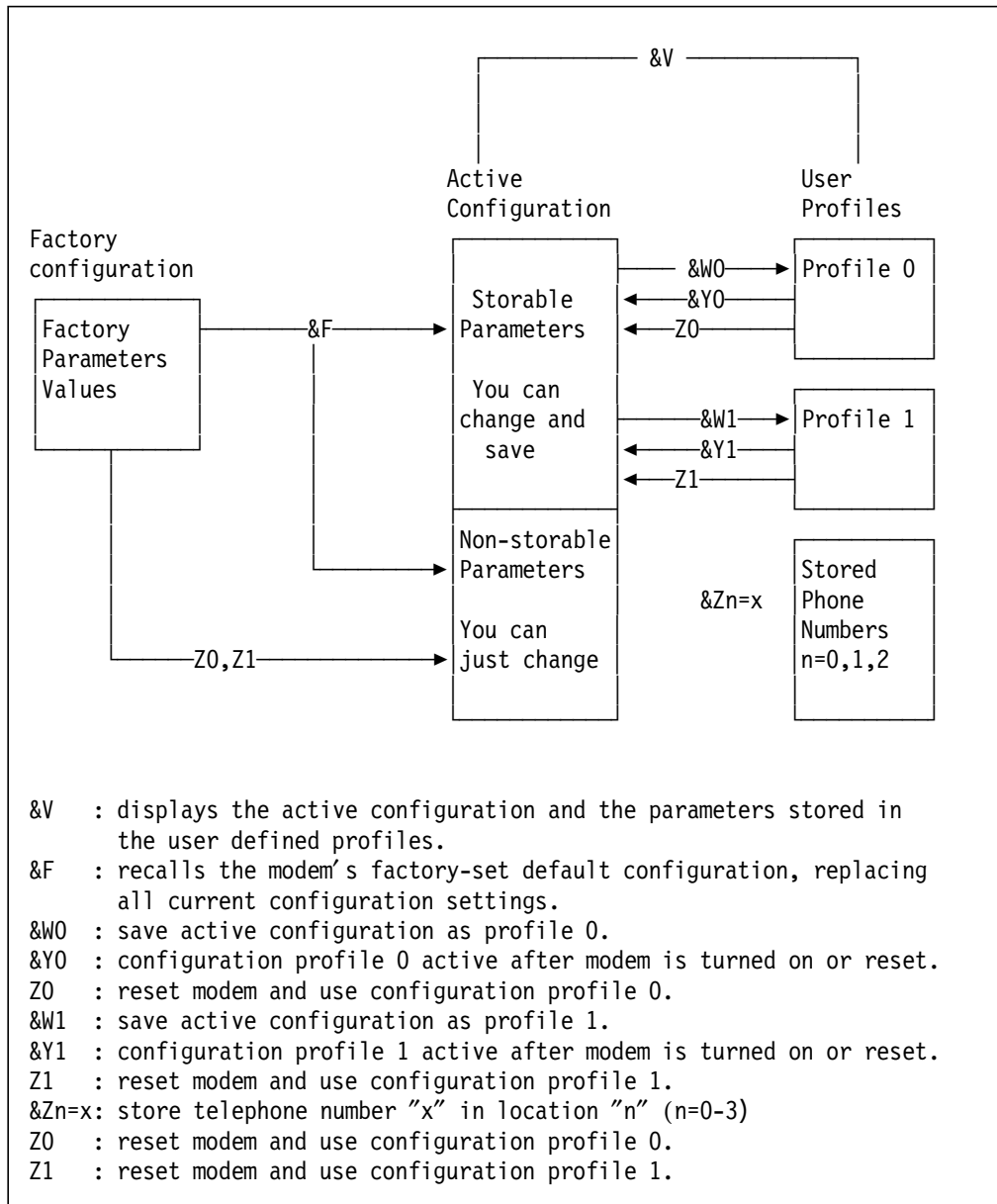


Figure 388. Modem Configuration Profiles

## C.5 AT Commands Quick Reference

For a complete description of the AT commands supported by a particular modem, you should consult the modem documentation. However, in order to give you an appreciation of some of the commands that are available, we will briefly describe some commands below, breaking them down by function type.

### Prefix, Repeat and Escape Commands

Command	Description
AT	Each command line begins with AT (and ends with Enter).
A/	Re-execute last command line.
+++	Switch to Command Mode, but keep data connection.
00	Return to Data Mode from Command Mode.
01	Return to Data Mode and initiate an equalizer sequence.

### Configuration Profile and Reset Commands

Command	Description
&F0	Load the factory default configuration.
&F1	Load MNP 5/V.42bis configuration with XON/XOFF flow control.
&F2	Load MNP 5/V.42bis configuration with RTS/CTS flow control.
&V	View current profile, stored profiles and stored telephone numbers.
&W0	Save active configuration as profile 0.
&W1	Save active configuration as profile 1.
&Y0	Configuration profile 0 active after modem is turned on or reset.
&Y1	Configuration profile 1 active after modem is turned on or reset.
Z0	Reset modem and use configuration profile 0.
Z1	Reset modem and use configuration profile 1.

### Answer, Dial, Hang-up and Store Commands

Command	Description
A	Answer incoming call immediately.
Dn	Dial telephone number "n".
	Dial Modifiers
,	Pause.
;	Return to Command Mode after dialing.
!	Force modem on-hook for 1/2 second (hook flash).
@	Wait for five seconds of silence.
P	Use Pulse (rotary) dialing.
T	Use Touch-Tone (DTMF) dialing.
W	Wait for second dial tone.
H0	Force modem on-hook (hang-up).
H1	Force modem off-hook (make busy).
&Zn=x	Store telephone number "x" in location "n" (n=0-3).
&P0	Power-on auto-dial disabled.
&P1	Power-on auto-dial enabled.

### Register Commands

Command	Description
Sr?	Read and display Register "r" value.
Sr=n	Set register "r" value to "n".

### Modem Operation Commands

Command	Description
E0	Do not echo command characters.
E1	Echo command characters.
&L0	Use dialup operation.
&L1	Use leased-line operation.
&M0	Asynchronous operation.
Y0	Modem neither sends nor responds to break signals.
Y1	Modem sends break signal for 4 seconds before disconnect.

### RS-232-C Control Signal Commands

Command	Description
&C0	Force Data Carrier Detect (DCD) signal active (ON).
&C1	DCD indicates true state of remote modem's carrier.
&D0	Ignore Data Terminal Ready (DTR) signal.
&D1	Return to asynchronous Command Mode after losing DTR.
&D2	Hang up and go to asynchronous Command Mode after losing DTR.
&D3	Reset after losing DTR.
&R0	Modem turns on Clear To Send (CTS) signal when Request to Send (RTS) signal from attached DTE is detected.
&R1	Modem ignores RTS signal and turns on CTS signal when ready to receive data asynchronously.
&S0	Force Data Set Ready (DSR) signal active (ON).
&S1	DSR off during testing and Command Mode.

### Synchronous Mode and Clock Commands

Command	Description
&Q0	Communicate in asynchronous mode.
&Q1	Communicate in synchronous mode 1 - Async-to-Sync.
&Q2	Communicate in synchronous mode 2 - Stored Number Dial.
&Q3	Communicate in synchronous mode 3 - Voice/Data Switch.
&Q4	Communicate in synchronous mode 4 - Hayes AutoSync.
&Q5	Communicate in error-control mode.
&Q6	Communicate in asynchronous mode with automatic speed buffering (ASB) - for interfaces requiring constant speed between the DTE (computer/terminal) and the DCE (modem).
&X0	Modem provides synchronous clock on EIA pin 15.
&X1	Modem accepts DTE synchronous clock on EIA pin 24 and relays it on EIA pin 15.
&X2	Modem derives synchronous clock from remote modem and relays it on EIA pin 15.

### Make/Break Ratio Commands

Command	Description
&P0	Make/break dial ratio 39/61 (USA).
&P1	Make/break dial ratio 33/67 (Europe and Hong Kong).



## MNP/V.42/V.42bis Commands

Command	Description
%An	Specify auto-reliable fallback character (n=0-127 ASCII).
\A0	64-character maximum MNP block size.
\A1	128-character maximum MNP block size.
\A2	192-character maximum MNP block size.
\A3	256-character maximum MNP block size.
\Bn	Transmit line break to remote modem (n=1<or=n<or=9).
%C0	Disable MNP Class 5/V.42bis data compression.
%C1	Enable MNP Class 5/V.42bis data compression.
\C0	Do not buffer data.
\C1	Buffer data for 4 seconds, until 200 characters are reached or until a packet is detected.
\C2	Do not buffer data for 4 seconds, until 200 characters are reached, or until a packet is detected.
\E0	Do not echo data during normal link.
\E1	Echo data during normal link.
\G0	Disable DCE flow control.
\G1	Enable DCE flow control.
\H0	HP ENQ and ACK protocol disabled.
\H1	Modem emulates ENQ/ACK protocol terminal.
\H2	Modem emulates ENQ/ACK protocol host.
\J0	Disable RS-232-C baud rate adjustment (keep high data between DTE and modem, regardless of modem-to-modem data rate).
\J1	Enable RS-232-C baud rate adjustment so serial data rate automatically adjusts to match the modem-to-modem data rate.
\Kn	Set break control, depends on modem's operating condition (0<or=n<or=5). Default is n=5.
\N0	Normal data link only.
\N1	Direct data link only.
\N2	Reliable MNP link only.
\N3	Auto-reliable MNP/Normal link.
\N4	Reliable V.42 link only.
\N5	Reliable .42 or MNP link only.
\N6	Auto-reliable V.42/MNP/Normal link.
\O	Initiate reliable link during normal link.
\Q0	Turn off software flow control.
\Q1	XON/XOFF software flow control.
\Q2	CTS signal unidirectional hardware flow control.
\Q3	RTS/CTS bidirectional hardware flow control.
\Q4	Unidirectional XON/XOFF hardware flow control (modem to host).
\Tn	Inactivity timer (n=0<or=n<or=90 minutes). Default is n=0.
\U	Accept reliable link during normal link.
\V0	Do not send extended MNP/V.42/V.42bis responses.
\V1	Send extended MNP/V.42/V.42bis responses.
\X0	Process XON/XOFF, but don't pass through.
\X1	Process XON/XOFF and don't pass through.
\Y	Switch to reliable link from normal link.
\Z	End reliable connection (switch to normal operation).
&K0	Disable local flow control
&K1	Enable RTS/CTS local flow control
&K2	Enable XON/XOFF local flow control
&K3	Enable RTS/CTS local flow control
&K4	Enable XON/XOFF local flow control
&K5	Enable Transparent XON/XOFF local flow control

### Response Commands

Command	Description
Q0	Send responses to DTE.
Q1	Do not send responses to DTE.
V0	Send numeric responses.
V1	Send word responses.
W0	Do not return negotiation progress messages.
W1	Return negotiation progress messages.
W2	Do not return negotiation progress messages; return CONNECT messages using modem to modem (DCE) speeds instead of modem to terminal (DTE) speeds.
\V0	Do not send MNP/V.42/.42 responses.
\V1	Send MNP/V.42/.42 responses.
X0	Responses 0-4/blind dialing.
X1	Responses 0-5, 8 and 10-13/blind dialing.
X2	Responses 0-5, 8 and 10-13/dial tone detection.
X3	Responses 0-5, 7, 8 and 10-13/blind dialing/busy signal detection.
X4	All responses/dial tone and busy signal detection.

### Speaker Volume and Status Command

Command	Description
L1	Low speaker volume.
L2	Medium speaker volume.
L3	High speaker volume.
M0	Speaker is always off.
M1	Speaker on until carrier detected.
M2	Speaker is always on.
M3	Speaker on after dialing until carrier is detected.

### Call-Back Security Commands

Command	Description
%S0	Call-back security disabled.
%S1	Call-back security enabled.

### Test Commands

Command Description

&T0 End test in progress.  
&T1 Perform Local Analog Loopback Test.  
&T3 Perform Local Digital Loopback Test.  
&T4 Grant Remote Digital Loopback request by remote modem.  
&T5 Deny Remote Digital Loopback request by remote modem.  
&T6 Perform Remote Digital Loopback Test.  
&T7 Perform Remote Digital Loopback Test with Self-test.  
&T8 Perform Local Analog Loopback Test with Self-test.

### Bell and CCITT Standards Commands

DTE Baud Rate Originate Mode Answer Mode

#### B0 Command in Effect

300	V.21	V.21
1200	V.22	V.22
2400	V.22bis/V.22/Bell 212A	V.22bis/V.22/Bell 212A
9600, 19200, 38400, 57600	V.32bis/V.32/V.22bis/V.22	V.32bis/V.32/V.22bis/V.22

#### B1 Command in Effect (Default)

300	Bell 103	Bell 103
1200	Bell 212A	Bell 212A
2400	V.22bis/V.22/Bell 212A/103	V.22bis/V.22/Bell 212A/103
9600, 19200, 38400, 57600	V.32bis/V.32/V.22bis/V.22 Bell 212A/103	V.32bis/V.32/V.22bis/V.22 Bell 212A/103

### Identification Commands

Command Description

I0 Modem sends product code.  
I1 Factory test.  
I2 Internal memory test.  
I3 MNP/V.42/V.42bis identification.

### Guard Tones and Originate/Answer Tones Commands

Command Description

&G0 No guard tones.  
&G1 550 Hz guard tone.  
&G2 1800 Hz guard tone.  
&K0 Place call using originate tones.  
&K1 Place call using answer tones (use to call originate-only modems).

---

## C.6 AT Commands: Considerations and Examples

In this section, we provide additional details on some of the more important AT commands that are used to start communications and to do problem determination.

### **&F Factory Defaults**

This command is used to restore the factory default settings.

It is recommended that you issue this command any time you start your modem configuration. This can avoid problems related to old setups already present in the modem's memory. Putting this command at the start of your initialization string automatically resets the modem to the factory settings prior to the setup of your specific configuration, and it can be done in the same step, as illustrated by the following example:

```
AT&F%C1&D2DT123456
```

#### **Note**

The highlighted **&F** resets the modem to factory settings. The other commands, %C1,&D2, etc. will be explained in the following pages.

### **&W Store Active Configuration**

This command stores the active configuration in the non-volatile memory of the modem. For example, assume you want to save the following characteristics as configuration profile 0:

Command	Purpose
X4	Use the X4 responses, and detect dial and busy signal
&C	Keep carrier detect always on

The command issued should be:

```
ATX4&C&W0
```

### **E Echo Commands**

This command is used to return (echo) command responses to your terminal screen when you are sending commands. If the modem is not returning your commands, send the command ATE1 to turn on the echo feature. If you continue without getting a response, check if your modem has a "DUMB" mode feature. Also check the connections and the software port configuration.

### **D Dialing**

The D command instructs your modem to dial (originate a telephone call). You can include the following dialing modifiers:

T Touch-tone dialing  
 P Pulse dialing (used for old public switched telephonic networks)  
 W Wait for second dial tone  
 , Pause  
 @ Wait for five seconds of silence  
 ! Flash  
 ; Return to command mode after dialing

Here is an example of using the command to dial the telephone number (919) 302-3299, using pulse dialing, and pausing after the area code (919):

```
ATDP919,3023299
```

### **&D Data Terminal Ready Signal (108)**

This is an important command for asynchronous operation. Normally, the modem assumes &D2 to be the default value. The &D2 command instructs the modem to react to the status of the DTR signal (108) from your DTE. In other words, you can get the modem to terminate the connection, initiate new calls and auto-answer calls based on the setting of DTR by the terminal, when appropriate.

### **M Internal Speaker and L Speaker Level**

The M command defines which steps of the connection process you want to listen to. Use the M1 command to start new connections and to monitor what's happening until the carrier is detected. If you do not want to hear the modem's speaker, use M0. The L command works with the M command, defining the speaker volume level. For example:

Command	Purpose
ATM0	Turn the speaker off.
ATM1L1	Lower speaker volume (L1) until carrier detected (M1).

### **A/ Repeat the Last Command Executed**

This command is used when you are setting up the modem, sending commands using the keyboard and want to repeat the last command executed. You don't need to press Enter, because the A/ command works as a retrieve<enter> command.

### **%C Enable Data Compression**

This is an important command to know if your modem supports hardware data compression. If you issue %C1 to a modem that supports data compression, you will receive an OK, and V42.bis or MNP5 data compression will be enabled. If you receive an error, it is likely that the modem does not support hardware data compression.

### **X Response Sets**

Use the X4 command to wait for a dial tone and receive BUSY, CONNECT 9600, NO DIALTONE, etc., responses. However, if you are dialing from a PABX that uses a different dial tone, and the modem is not dialing as expected, then use an X3 command, which will cause the modem not to wait for a dial tone before dialing.

## **Z Reset and Retrieve Stored Configuration Profiles**

The Z0 and Z1 commands reset the modem and recall configuration profiles 0 and 1 respectively, which are stored in the non-volatile memory of the modem.

### **&C Carrier Detect Signal**

Use the &C1 command to turn on the carrier detect signal (109) only after the modem detects a carrier signal from the remote modem.

### **&R Clear to Send Signal (106)**

Use &R1 for full-duplex operation and &R0 for half-duplex operation.

### **&S Data Set Ready Signal**

Use the &S1 command to operate according to RS-232 specifications.

### **&V Display Configuration Profiles**

The &V command displays the active and stored configuration parameters, as well as any telephone number stored in the modem memory. It is an important command that allows you to see what's already configured in the modem profiles, including most register values.

### **&Q Transmission Modes**

The &Q command specifies the asynchronous and synchronous transmission method used, and it also has an option to support error control communications. It is equivalent to the command &M, which is supported by some modems.

### **&Zn=x Store Telephone Number x in Location n**

For example, to load the number (192) 65-7140 in position 1 of the memory, issue the command:

```
AT&Z1=192657140
```

To automatically dial this number, use the command DS=n as follows:

```
ATDS=1
```

### **Sr? and Sr=n**

Use Sr? to read a value stored in register number r, as shown in the following example:

Command	Response
ATS0?	000

The value loaded in register number 0 is 000. This modem is not configured for auto-answer.

Use Sr=n to write a value in register number n.

Command	Response
ATS0=002	OK

The value of register 0 was changed to 002. Now your modem can auto-answer. Check this information by reading the new value in register 0 with the command ATSO?. If you want to leave your modem in auto-answer, send the command &W to write this information in non-volatile memory as shown in the following example:

Command	Response
ATSO=002&W	OK

The number 002 loaded in register 0 represents the number of rings that the modem will wait before answering the call (in this case 2 rings).

The following command is an example of the initialization string used in an asynchronous switched 5250 emulation scenario using SNA Phone Connections and a GVC FM144V modem:

When the PCM that controls this connection activates, one of its tasks is to initialize the modem. To do so, it will send two initialization strings, as follows:

#### **Initialization 1 - > ATI**

Where: I = Display Product Initialization Code

#### **Initialization 3 - > ATE1L2M1Q0V1X4Y0&C1&D2&M0&R0&S1&T5\\N6%C1S0=0**

Where:

- E1 - Echo commands
- L2 - Define medium volume
- M1 - Define speaker on until carrier detect
- Q0 - Define modem send responses
- V1 - Define words responses
- X4 - All responses, dial tone and busy signal detection
- Y0 - Modem does not send or respond to break signals
- &C1- Turn on carrier detect signal when remote carrier signal present
- &D2- Modem hangs up, following an ON-to-OFF DTR transition
- &M0- Define asynchronous operation
- &R0- Modem turns on CTS when detects RTS from the DTE
- &S1- DSR off in test mode and command mode
- &T5- Ignore RDL test request by remote modem
- \N6- V.42/MNP/Normal Data Link
- %C1- Enable MNP5 or V.42bis data compression
- S0=0 - Disable autoanswer

If the initialization strings are successful, the next step would be to send a dialing command (ATDT#) when you start the emulator.

### Note

Some AT commands are not listed in the *AT Command Quick Reference*, because they represent the same thing as other commands, which have already been covered.

In this case &M0 represents the same thing as &Q0, which is listed in the *AT Command Quick Reference*.

Initialization string 3 was used in this example because CM/2 was only configured for outgoing calls. To configure CM/2 for incoming calls, Initialization string 2 is used and register 0 of the modem will take on a value of 002, because of the command S0=2 instead of S0=0.

### Easy Asynchronous Operation

To enable...	Type these commands...
V.42bis operation	AT\N6\Q3\J\V1%C1 <enter> or AT&F2 <enter>
MNP5 operation	AT\N3\Q3\J\V1%C1 <enter>
Normal operation	Use the factory default settings. If you've modified any settings, type AT&F <enter> to return to factory default settings.
Auto-answer	ATS0=1 <enter>
Power-on auto-dial	AT%P1S0=0&Z0=n <enter> (where "n" is the telephone number to be auto-dialed when the modem is powered-on).
Power-on leased-line auto-connect	Originating modem - AT%P1&L1S0=0 <enter> Answering modem - AT%P1&L1S0=1 <enter>

### Easy Synchronous Operation

To enable...	Type these commands...
Auto-answer	AT&Q2S0=1 <enter>
Power-on auto-dial	AT&Q2%P1S0=0&Z0=n <enter> (where "n" is the telephone number to be auto-dialed when the modem is powered-on).
Power-on leased-line auto-connect	Configure modem for dumb mode after sending the following commands: Originating modem - AT&M2&L1S0=0 <enter> Answering modem - AT&M2&L1S0=1 <enter>
Manual dialing	AT&Q3 <enter>



### S-register Descriptions

Register	Description	Range/Units	Factory Setting
S0	Select ring to answer on	0-255 rings	0
S1	Ring count (incremented with each ring)	0-255 rings	0
S2	Escape sequence character	0-127 ASCII	43
S3	Carriage return character	0-127 ASCII	13
S4	Line feed character	0-127 ASCII	10
S5	Back space character	0-32, 127 ASCII	8
S6	Wait before blind dialing	2-255 sec	2
S7	Wait time for carrier/silence	1-255 sec	50
S8	Duration of delay for comma	0-255 sec	2
S9	Carrier detect response time	1-255 1/10 sec	6
S10	Delay carrier loss to hang up	1-255 1/10 sec	14
S11	Duration/spacing of tones	50-255 msec	95
S12	Escape sequence guard time	0-255 1/50 sec	50
S18	Select test timer	0-255 sec	0
S25	DTR change detect time	0-255 1/100 sec	5
S26	RTS/CTS delay	0-255 1/100 sec	1
S30	Automatic timeout (S30 monitors the activity on the line; the factory-set default is 0, which disables the timer)	0-255 10 sec	0
S36	Negotiation fallback	0,1,3,4,5,7	7
S37	Maximum DCE line speed	0,1,2,3,5,6,7,9	0
S38	Delay before forced hangup	0-255 seconds	20
S43	Current DCE speed	0-12	n/a
S46	Error-control protocol selection	2, 136, 138	2
S48	Feature negotiation action	0,3,7,128	7
S49	Buffer lower limit	1-249 bytes	8
S50	Buffer upper limit	2-250 bytes	16
S63	Private Circuit Carrier Level	-9 dBm	-9
S69	Link layer window size	1-15 frames	15
S70	Maximum number of retransmissions	0-255 retries	10
S71	Link layer timeout	1-255 1/10 sec	2
S72	Loss of flag idle timeout	1-255 seconds	30
S73	No activity timeout	1-255 seconds	5
S82	Break signaling technique	3,7,128 values	128
S84	Adaptive Startup (ASU) Negotiation	0, 128, 129 130, 131, 132	129
S85	ASU Negotiation Report	0, 128, 129 130, 131, 132	0
S86	Connection failure cause code	0,4,5,6,7,8,9, 10,11,12,13, 14,15	n/a
S87	Fixed Speed DTE Interface	14, 28	14
S91	PSTN Transmit Level Adjustment	0 to -15 dBm	0
S92	MI/MIC Operation	0,1,3,5,7,9,11, 13,15	0
S93	CCITT V.25bis DTE Interface Speed:	3,5,6,7,8,9,10, 11,13,15	n/a
S94	Command Mode Selector:	0-15	0
S95	Negotiation Message Options:	1,2,4,8,16,32	0
S97	V.32 automode V.22/V.22bis probe timing	15 to 70 (1.5 to 7.0 seconds)	30
S108	Signal Quality Selector	0-3 values	2
S109	V.32bis Carrier Speed Selector	0-3 values	1
S110	V.32/V.32bis Selector	0-2 values	2

---

## C.7 Data Compression

Data compression can significantly improve the throughput of your connections by reducing the time required to transmit and receive data.

When hardware data compression is enabled with an AT command, %C1 for example, the modem compresses the data received from the DTE before sending it to the analog line, and decompresses the data received from the other modem before sending it to the DTE.

However it is important to know that some modems don't implement hardware data compression and come with software to do it. If you are looking for the best performance and compatibility, try to avoid using modems that implement data compression techniques by software.

To know if the modem supports data compression by hardware, send the command AT%C1 or an equivalent that enables any data compression method and wait for a response of OK.

### C.7.1 Compression Techniques

The following data compression methods are usually used by modems:

#### **CCITT V.42bis**

This method provides compression capabilities of 4:1. In other words, you can have a DTE speed four times greater than the line speed.

For example, you can define 57600 bps in your software configuration and your modem will run at 14400 bps over the analog line (obviously if they support both speeds).

#### **MNP Class 5**

This method provides compression capabilities of 2:1.

For example, you can define 4800 bps in your software configuration and your modem will run at 2400 bps over the analog line, after enabling MNP/5.

#### **Note**

If you are using data compression to transmit a file already compacted in the ARC or ZIP format, for example, you may actually be increasing the time it takes to transfer instead of reducing it. In that case you should turn off data compression.

## C.8 Modem Leads

Most external modems and some internal modems have leads to indicate the sequence of communications, which describes how a DTE (Data Terminal Equipment) starts a communications process with a modem (Data Communications Equipment).

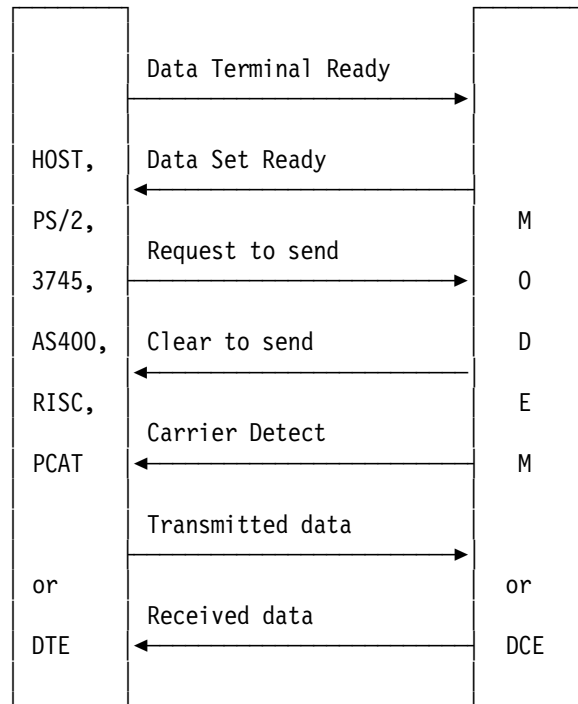


Figure 389. DTE and DCE Communications

The modem leads are an important way of understanding where you are in the communication process (refer to above figure).

There are some important leads that you should know about, because they can help you to start communications between two computers, and with problem determination as well.

The figure shown below is an example of the modem lead sequence for switched full-duplex communication using AT commands to dial:

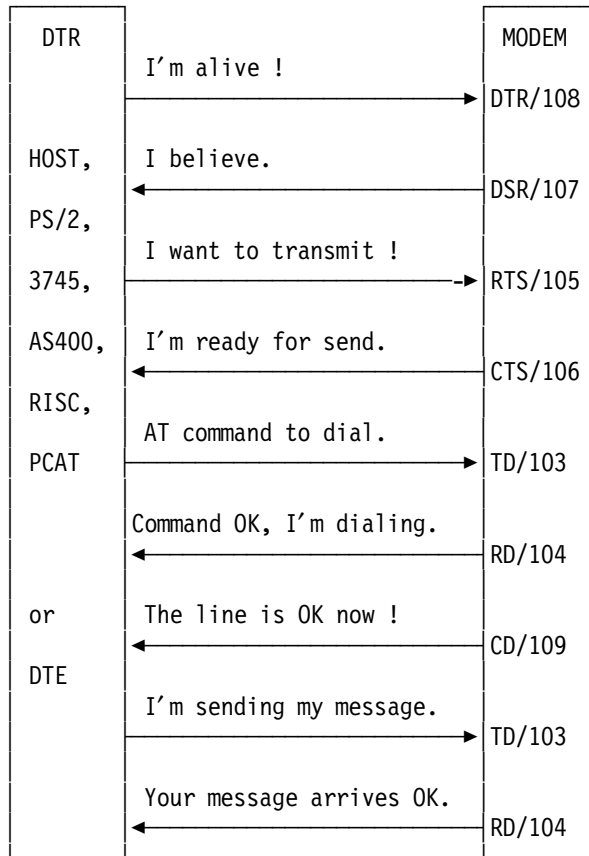


Figure 390. Switched Full-Duplex Communication

The next figure shows an example of the modem lead sequence for leased full-duplex communication.

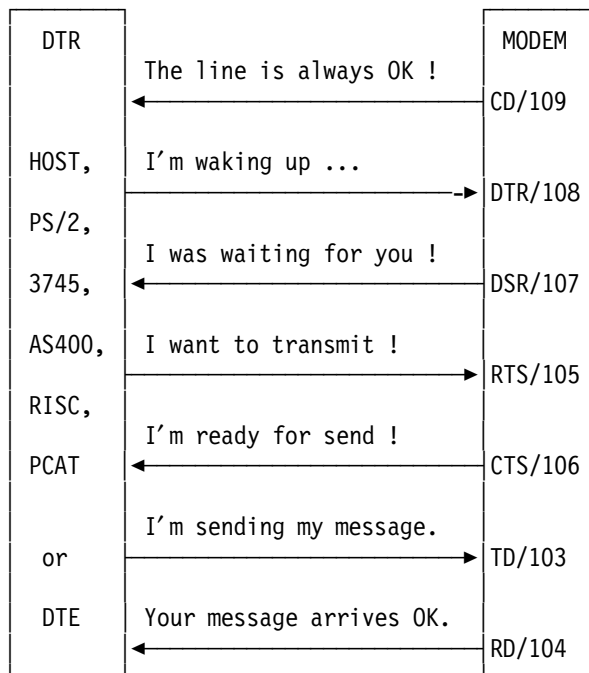


Figure 391. Leased Full-Duplex Communication

## **Modem Leads Descriptions**

This describes the leads and LEDs on a modem:

### **108/DTR - Data Terminal Ready**

This is the lead that shows you if the communications program started the port. It could be CM/2 activating COM1 at the workstation side, a 3745 line, or an AS400 controller line to the modem at the host side.

After connecting the appropriate cable and starting *any* communications program, the 108/DTR lead must be ON. The same thing will happen at the host side, after starting the line from a 3745 or an AS/400 controller.

In the modem AT command configuration, let the DTE control the DTR signal by using the command AT&D2.

If the 108/DTR lead is always off, check the communications program, the port or the cable. You probably don't have a modem problem.

### **107/DSR - Data Set Ready**

This is the modem response to the communications program, after receiving the 108/DTR signal. It could be forced on or not in the modem setup.

### **105/RTS - Request to Send**

This is a DTE signal that requests the modem to send data. It is the signal that determines the line turnaround time in half-duplex communications. In full-duplex communications this signal should remain on during data transmission.

### **106/CTS - Clear to Send**

This is a modem signal that will be turned on when the modem detects a request to send a signal (RTS) from the attached computer.

Leave this signal dependent on the RTS signal in your modem configuration. You could have problems if you try to force this signal on.

### **109/CD - Carrier Detect**

This is a remote modem signal that will be turned on when the line between modems is OK.

Normally in a leased line this signal is always on. In switched lines, you will wait for this signal after dialing and connecting to the remote modem.

If the 109/CD lead turns on for a few moments and then turns off, the modem configuration could be wrong. Review parameters such as speed, parity, method of compression and finally the level of transmission. Try to use lower speeds to identify possible line problems.

### **103/TD - Transmission Data**

This is a DTE signal that will be turned on when the DTE is sending dialing commands that are being echoed and when the DTE is sending data after the carrier detect signal comes on.

## 104/RD - Receive Data

This is a modem signal that will be turned on when the DTE is sending dialing commands that are being echoed.

It is a remote DTE signal that will be turned on when the remote DTE is sending data to the local DTE.

### Note

Synchronous, AutoSync and SNA over asynchronous communications always leave the 103/TD and the 104/RD signals blinking, because even though there is no data to transmit or receive, the protocol continues sending and receiving RR (Receiver Ready) frames.

When you are using traditional asynchronous communications, the leads 103(TD) and 104(RD) flash only when you are receiving or transmitting data. These leads will remain off if you are not transmitting or receiving data.

---

## C.9 IBM Asynchronous Modem Setup

This section provides guidance on how to set up the IBM 5841, 5853 and 7855 modems for asynchronous communications on 1200, 2400 and 9600 bps lines. Please refer also to the *Guide of Operations* for more detailed information about your modem:

### 1. IBM 5841 Modem for 1200 ASYNC

The IBM 5841 modem will communicate at speeds up to 1200bps. It has eight small switches on the back of the unit. Set switches 1-4 and 6-8 in the UP position and switch 5 in the DOWN position. All of the front panel switches should be off.

**Note:** You will have to change the Line speed (bps) fields in your asynchronous configurations to 1200bps. (You might have done this previously, but check that it is correct.)

### 2. IBM 5853 Modem for 2400 ASYNC

The IBM 5853 modem will communicate at speeds up to 2400bps. It has eight small switches on the back of the unit. Set switches 1-6 and 8 in the UP position and switch 7 in the DOWN position. All of the front panel switches should be off. The rest of the setup panels are as shown in this document.

**Note:** You will have to change the Line speed (bps) fields in your asynchronous configurations to 2400bps. (You might have done this previously, but check that it is correct.)

### 3. IBM 7855 Modem for 9600 ASYNC.

The speed of the IBM 7855 Modem is dependent on several factors:

- The mode of operation: asynchronous or synchronous.
- The actual line speed, which can be up to 12,000bps.
- The data terminal equipment (DTE) speed, which can be up to 19,200bps for asynchronous.
- The speed and type of the modem at the remote end of the link.

In asynchronous mode the line and DTE speeds can be different because the modem does buffering to accommodate the speed difference. If the modems on both ends of the link are configured to utilize data compression, then you could get an effective data throughput of up to 19,200bps. In synchronous mode, the line and DTE speeds are identical (synchronous dial-up is not covered, but IIN does support it).

Today IIN supports up to 9600bps and does not utilize compression. We could configure ASYNC PC/3270 V4.1 to use 19,200bps and the 7855 will do the buffering. However since IIN does not support this we will just set the line speed to 9600bps.

The 7855 has a liquid crystal display (LCD) and an operator panel that has four arrow keys (up, down, left and right) that allow you to navigate through the setup menus, options and dial directory setup.

First make sure the 7855 is set to the factory settings. If you are not sure, use First Setup, Reset to Factory instead of asynchronous AT mode in the procedure below. Here are the details of the setup option to set to Asynchronous AT mode:

```
Press: LCD will display:
<- -> <Exit Enter> (you press both arrow keys at the same time)
-> View Only
↓ First Setup
-> Synchronous
↑ ASYNC V25 bis
↑ Asynchronous AT (This is the change you want to make)
<- First Setup
<- <Exit Enter>
<- Remain Unlocked
<- Save Profile 0
<- ASYN7E A 9600 a
```

Figure 392. Setting up the IBM 7855 Modem for 9600 ASYNC

What you did was to:

- Enter configuration
- Go into First Setup
- Select Asynchronous AT mode
- Then back out of the menus, saving the Profile.

This is all you need to change on the modem. The 7855 will adjust to the data path (8 bit), Parity (None) and DTE speed (9600) that PC/3270 V4.1 will use.

**Note:** You will have to change the Line speed (bps) fields in your asynchronous configurations to 9600bps. (You might have done this previously, but check that it is correct).

**Important note**

Be sure to use the 9600ASC IIN phone number when configuring for automatic dialing. It will not work without dialing the correct modem on the other end!

## C.10 Modem Control Information Setting for PCOM

The Modem Control Information panel allows you to change pre-defined modem control information and lets you add the information for your own modem. The setting is used when a dial configuration file is created or changed by the Configure Phone/Modem option of the Automatic-Dial Facility.

Select **Yes** for the Automatic-Dial in the Advantis (IIN), Advantis(Passport), SNA-over-Async, Home3270, or Hayes-AutoSync configuration panel to enter the Modem Control Information dialog box (refer to Chapter 3, "PC/3270 Asynchronous Connections" on page 31 for further details about the above attachments).

If **No** is selected, a leased line connection is assumed and the Automatic-Dial Facility is not used for a session connection.

The screenshot shows a dialog box titled "Modem-Control Information - PCSDIAL.ADU". It has a menu bar with "Modem" and "Help". The main area contains the following fields and buttons:

- Modem Name:** A text box with a list of modem names.
- Retries:** A numeric input field with the value 0.
- Response Time [seconds]:** A numeric input field with the value 5.
- Keying Delay [x100 mseconds]:** A numeric input field with the value 1.
- Initialization:** A numeric input field with the value 0.
- Configuration:** A numeric input field with the value 0.
- Operating Mode:** Three buttons: "Direct: AT&Q0&K0\r", "Buffered: AT\\N0&K3\r", and "Reliable: AT\\N3&K3\r".
- Initialization Command:** A text box containing "ATZ0&F\r".
- Configuration Command:** A text box containing "AT&C1&D3%C0%E1X4W2\r".
- Hangup Command:** A text box containing "+++ATH0\r".
- Auto-answer-on:** A text box containing "ATS0=1\r".
- Speaker Volume Command:** Four buttons: "Off: ATM0\r", "Low: ATL1\r", "Medium: ATL2\r", and "High: ATL3\r".

At the bottom of the dialog are two buttons: "OK" and "Cancel".

Figure 393. Modem Control Information - PCSDIAL.ADU - Home3270

If your own modem is not on the list, select one that is similar and change the modem control information as necessary.

From the Modem Control Information - PCSDIAL.ADU panel, as shown above, you can change the default settings for an existing modem (we do not recommend that) or create a new definition for your modem.



To do that, follow these steps:

1. Click on **Modem** on the menu bar on the Modem Control Information - PCSDIAL.ADU panel and select **Add Modem...** from the pull-down menu.
2. Type in the name and type of the modem into the Enter Modem Name field of the new opened Add MCI Entry panel and click on the **OK** button.

A new empty Modem Control Information - PCSDIAL.ADU panel is shown with your entered modem name.

3. Click on **Modem** at the menu bar again and select **Copy from...** from the pull-down menu.
4. The new opened Copy MCI Entry panel lets you select one that is most similar to your modem. Clicking on **OK** will add all control information to your, just-added modem entry.
5. Now, you can change the control information as necessary.
6. Clicking on **OK** lets you save the new modem control information as a user-defined modem in a separate file called PCSMODEM.USR in the PCOM PRIVATE directory.

An asterisk (\*) appears in the first position of the Modem Name field of an user-defined modem.

## The Modem-Control Information Parameter Fields

This section explains the parameter fields of the Modem Control Information - PCSDIAL.ADU panel as shown in Figure 393 on page 382.

### Modem Name

The information required to configure, initialize and use many modems is included in the program; just select the modem you want to use. Refer to the lists of the modems for which the information is provided:

- Asynchronous Modem
- AutoSync Modem
- Synchronous Modem

### Initialization Row

This row of information defines the parameters for Retries, Response Time and Keying Delay, which will be used by the initialization command.

### Configuration Row

This row of information defines the parameters for Retries, Response Time and Keying Delay, which will be used by the configuration command.

- **Retries**

This is the number of times that the Automatic-Dial Facility attempts an initialization or configuration command.

- **Response Time**

This is the period, in seconds, that the Automatic-Dial Facility waits for the modem to respond to an initialization or configuration command before it retries the command or assumes that the command was completed.

- **Keying Delay**

This is the period, in tenths of a second, the Automatic-Dial Facility waits before it sends the next character of an initialization or configuration command to the modem. This delay prevents the facility from sending characters faster than the modem can recognize them.

### **Operating Mode Command**

One of these three commands will be sent to the modem following the initialization command string.

- **Direct Mode**

This mode assumes the DCE speed is identical to the serial port speed. The modem must establish a direct mode, or non-buffered normal connection. If your modem does not support the CTS/RTS local flow control, select this mode.

- **Buffered Mode**

In the buffered mode, the connection does not use any form of modem-to-modem flow control, error correction (ECL), or compression (MNP). The modem must establish a normal mode or speed-buffered connection. To perform the speed-buffered connection, the modem uses the unidirectional CTS local flow control.

- **Reliable Mode(Buffered)**

In the reliable mode, the modem must establish a reliable mode, or speed-buffered error-correcting (ECL) connection. This connection may optionally use modem data compression (MNP). Generally, ITU-T V.42bis data compression is achieved in addition to ITU-T V.42 error control in this mode. Because this standard typically provides capabilities with a compression ratio of up to 4:1, the serial port speed should be faster than modem-to-modem speed. The modem uses the bidirectional CTS/RTS local flow control.

### **Initialization Command**

This is the initialization command that is sent to the modem.

### **Configuration Command**

This is the configuration command that is sent to the modem.

### **Hangup Command**

The Hangup command is used to disconnect from the remote computer system.

### **Auto-Answer-On Command**

This command is used to set your modem to answer incoming calls automatically.

### **Speaker Volume Command**

Four speaker volumes are available and can be customized to/for:

**Off**      Disable speaker volume

**Low**      Set speaker low volume

**Medium**    Set speaker medium volume

**High**      Set speaker high volume

**Notes for commands:**

1. When special characters that cannot be entered easily from the keyboard are required, use the following character sequence to enter them:

**\n** New line or line feed

**\t** Tab

**\b** Backspace

**\r** Carriage return

**\f** Form feed

**\\** Backslash(\)

**\nnn** Any ASCII character by decimal code

2. Because literal blanks are discarded at the beginning of some fields, it is necessary to use the \032 form to get a leading space if one is actually required.

It is also recommended that the \126 form be used for the ASCII tilde character when it is required as the first character in a field.

3. We highly recommend that you be familiar with the modem command set, before you change anything. For further information about your modem, refer to the Installation and User's Guide or Reference Manual.



---

## Appendix D. Special Notices

This publication is intended to help IBM and customer personnel to install, customize and use the Personal Communications family in a mobile-computing environment. The information in the publication is not intended as the specification of any programming interfaces that are provided by Personal Communications. Please refer to the PUBLICATIONS section of the IBM Programming Announcement for the Personal Communications family for more information about what publications are considered to be product documentation.

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LANStreamer	Micro Channel
MVS/ESA	Mwave
NetView	OfficeVision/MVS
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OS/2	OS/400
Personal System/1	Personal System/2
PowerPC	PROFS
PS/ValuePoint	PS/VP
PS/1	PS/2
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## Appendix E. Related Publications

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

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### E.1 International Technical Support Organization Publications

For information on ordering these ITSO publications see "How To Get ITSO Redbooks" on page 393.

- *Personal Communications Version 4.X Interoperability and Problem Determination*, GG24-4457
- *Personal Communications Version 4.1 Implementation Guide*, SG24-4681
- *Personal Communications for the LAN/WAN User - DOS, Windows and OS/2*, SG24-4688 (available 4Q96)
- *Personal Communications for OS/2 and CM/2 Product Differentiation Guide*, GG24-2546
- *Communications Manager/2 - SNA Phone Connect*, GG24-4385
- *Communications Server for OS/2 Warp V4.0 Enhancements*, SG24-4587
- *Personal Communications Version 4.1 for Windows 95 Implementation Guide*, SG24-4689
- *To Emulate or Not to Emulate? A 3270 and 5250 Workstation and Emulation Selection Guide*, SG24-4458
- *An Introduction to Wireless Technology*, SG24-4465

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### E.2 Redbooks on CD-ROMs

Redbooks are also available on CD-ROMs. **Order a subscription** and receive updates 2-4 times a year at significant savings.

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### E.3 Other Publications

These publications are also relevant as further information sources:

- *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
- *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
- *Tell Me About OS/2 Access Feature*, SC31-8257

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## How To Get ITSO Redbooks

This section explains how both customers and IBM employees can find out about ITSO redbooks, CD-ROMs, workshops, and residencies. A form for ordering books and CD-ROMs is also provided.

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