



IBM

International Technical Support Centers

**INSTALLATION GUIDELINES FOR THE IBM
TOKEN-RING NETWORK PRODUCTS**

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Abstract

This document is a guide for the successful implementation of the IBM products in an IBM Token-Ring LAN Network environment.

The emphasis is on pointing out the installation/customization parameter relationship between the different products that can communicate with each other.

This guide is addressed to system programmers, system analysts and network planners who need to use the IBM Token-Ring Network LAN capabilities, and for those who need to define these capabilities for communication networks.

CSYS

(599 pages)

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Preface

Document Purpose and Scope

The purpose of this document is to:

1. Guide the reader in installing hardware devices in the IBM Token-Ring Network.
2. Guide and assist the reader in customizing and installing software and applications for use across the IBM Token-Ring Network.

Organization

This document is organized as follows:

- Introduction and Quick Reference
This section includes a quick-reference guide to help you locate and use the section you require.
- Part A
Hardware Installation of the IBM Token-Ring Products.
This section provides the reader with a step-by-step guide to the installation of hardware products in the Token-Ring Network. It covers the necessary hardware and any supporting software.
- Part B
Application Installation in a Token-Ring Network.
This section covers the applications that are currently in use on Token-Ring Networks. This section helps you to install the relevant software correctly.
At the end of most sections, scenarios are presented so that you can match, for example, host and PC operands.
- Part C
Management of Token-Ring Networks.
This section covers the available LAN management software, the options for use and installation procedures.
- Part D
Connectivity Scenarios.
Connectivity scenarios uses typical configurations to present the relationship of the different parameters when trying to establish a connection between different systems.

ITSC Publication Structure - LANs

The rapid evolution of Local Area Network products has resulted in the availability of a wide variety of documents, including the reference materials available with each product and additional technical planning and support material available from various development and support groups.

To assist users to locate appropriate, up-to-date information the International Technical Support Center is structuring its local area network documentation into a library of publications.

Each publication is produced to address some technical requirements of a specific audience as described in the abstract and preface of the document. Because the ITSC publications are intended to complement, but not replace reference material available with the products themselves, each document also provides a bibliography of related publications.

The International Technical Support Center publications related to local area networks have been planned with the following structure in mind to simplify the problem of locating up-to-date information.

1. Overview manuals which provide tutorial information and cross product conceptual and planning information.
2. Installation manuals which complement product reference material by describing the experiences of the ITSC in installing particular products within a total system. These documents do not address all installation parameters or options as do the product reference materials, but are intended to highlight those aspects of installation which have the greatest impact on successful use of the product, including the relationship between a specific product and other network or system products.
3. Network design and management manuals which describe trade offs and considerations for managing or planning local area networks.

The current library contains the following publications:

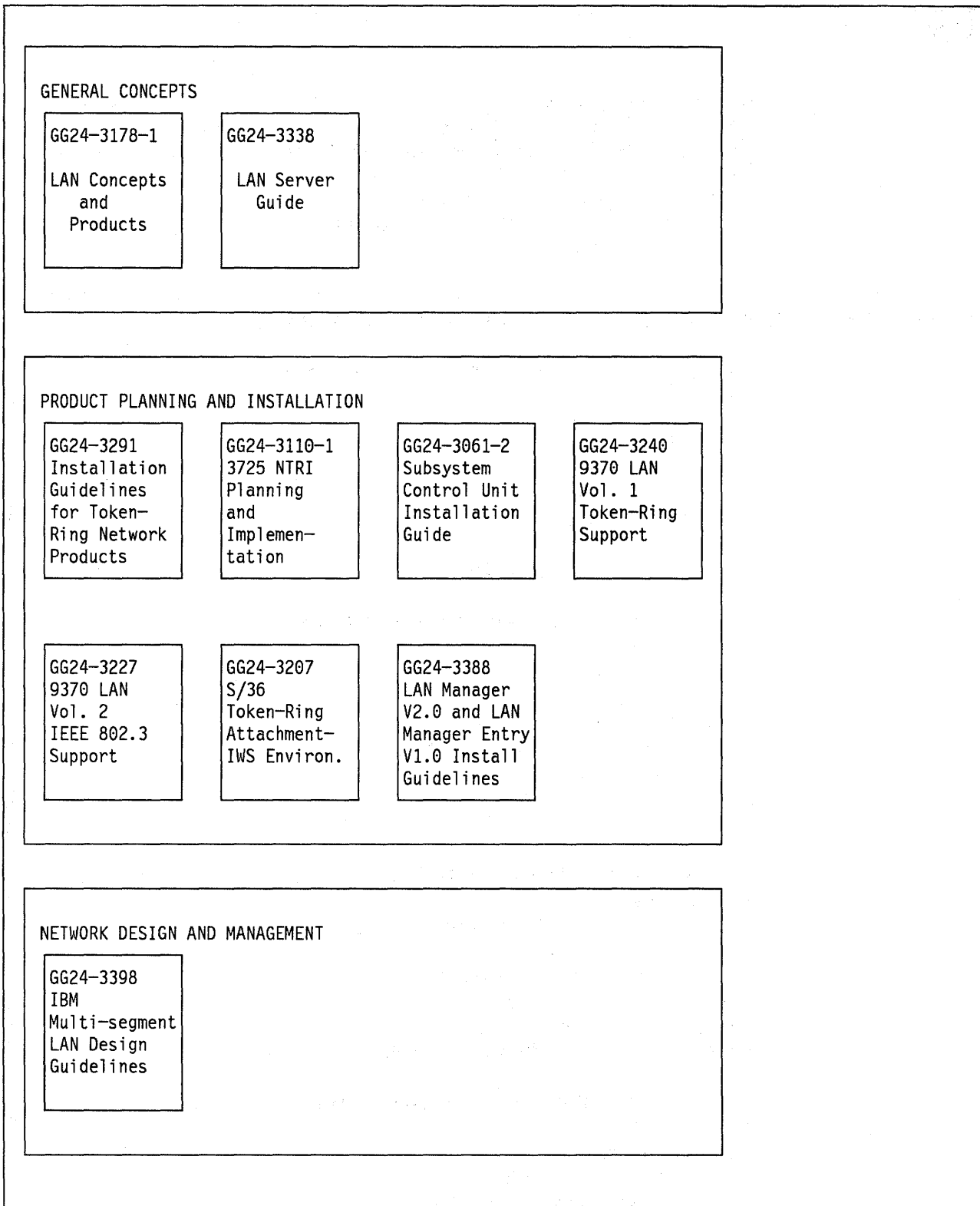


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Chapter 1. Introduction

The local area networks (LANs) of today are very different from those of even two years ago. LANs, first made popular by CSMA/CD type of networks such as Ethernet¹, were originally seen by many people as a way of sharing resources or as an alternative to cluster controllers for local connections. This conception of LANs has persisted for quite a while. However, we are now seeing a radical change from this traditional view.

The local area network of today, specifically the IEEE 802.5 International Standard, Token-Passing Ring, has led to a great change in the concepts of LANs and their potentials.

The IBM², Token-Ring Network now provides a communications subsystem for an organization that enables connections and communications between practically all of IBM's devices. The speeds and bandwidths of these devices, even with some of today's most demanding applications, still leave spare capacity and potential for growth.

The current speed of 16 million bits per second together with the token-passing protocol offers the best performance of current international LAN standards³, yet the future offers new technologies, such as FDDI (Fiber Distributed Data Interface) at over 100 million bits per second.

So far, LANs are really only being used for connection purposes. However, we are bound to see an evolution in applications that utilize these bandwidths, as is starting to happen with the Communications Manager of OS/2 Extended Edition. This provides a user with access to multiple hosts; data or applications can be anywhere on any host on any network. OS/2 Communications Manager and the LAN provide the user with a new, single-screen view of all the information systems and data he requires.

It seems that we are seeing just the tip of the iceberg in terms of what applications LANs will lead us to and the way we will do business in the future.

This document will discuss the installation and use of different types of IBM equipment on the IBM Token-Ring Network.

The benefits of using the IBM Token-Ring Network can be summarized as follows:

- Performance

The 16 million bits per second provided by a Token-Ring Network connection of terminals to a host leads to significant improvements in response time over, for example, a 56 Kbps line.

¹ *Ethernet* is a Trademark of The XEROX Corporation.

² *IBM* is a Trademark of The International Business Machines Corporation.

³ See W. Bux, 'Local Area Networks: A Performance Comparison' *IEEE Transactions on Communications Vol 29*, pp 1465-1473, 1981.

- **Change Management**

The ability to move the PC in location A to location B without any change in VTAM definitions or NCP generation leads to reduced costs and flexibility.

- **Network Management**

The failing segment on a backbone or ring can be isolated immediately. The IBM LAN Manager allows centralized management of the LAN and immediate identification of problems.

- **Peer-to-Peer Communications**

Users on a LAN share resources and communication between users without host intervention. As LU6.2 applications become more available, these functions will become more important.

- **Easy to Install and Maintain**

The basic architecture of the Token-Ring Network is a logical ring connected through a physical star topology through the use of Multistation Access Units (MAUs). MAUs are passive wiring concentrators that react to an attached node based on the presence or absence of a signal from that node. These MAUs can be connected together in a ring formation to support up to 260 nodes.

Several smaller "rings" can be connected together through the use of bridges. This provides the advantage of easier management, maintenance and problem determination as well as increased performance of the network.

The IBM Cabling System adds another dimension to the ease of installation by providing a structured approach to building wiring. It allows for easy addition or removal of nodes and also provides the means to maintain very good documentation of the ring.

- **Maximum Distance**

Because each node in a Token-Ring Network regenerates the signal, much greater distances can be covered than were possible when using bus or star topology. The network can also communicate over standard communications facilities through the use of gateways.

The following diagram shows an example of a Token-Ring Network configuration.

1.1 A Token-Ring Network Configuration

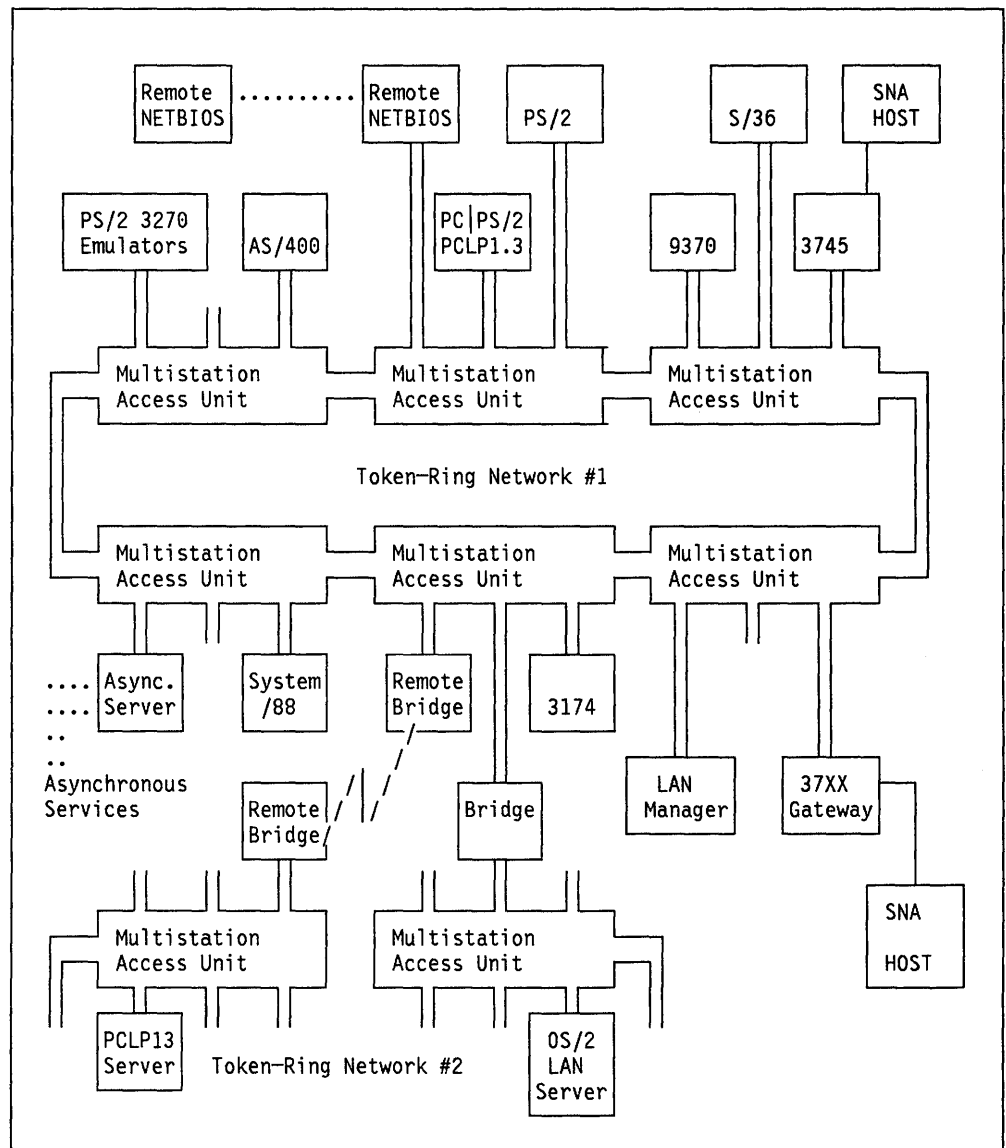


Figure 2. Token-Ring Network

1.2 Connectivity Scenario Quick Reference Guide

This quick reference is to help you find the scenario part you are interested in.

The quick reference is made up of four scenario sections:

1. SNA Token-Ring Network Environment; see page 4
2. Token-Ring Network applications; see page 5
3. TCP/IP Token-Ring Network Environment; see page 5
4. System/88 Utilization; see page 6

1.3 SNA Token-Ring Network Environment

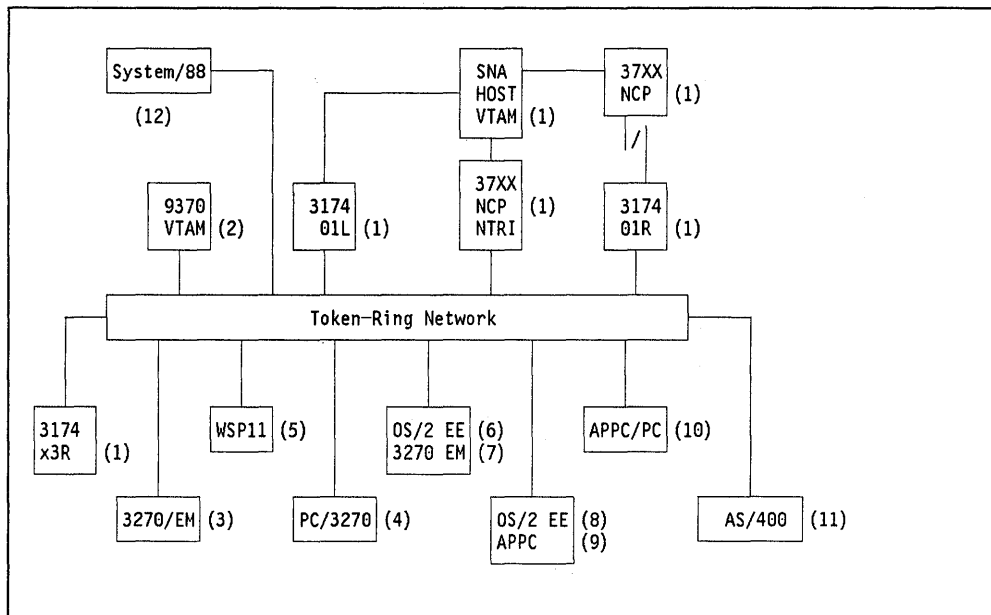


Figure 3. SNA Token-Ring Network Environment

The scenarios covered in the SNA Token-Ring Network environment can be placed in two major categories:

1. Workstations on the Token-Ring Network accessing SNA applications using 3270 device emulation
2. Workstations on the Token-Ring Network accessing SNA applications using APPC.

The products that will be considered in these scenarios are:

1. SNA Token-Ring Network Environment on page 579
2. Workstations Accessing a 9370 Host on page 593
3. PC 3270 Emulation Version 3 on page 471
4. Personal Communications/3270 on page 489
5. Workstation Program Version 1.1 Connectivity on page 483
6. OS/2 EE 1.1 Communication Manager - 3270 Emulation on page 523
7. OS/2 EE 1.2 Communication Manager - 3270 Emulation on page 527
8. APPC Facility for OS/2 EE 1.1 on page 171
9. APPC Facility for OS/2 EE 1.2 on page 205
10. AS/400 Connection to S/370 Host on page 541
11. APPC/PC on page 293
12. S/88 APPC to S/370 Host on page 575

1.4 Token-Ring Network Applications

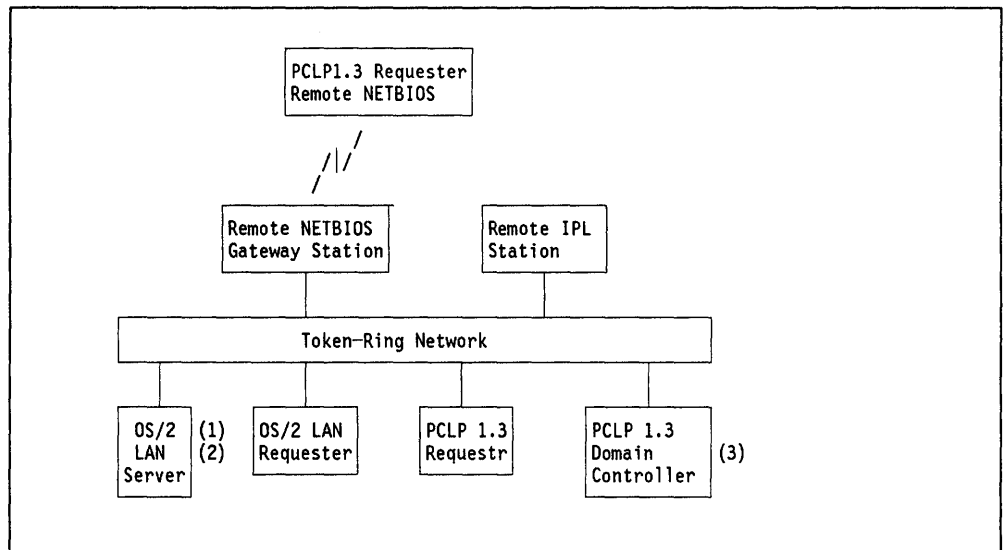


Figure 4. Token-Ring Network Applications

The products that will be considered in these scenarios are:

1. OS/2 Local Area Network Server 1.0 on page 501
2. OS/2 Local Area Network Server 1.2 on page 513
3. PCLP 1.3 Remote IPL Service on page 511

1.5 TCP/IP Token-Ring Network Environment

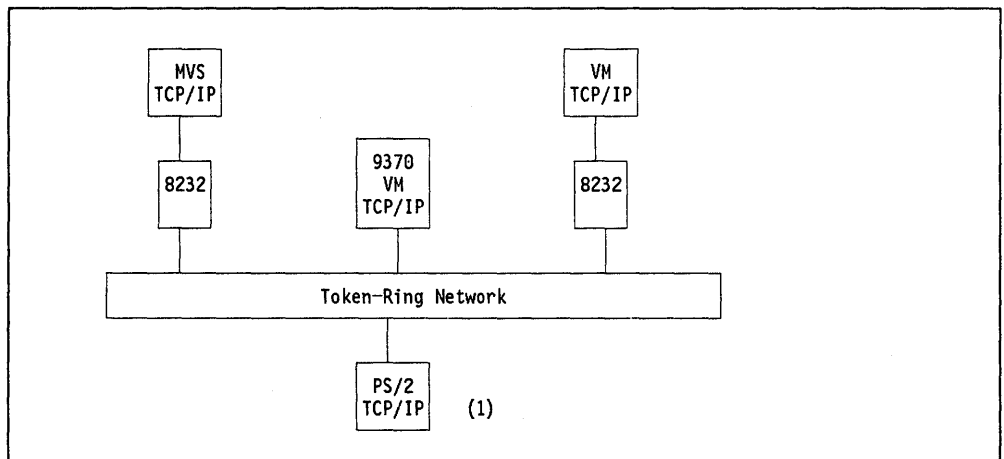


Figure 5. PS/2 TCP/IP Connection to VM and MVS

The product that will be considered in this scenario is:

1. TCP for PS/2 connected with TCP/IP for VM or MVS in "TCP/IP Scenarios in a Token-Ring Environment" on page 555

1.6 System/88 Utilization

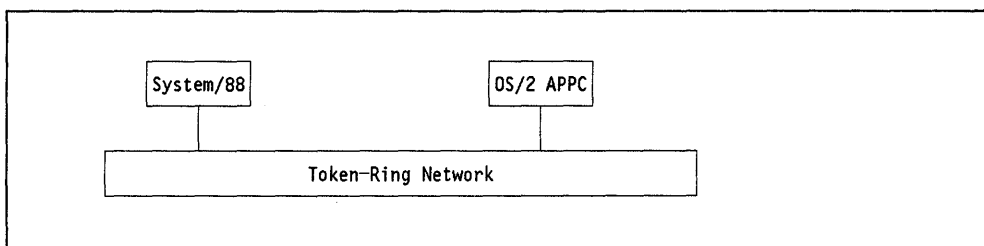


Figure 6. System/88 Connection with OS/2 APPC

The product that will be considered in this scenario is:

1. System/88 APPC to PS/2 APPC on page "System/88 Advanced Program-to-Program Communications Scenarios" on page 571.

PART A. Hardware Installation of Token-Ring Network Products

Chapter 2. PC Token-Ring Network Adapter Installation

2.1 Overview

The IBM Token-Ring Network Adapter has two models: The Adapter II operating at a data rate of 4 Mbps and the 16/4 dual speed adapter operating at a data rate of 16 and 4 Mbps both supporting the attachment of the PC to the Token-Ring Network (TRN).

The Adapter II has a total of 16 Kb and the 16/4 Adapter a total of 64 Kb memory.

The 16/4 Adapter supports RAM paging and early token release (ETR). The adapter support interfaces listed below support both the RAM paging and ETR functions of the adapter.

- IBM Local Area Network Support Program Version 1.1
- IBM OS/2 EE Version 1.1 or 1.2

RAM paging organizes the adapter's RAM into four 16 Kb pages that are presented to the application program one page at a time, allowing the 16/4 adapter to occupy only 16 Kb of address space in the computer while approximating the performance of an adapter occupying 64 Kb of address space.

The adapter is connected to the Multistation Access Unit (MAU) with an adapter cable where the IBM Cabling System Type-1 is being used. If telephone twisted-pair wiring is used (IBM Cabling System Type 3 Media) then the adapter is connected to a wall socket using a Type 3 cable (to operate at 4 Mbps only), with a combination filter and "D" connector on one end and a Type 3 Jumper Cable on the other.

The adapter is shipped with a diskette containing diagnostics programs.

There is also an easy-to-read installation guide included.

2.2 Planning Checklist

2.2.1 Prerequisites - Hardware

- One of the following: PC, PC/AT, PC/XT, Industrial Computer (Model 5531 and 7531) PS/2 Mod 25, PS/2 Mod 30 (non Micro Channel models)
- Token-Ring Adapter II or 16/4
- Adapter slot
- 256 Kb of memory
- At least one diskette drive.

2.2.2 Prerequisites - Software

- DOS Version 3.3 and later
- LAN support program V1.1
- OS/2 EE V1.1 or V1.2

2.2.3 Coexistence and Compatibility

If there is a 3278/79 emulation card, an SDLC adapter or a secondary Asynchronous Communications Adapter card already in the PC, pay particular attention to the switch settings mentioned later. This is because interrupt levels for each of these adapters must be different.

The allowable interrupts for each card are as follows:

ADAPTER	INTERRUPT LEVEL
3270 Coaxial Adapter Card	2 ONLY
SDLC Card	3 and 4
2nd Asynch. Comms Adapter	3 ONLY
Token-Ring Network Adapter II	2 or 3 or 7
Token-Ring Network Adapter/A	2 or 3 or 10 or 11
Serial Port	3 or 4
Parallel Port	5 or 6

Figure 7. Adapter Interrupt Levels. The possible interrupts for each adapter

Note. If two similar adapters are to be in one PC then they must also have different interrupt levels.

2.3 Installation Steps

The adapters have one switch block with 12 switches located in the upper left corner of the card.

1. Set switches for the adapters.

- ROM Addresses and Interrupt Level.

Positions 1-6 need to be set according to case a or b:

- a. If this is the first, primary or only Token-Ring Network adapter card to be installed in this PC then set as in Figure 8.

	1	2	3	4	5	6	7	8	9	10	11	12
ON		XXX	XXX			XXX						
OFF	XXX			XXX	XXX							

Figure 8. Primary Adapter ROM Setting for Token-Ring Network Adapter

- b. If the PC has two network adapters; that is, two Token-Ring Network adapter cards (as for a bridge) or one Token-Ring Network adapter card and one PC Network adapter card⁴ then set one card as in "a" above and set the other to be the alternate adapter as in Figure 9 on page 11.

	1	2	3	4	5	6	7	8	9	10	11	12
ON		XXX				XXX						
OFF	XXX		XXX	XXX	XXX							

Figure 9. Alternate Adapter ROM Setting for Token-Ring Network Adapter

Positions 7-8 set the interrupt levels. There are four combinations. ONLY THREE ARE PERMISSIBLE!

See the table in Figure 10 to set the switches correctly.

INTERRUPT	SWITCH-7	SWITCH-8
level 2	ON	ON
level 3	ON	OFF
level 7	OFF	OFF
* level 6	OFF	ON ** DO NOT USE **

Figure 10. Interrupt Level Setting

See "Coexistence and Compatibility" to check that you have the correct setting.

Switch 9 should be set to indicate that this is a primary or alternate adapter.

If you do not have any other local area network adapters installed in your computer set switch 9 in the OFF position (primary adapter). If you do have another local area network adapter installed, set switch 9 to the ON position (alternate adapter). If you are installing two IBM Token-Ring Network adapters in your computer, set the first one to primary and the second one to alternate. Here is an example how the switch can be set.

⁴ If you are installing a Token-Ring Network adapter with a PC Network adapter, the Token-Ring adapter MUST be the alternate adapter.

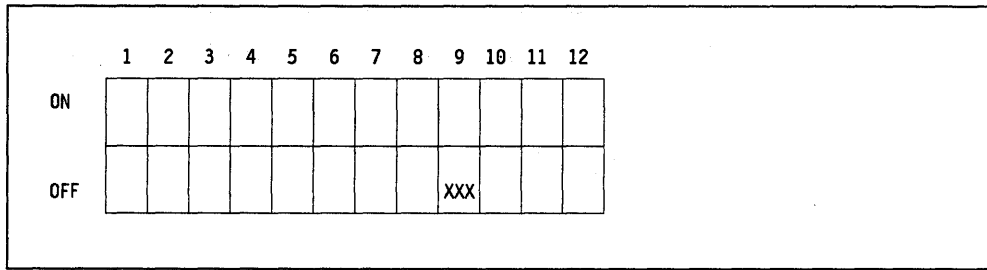


Figure 11. Primary Adapter Settings for Token-Ring Network Adapters

For Alternate setting switch 9 should be in the ON position.

- Shared RAM

Adapter II only: Switch 10 should be set to the desired shared RAM size (8 Kb or 16 Kb). Here is an example of how the switch can be set.

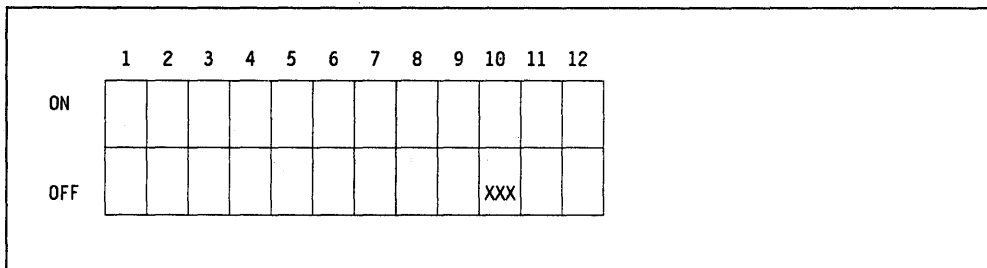


Figure 12. Shared RAM Size Setting (16KB) for Token-Ring Network Adapter II

When switch 10 is set to the ON position 8 Kb of shared RAM are configured into the computer memory map. Also, only 8 Kb of the adapter memory are used for message transfer.

When switch 10 is set to the OFF, 16 Kb of shared RAM are configured into the computer memory map.

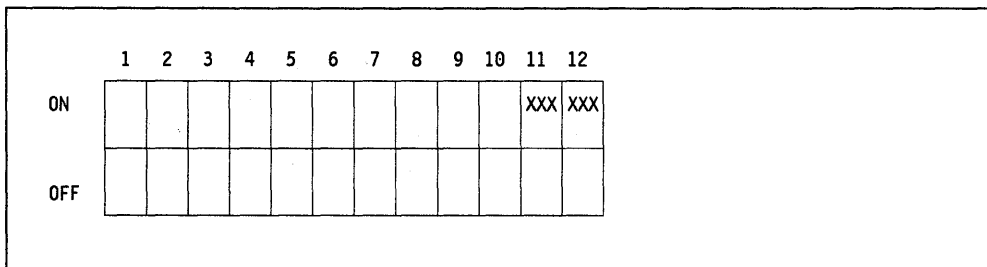


Figure 13. Switch 11 and 12 Default Settings for Token-Ring Network Adapter II

Switches 11 and 12 should be set to ON by the manufacturer. Please check:

Adapter 16/4 only:

Switches 10 and 11 on the switch block set the desired Shared RAM size for the 16/4 adapter.

You may select a RAM size of 8, 16, 32 or 64 Kb. The space assigned to the RAM size you select must not conflict with the address space assigned to any other feature in your computer.

	1	2	3	4	5	6	7	8	9	10	11	12
ON											XXX	
OFF										XXX		

Figure 14. Shared RAM Size Setting (16Kb) for Token-Ring Network 16/4 Adapter

This is the recommended RAM size (16 Kb) for the 16/4 Adapter and when selected enables a function on the 16/4 Adapter called RAM paging which allows your software to access all of the 64 Kb of RAM on the adapter one page (16 Kb) at a time while using only 16 Kb of memory.

To use RAM paging you must:

- Have the appropriate software installed (IBM Local Area Network Support Program V1.1 or OS/2 EE V1.1 or 1.2).
- Select a RAM size of 16 Kb.

	1	2	3	4	5	6	7	8	9	10	11	12
ON										XXX	XXX	
OFF												

Figure 15. Shared RAM Size Setting (8 Kb) for Token-Ring Network 16/4 Adapter

This setting is recommended if memory space is limited. Use this setting if you want 8 KB of RAM to be shared by our system unit and adapter. The RAM address should be on a 16 Kb address boundary when you load your adapter support interface.

	1	2	3	4	5	6	7	8	9	10	11	12
ON										XXX		
OFF											XXX	

Figure 16. Shared RAM Size Setting (32 Kb) for Token-Ring Network 16/4 Adapter

Use this switch setting only if you want 32 Kb of RAM to be shared by your system unit and the adapter or if required by your application program. The RAM starting address should be on the 32 Kb address boundary when you load your adapter support interface.

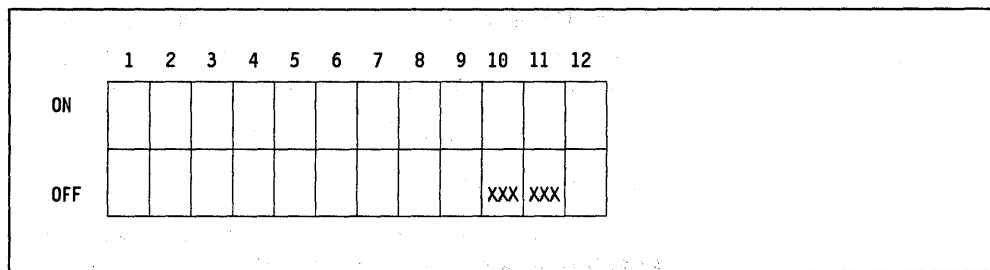


Figure 17. Shared RAM Size Setting (64 Kb) for Token-Ring Network 16/4 Adapter

Use this switch setting only if you want 64 Kb of RAM to be shared by your system unit and the adapter or if required by your application program. The RAM starting address should be on a 64 Kb address boundary when you load your adapter support interface.

If you must use the 64 Kb setting and do not have room in your system unit memory map for 64 Kb of shared RAM and 8 Kb of ROM you may locate the 8 Kb of ROM in the upper part of the 64 Kb shared RAM area. The adapter will detect the conflict and automatically adjust the shared RAM size to 56 Kb. For example:

- If you set the 64 Kb RAM size starting address to x'C0000' in your system unit the 64 Kb RAM will occupy the address space: x'C0000' to x'CFFFF' in your system unit.
- If you set the 8 Kb ROM starting address to x'CE000' in your system unit the 8 Kb will occupy the last 8 Kb of RAM address space: x'CE000' to x'CFFFF' in your system unit.

Switch 12 on the switch block indicates the rate at which the adapter will pass data to the network.

This is an example of a data rate of 16 Mbps.

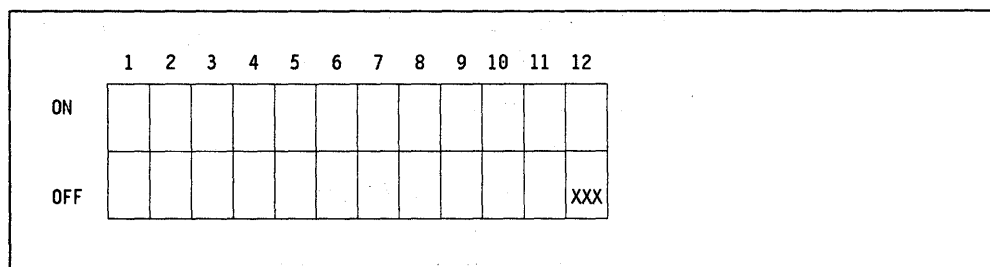


Figure 18. 16 Mbps Setting for Token-Ring Network 16/4 Adapter

For a data rate of 4 Mbps switch 12 should be in the ON position.

Warning: Connecting the adapter to a LAN segment using a data rate different from the adapter data rate is never permitted and can adversely affect system operation.

2. Prepare the PC

Make sure that the power is off. If you have a fixed disk take precautions, if necessary, to avoid scratching.

NOTE. Put a label on the end of the adapter next to the socket identifying it as a primary or alternate Token-Ring Network adapter. This makes identification of the adapter easier after installation.

Remove the outer cover of the PC.

3. Install the adapter

PC: Use slot 4 whenever possible for ventilation reasons. Do not install two adapters in a standard PC due to increased temperature inside the PC.

PC/AT and XT and PS/2: Use any available slot.

Make sure that the adapter is correctly in place and the restraining screw is tightened.

4. Diagnose

The diagnostics program is designed to ensure that the installed adapter(s) are functioning correctly.

- a. The adapter must be installed with the adapter cable attached to the adapter but NOT to the MAU.
- b. WARNING. The screen adapter and Token-Ring Network adapter look very similar; be careful not to plug the screen into the Token-Ring Network adapter - if you do, the screen will appear PURPLE. Remove cable immediately, or you may melt the screen!
- c. The PC is then initialized using the diagnostics diskette. Choose Option 0 and proceed with the tests. The screens are clear and self explanatory. The diagnostics program will tell you how many adapters are installed and their interrupt levels.

The diagnostics program will also tell you the universal adapter address.

5. Replace the cover

6. Connect the Token-Ring Network adapter cable to the MSAU (8228) via the IBM Cabling System (ICS) or, if using telephone twisted pairs (TTP), make sure the appropriate "D" connector is used.

7. Install supporting software

In order to use your Token-Ring Network adapter, you will need to load an adapter interface support program.

2.4 Basic Troubleshooting

Typically, when problems occur trying to use the Token-Ring Network, you will see messages such as:

"Network Adapter Card not functioning"
"Communications Hardware not available"
"Cannot find adapter support"

These are all symptoms that the adapter interface support program has failed to load - see "LAN Support Program V1.1" on page 87.

Further courses of action may include running the diagnostics program again.

Chapter 3 of the *Token-Ring Network PC Adapter Guide To Operations*, which comes with the adapter, covers the recommended actions.

2.5 Where To Go For More Information

- *Token-Ring Network PC Adapter Guide to Operations* - included in the adapter package
- *SC30-3383 IBM Token-Ring Network PC Adapter Technical Reference*
- *SC30-3384 IBM Token-Ring Network PC Adapter Hardware Maintenance and Service*
- *GG24-1739 IBM Token-Ring Network PC Products Description and Installation*.

Consult each type of adapter's installation instructions to ensure proper installation according to the type of network in your LAN.

Chapter 3. PS/2 Token-Ring Adapter/A Installation

3.1 Overview

The PS/2 Micro Channel models 50, 60, 70 and 80, use different style adapter cards known as Form Factor-2 cards and called "Token-Ring Network Adapter/A". This adapter performs the same functions as the Token-Ring Network Adapter II with modifications for the PS/2. Reference to a PS/2 in this section will mean a Micro Channel model unless otherwise stated.

The PS/2 Models 25 and 30 are NOT Micro Channel models and therefore use Token-Ring Network Adapter II cards. The installation of Token-Ring Network adapters for the PS/2 Models 30 and 25 follow the same course as for the PC. See "PC Token-Ring Network Adapter Installation" on page 9.

There is a major difference in the installation of the PS/2 cards; there are no switches to set and all installation parameters are set through software. The installer will use the relevant PS/2 model's Reference Diskette to install the adapter which comes with the system.

3.2 Planning Checklist

3.2.1 Prerequisites - Hardware

- PS/2 Model 50, 55, 60, 70 or 80

These will require a Token-Ring Network Adapter/A

- Token-Ring Network adapter cable or Type 3 media filter cable.

3.2.2 Prerequisites - Software

- DOS 3.3 or higher
- The relevant system reference diskette.

3.2.3 Coexistence and Compatibility

Check with Figure 7 on page 10 for details of compatibilities with other adapters. The same rules apply, but in this case parameters are set by using the reference diskette.

3.3 Installation Steps

1. Before installing the Token-Ring Network Adapter/A, you will need to copy files from the Token-Ring Network option diskette that came with the adapter, to the backup copy of the Reference Diskette.

If you do not have a backup Reference Diskette, you will need to make one - you will require a 2.0 Mb diskette. IPL the PS/2 using the original Reference Diskette and follow the instructions from option 2 of the Main Menu.

To copy files from the Token-Ring Network Adapter/A Option diskette, IPL the PS/2 with the backup copy of the Reference Diskette and follow instructions under option 5, Copy an Option Diskette, from the main menu. See Figure 22 on page 19.

DO NOT USE DOS COPY TO PERFORM THIS FUNCTION.

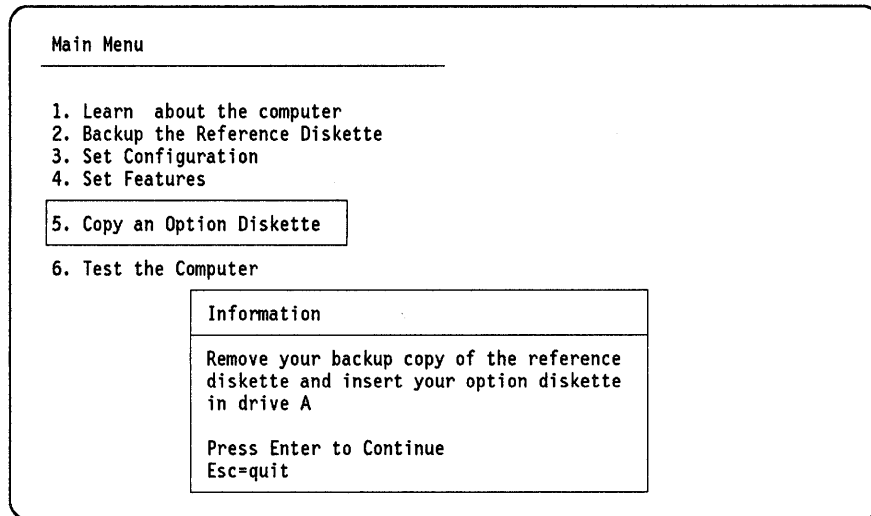


Figure 19. PS/2 Reference Diskette - Copy an Option Diskette. Follow the instructions given.

Save the original Token-Ring Network Adapter/A diskette.

2. Put the labels provided in the adapter package onto the faceplate of the adapter. This will make identification of the adapter easier after installation.
3. Power off and remove the case of the PS/2. In the case of the upright models you will need the cover lock key. Use a coin to undo the fixing screws - no screwdriver is required.
4. Matching the adapter pins to a correctly sized slot, remove the external faceplate by undoing the black thumbscrew securing the faceplate and sliding up.
5. Firmly insert the adapter in the free slot and tighten black thumb screw. Make a note of the slot number (listed on the outside).
6. Replace cover and attach cables.
7. Start the system using your updated copy of the Reference Diskette. After the IBM copyright panel you will see the initial error screen⁵ which you respond to by typing 'Y' from page 2 and the system will be automatically configured. See Figure 20 on page 19 below.

⁵ This is caused by having a hardware configuration which does not match the system's set configuration.

Adapter Configuration Error - 00165

The computer's internal self-tests found an option adapter that is different from the option adapters indicated in the computer's configuration.

This error occurs if option adapters are added, removed, or are not working properly.

If you have added or removed an adapter, run automatic configuration. To view or change the results of automatic configuration, go to the Main Menu of this diskette and select 'Set Configuration'

Figure 20. PS/2 Reference Diskette - Error Screen 1 of 2

(page 2)

Select 'View configuration' or 'Change configuration' from the Set Configuration menu.

If you have not added or removed an adapter, do not run automatic configuration. Go to the Main Menu of this diskette. Select 'Test the computer' to determine the cause of the error and what action to take.

Automatically Configure the System ? (Y/N) < Y >

Figure 21. PS/2 Reference Diskette - Error Screen 2 of 2. On installing any new option above screens will be displayed first.

8. On completing the configuration, you are prompted to press the Enter key to restart the system using the Reference Diskette.

This time, after the IBM copyright panel, you will see the Main Menu. See Figure 22.

Main Menu

1. Learn about the computer
2. Backup the reference diskette
3. Set configuration
4. Set features
5. Copy an option diskette
6. Test the computer

Figure 22. PS/2 Reference Diskette - Main Menu

9. You now want to view the configuration, check that it is correct and possibly change it. Choose Option 3 from the Main Menu to set the configuration.

```

Set Configuration
-----
1. View Configuration
2. Change Configuration
3. Backup Configuration
4. Restore Configuration
5. Run Automatic Configuration

Press a number to select

```

Figure 23. PS/2 Reference Diskette - Set Configuration. There are several options; you should view and then change if necessary.

10. To view the configuration, choose Option 1. See Figure 24 on page 20. As you can see, the options are listed along with the parameters currently configured.

To change any parameters, press the Escape key to return to "Set Configuration" and choose Option 2.

```

View Configuration
-----
Total System Memory
  Installed Memory.....2048 KB (2.0 MB)
  Usable Memory .....2048 KB (2.0 MB)

Built-In Features
  Installed Memory.....2048 KB (2.0 MB)
  Diskette Drive A Type .....1.44MB 3.5"
  Diskette Drive B Type .....NOT INSTALLED
  Math Co-processor .....NOT INSTALLED
  Serial Port .....SERIAL_1
  Parallel Port .....PARALLEL_1

Slot1 - EMPTY

Slot2 - EMPTY

Slot3 - EMPTY

```

Figure 24. PS/2 Reference Diskette - View Configuration 1 of 2

```

(Page 2)

Slot4 - EMPTY

Slot5 - EMPTY

Slot6 - EMPTY

Slot7 - IBM Token-Ring Network 16/4 Adapter/A
  Primary or Alternate adapter.....Primary
  Adapter rate.....16 Mbps
  ROM Address range .....C0000 - CDFFF
  RAM Address range .....D8000 - DBFFF
  Interrupt Level .....Interrupt 2

Slot8 - ESDI Fixed Disk Controller
  Adapter Memory Location .....Segment D000
  DMA Arbitration Level .....Level 5
  DMA Burst Length .....8 Word Burst
  Fairness on/off .....On

```

Figure 25. PS/2 Reference Diskette - View Configuration. This is covered on two screens. The change configuration panel is similar.

This menu is very similar to the View panel; you can “toggle” through the possible parameters for each option using PF5 and PF6. Press PF10 to save the new configuration.

11. The installation is now complete. Restart the system with a DOS diskette or from the fixed disk.

3.4 Basic Troubleshooting

If you do experience problems trying to install the adapter, do the following:

1. Check the Token-Ring Network Adapter/A diskette options loaded onto the Reference Diskette correctly.
2. From the Main Menu, use option 6 to test the computer. Follow the instructions.
3. Consult the *PS/2 Quick Reference Guide*, which should be with the Reference Diskette, for further actions.

3.5 Where To Go For More Information

The *PS/2 Quick Reference Guide* contains useful information about installing options.

There is also a *Token-Ring Network Adapter/A Installation Guide* that comes with the adapter.

For details on interrupt levels, RAM and ROM address settings, see the following:

- *GG24-IBM Token-Ring Network PC Products Description*.

Chapter 4. IBM 8232 LAN Channel Station

4.1 Overview

The IBM 8232 LAN Channel Station provides connections between an IBM S/370 channel and several LAN environments, all running the TCP/IP protocol:

- IBM Token-Ring Network
- IBM PC Network Broadband
- Ethernet Network.

In addition to TCP/IP networks, the IBM 8232 LAN Channel Station also provides the attachment to the S/370 channel for:

- Manufacturing Automation Protocol (MAP) Version 2.1 Network
- AIX/370 Workstations
- IBM VM/Passthrough PRPQ # P10024.

The LAN Channel Station consists of an IBM Industrial Computer, a special sub-channel attachment adapter and the LAN adapter. Two models are available: Model 1 is a single unit, providing connectivity between one S/370 channel and up to two LANs. Model 2 is a double unit and provides attachment to two S/370 subchannels and up to four LANs.

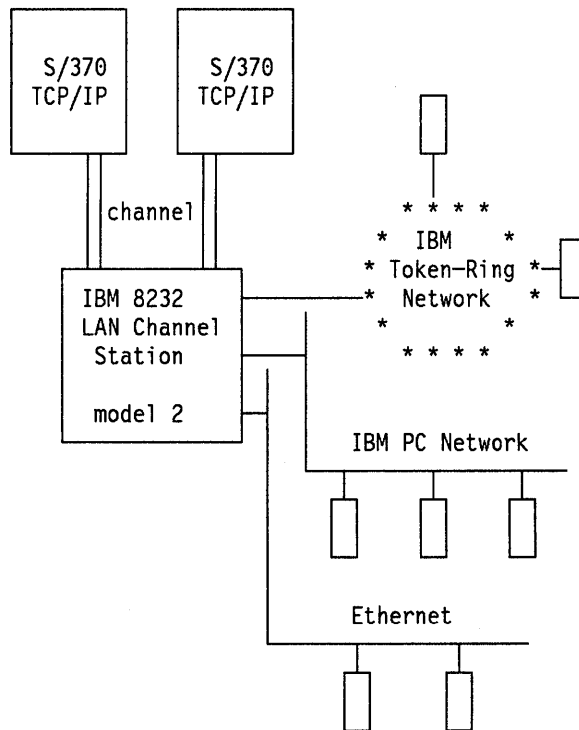


Figure 26. IBM 8232 LAN Channel Station

Software on the IBM 8232 is needed to control the channel attachment and to communicate with the host software. It can be:

1. IBM 8232 LAN Channel Support Program (5601-232), required for running the 8232 on a TCP/IP network. The program provides:
 - Control of the S/370 sub-channel adapter.
 - Interface to TCP/IP running on the host.
 - Device driver support for Ethernet adapter.
2. IBM VM/Passthrough, PC Connect Facility - 8232 Communication Program (PVM/PC) 1.0, Program Offering PRPQ # P10084, required for the PVM connection.

4.1.1 TCP/IP and the IBM 8232

The IBM 8232 LAN Channel Station will enable the S/370 TCP/IP software to communicate over the LANs connected to the 8232. The role of the 8232 is limited to that of a device driver. It has no higher layer (IP or TCP) functionality. To illustrate this, let us consider the IP routing done by this configuration, for instance, to link an Ethernet to an IBM Token-Ring Network for the TCP/IP protocols. The flow of any IP packet that is routed between the two networks is depicted in Figure 27.

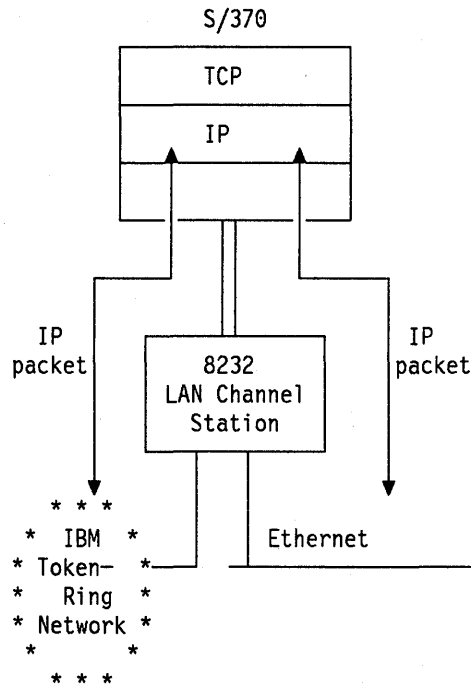


Figure 27. IP Routing through the IBM 8232

Note that all IP packets being routed between Ethernet and Token-Ring are flowing through the 8232 and through the S/370 channel, up to the host's TCP/IP application and back.

4.2 Planning Checklist

4.2.1 Prerequisites - Hardware

The following items will be needed to install the IBM 8232 on the channel. They are not provided with the 8232.

- An IBM 5532 Industrial Color Display or an IBM 7534 Industrial Graphics Display.
- Two blank, formatted, high-capacity, double-sided, double-density diskettes (IBM P/N 6109660 or equivalent).

The following adapters will be needed to attach the 8232 to the local area networks. They are not included in the 8232.

- A Token-Ring Network Adapter II or a Token-Ring Network 16/4 adapter for each network connection is needed, if the 8232 is attached to an IBM Token-Ring Network.
- If the 8232 is connected to a PC Network, a PC Network Adapter II is needed.
- If the 8232 is connected to an Ethernet local area network, an Ethernet Ungermann-Bass adapter card (P/N 2273A) or an equivalent adapter is needed.

4.2.2 Prerequisites - Software

The installation of the 8232 requires the following software:

- IBM Personal Computer Disk Operating System (IBM PC DOS) Version 3.3 or later.
- The IBM Local Area Network Support Program Version 1.0 or later is required for all Token-Ring Networks and PC networks. Version 1.1 is required if the IBM Token-Ring Network 16/4 Adapter is used.
- The IBM LAN Channel Support Program Version 1 or later.

4.3 Installation Steps

The installation and the setup of the 8232 requires careful coordination between the customer and the IBM customer engineer.

These are the installation tasks, that must be performed by the IBM customer engineer:

- Unpack and perform the physical installation
- Run the Industrial Computer's diagnostics
- Run the IBM 8232 diagnostics
- Attach the IBM 8232 to the channel
- Run the T8232A OLTs from the host.

These are the installation tasks that must be performed by the customer:

- Prepare host system for attaching the IBM 8232

- Install LAN adapters in the 8232
- Run LAN adapter diagnostics
- Attach the 8232 to LANs
- Create the 8232 operating diskette
 - Install the IBM Local Area Network Support Program
 - Install the IBM LAN Channel Support Program
- Verify LAN-to-host communication.

All the steps except the one about the LAN Channel Support Program are detailed in the *IBM 8232 LAN Channel Station Operator's Guide*. Information that is needed to install the LAN Channel Support Program can be found in the *IBM LAN Channel Support Program User's Guide*.

4.4 Where To Go For More Information

For more information on the 8232 LAN Channel Station installation, refer to these publications:

- *IBM LAN Channel Support Program User's Guide*, SC30-3458
- *IBM 8232 LAN Channel Station Operator's Guide*, GA27-3785
- *IBM 8232 LAN Channel Station Installation and Test*, GA27-3796
- *IBM 8232 LAN Channel Station Safety Notices*, GA27-3833
- *IBM Industrial Computer 7532 Operators Guide*, (#6036)
- *IBM Industrial Computer 7532 Installation and Setup Manual*, (#6037).

Chapter 5. IBM System/88 Token-Ring Hardware

This section describes the way the IBM System/88 attaches to a Token-Ring Network, the S/88 components needed for attachment and the way to install it.

5.1 Overview

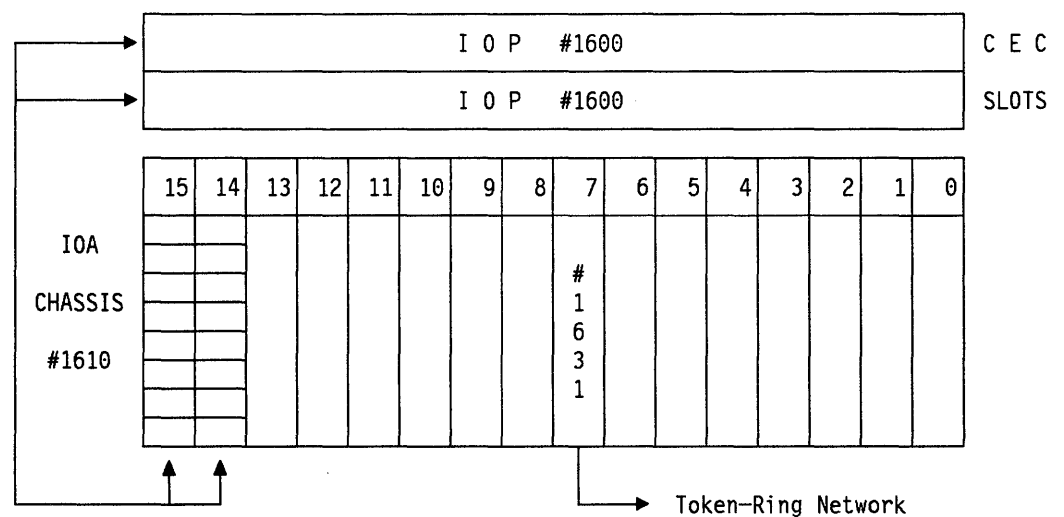
The S/88 attaches to the Token-Ring Local Area Network through the System/88 Token-Ring adapter. This adapter whose feature number is #1631, allows the S/88 to access an IBM Token-Ring Network to communicate with other systems that are also accessing the network.

The Token-Ring adapter provides the physical connection as well as the link level control code conforming to the IEEE 802.5 standard. The currently supported data rate is 4 Mbps.

The System/88 Token-Ring adapter can be installed in any System/88 module that has installed the Input Output Processor (IOP) Subsystem hardware which contains the following main parts:

- IOP cards, connected directly to the main processor bus by the Central Electronic Complex (CEC) slots.
- Input Output Adapter (IOA) chassis, which provides the slots to insert the input/output adapters.
- Duplexed buses on internal cable to connect the IOP cards to the IOA chassis.

The Token-Ring adapter can be inserted into any empty slot of the IOA chassis. The following figure graphically shows the IOP Subsystem with the Token-Ring adapter installed in the IOA chassis slot number 7.



Note: Slots 0-13 can be used to insert input/output adapters. Slots 14 and 15 (the terminators) are used to connect the IOA chassis to the IOP cards.

Figure 28. IBM System/88 Token-Ring Adapter Physical Installation

The IOP Subsystem architecture is available in the following System/88 machines providing the IOA chassis with 14 slots for input/output adapters:

- 4576 - processors, Models 50 and 8X
- 4578 - processors, all models
- 4579 - processors, all models
- 4577 - expansion cabinet, Models 02X.

The IOP Subsystem architecture is available in the following System/88 machines providing the IOA chassis with 6 slots⁶ for input/output adapters:

- 4593 - processors, all models.

There can be **only** two System/88 Token-Ring adapters per System/88 module.

5.2 Planning Checklist

- Check that the System/88 Operating System is Version 6 or later.
- A System/88 module supports a maximum of two Token-Ring connections.
- The cable provided with the Token-Ring adapter is only 8 feet long; you must supply additional cable for longer distances.
- At this time, only APPC is supported when using the Token-Ring connection to access an SNA environment. You must plan program development in the System/88 as well as in the other system with which it will communicate.

5.2.1 Prerequisites - Hardware

The System/88 Token-Ring adapter (#1631) requires an empty slot in the S/88 IOA chassis. The IOA chassis is part of the IOP Subsystem architecture which is currently available in the following machines:

- 4576 - processors, Models 50 and 8X
- 4578 - processors, all models
- 4579 - processors, all models
- 4593 - processors, all models
- 4577 - expansion cabinet, Models 02X.

The System/88 Token-Ring adapter uses 29 watts from the IOA chassis. It is recommended to run the configurator to verify that there is no watt limit constraint when adding this Token-Ring adapter to an existing configuration.

⁶ one of them always used for the system console and Remote Support network

5.2.2 Prerequisites - Software

The following product is required to support the System/88 Token-Ring adapter:

- 5732-001 System/88 Operating System Version 6 or later.

The Operating System provides subroutines to communicate with the adapter via the Multiplexed Generic Communications Driver (MPX/GCOMM). A user program written in BASIC, COBOL, C Language, FORTRAN, Pascal or PL/I can invoke these subroutines.

Additionally, the following set of products provide the system programmer with the capability of using the APPC programming interface when communicating the S/88, across the Token-Ring Network, to another system that also supports the APPC.

- 5732-057 System/88 SNA Token-Ring Link Manager
- 5732-027 System/88 Network Interface Support
- 5732-006 System/88 Transaction Processing Services
- 5732-025 System/88 Advanced Program-to-Program Communications

5.2.3 Coexistence and Compatibility

The System/88 Token-Ring adapter is supported by the operating system in the same standard way as it supports other communications adapters. There is no compatibility restriction when mixing the Token-Ring adapters and other communications adapters in the same IOA chassis or in general, in the same S/88 module.

5.3 Installation Steps

1. Install the S/88 Token-Ring adapter in an empty IOA slot. Due to the hot-pluggability characteristic of the S/88, this step can be done without turning off the system.
2. Connect the S/88 Token-Ring adapter to a 8228 Multistation Access Unit.
3. Define the S/88 Token-Ring adapter to the S/88 Operating System.

For more detail on this particular step, refer to "System/88 Advanced Program to Program Communications" on page 373 in this document.

5.4 Where To Go For More Information

For more information related to the System/88 Token-Ring connection, refer to these publications:

- *Token-Ring DLC Interface Programmer's Guide - SC34-1060*
- *Site Planning Guide - SA34-0302*
- *Device Configuration Guide - SC34-0979*
- *IBM Token-Ring Network Introduction and Planning Guide - GA27-3677*
- *IBM Token-Ring Network Architecture Reference - SC30-3374.*

Chapter 6. Attaching The System/36 To A Token-Ring Network

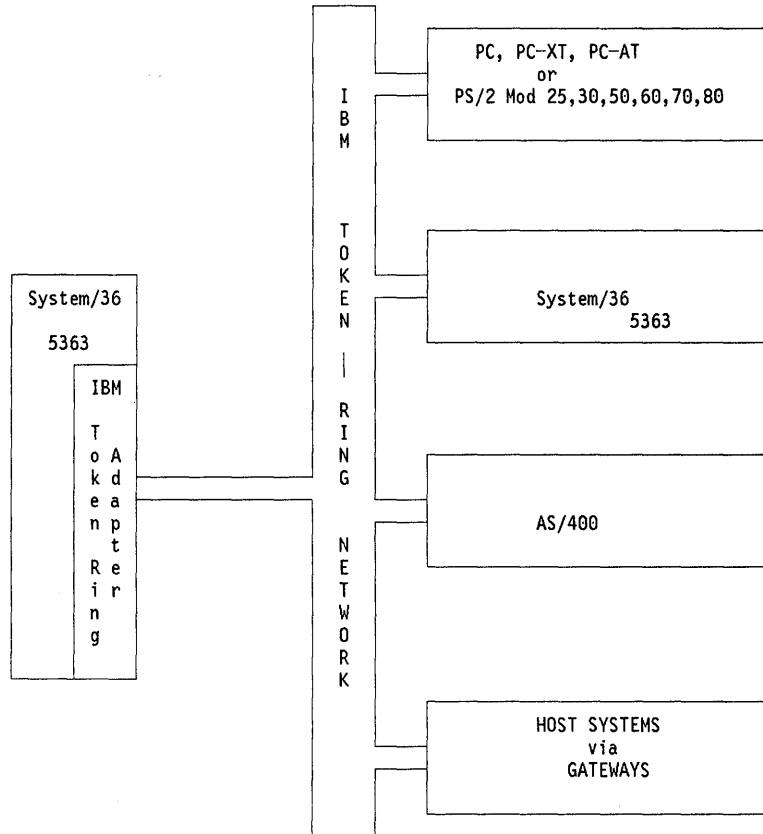


Figure 29. Attaching the System/36 to the IBM Token-Ring Network

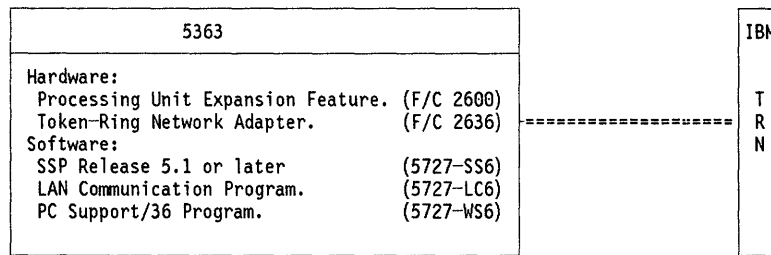


Figure 30. System/36 Attachment to the IBM Token-Ring Network

6.1 Overview

This chapter describes the physical attachment of System/36s to a Token-Ring Network.

The S/36 (5363) attaches directly to a Token-Ring Network. This physical attachment, combined with the use of specific programs, allows the System/36 to communicate with other equipment connected to the LAN and allows PCs in the network to use the facilities of the System/36 such as its DASD and printers.

6.2 Planning Checklist

6.2.1 Prerequisites - Hardware

- **SYSTEM/36 (5363)**
 - Processing Unit Expansion feature #2600
 - Token-Ring Network Adapter feature #2635
- A Multistation Access Unit (MAU)

6.2.2 Prerequisites - Software

- System/36 SSP Release 5.1 or higher (5727-SS6 on the 5363)
- System/36 LAN Communication Program (5727-LC6 on the 5363)
- PC Support/36 Program (5727-WS6 on the 5363)
 - PC Support/36 Organizer
 - PC Support/36 Shared Folders
 - PC support/36 Expansion Feature
 - PC Support/36 Workstation Feature
 - PC Support/36 IBM Token-Ring Network Support.
- DOS 3.2 or higher
- IBM LAN Support Program

6.2.3 Prerequisites - Other

5363 SYSTEM UNIT

- The 5363 attaches directly to the Token-Ring Network via the Token-Ring Network Adapter which is installed in the system unit. Up to a maximum of two of these adapters can be installed. These are attached either to the same Token-Ring Network in order to increase the number of PCs that can be supported on the ring, or to two different networks.

6.2.4 Coexistence and Compatibility

1. If the RTIC card (#6050) is installed on your system, you may:
 - Install one LAN and one X.25 line, or
 - Install one LAN line and one or two SDLC lines, or
 - Install two LAN lines and one SDLC line, (Only one LAN line can be active if SDLC is enabled.) or
 - Install one or two LAN lines only.

2. The Token-Ring Network Attachment cannot be used concurrently with BSC or Asynchronous Communications support.
3. If remote service to other System/36s is required, then APPN will be required in those S/36s that are intermediate nodes in the network. Other products such as DDM, DW/36 3270 Emulation, etc., may be installed depending on the user's requirements.

6.3 Installation Steps

In order to make your system operational, some tasks have to be completed. They are hardware-oriented as well as software-oriented installation tasks.

6.3.1 Hardware Installation

6.3.1.1 5363 System Unit

The 5363 System Unit attaches directly to the Token-Ring Network via the Token-Ring Network Adapter (feature #2635). A maximum of two network adapters can be installed. These may both be attached to the same or different networks. Prior to installing the feature, ensure that the switches on the adapter card(s) are set as in the table below:

- For the first adapter:

	1	2	3	4	5	6	7	8
ON		XXX	XXX			XXX	XXX	XXX
OFF	XXX			XXX	XXX			

Switch Block #1

	1	2	3	4	5	6	7	8
ON	XXX	XXX	XXX		XXX	XXX	XXX	XXX
OFF				XXX				

Switch Block #2

- And for the second adapter (optional):

	1	2	3	4	5	6	7	8
ON		XXX				XXX	XXX	XXX
OFF	XXX		XXX	XXX	XXX			

Switch Block #1

	1	2	3	4	5	6	7	8
ON	XXX	XXX	XXX		XXX	XXX	XXX	XXX
OFF				XXX				

Switch Block #2

Install the adapter card(s) and customize the system unit to recognize the new features. Follow the instructions in the *IBM System/36 5363 Installation Instructions for Feature Cards*. On completion of the customization, re-IPL the system and run the "Online Problem Determination" (OLPD) program to ensure that the installation was successful. Be sure to note the address of the adapter card(s) as this information will be required when setting up the PCs on the network.

- Attach one end of the adapter cable (supplied with the card) to the adapter and plug the other end into one of the sockets numbered 1 to 8 on an IBM 8228 Multistation Access Unit (MAU) connected in the network.

PC Attached to the Network

PCs are attached to the Token-Ring Network through the Token-Ring Network Adapter or Adapter II card. One adapter card has to be installed in each PC that attaches to the network. Optionally, a second adapter may be installed to provide an additional link to the same or to a different network. Detailed instructions on installing this adapter are given in the section on "PC Token-Ring Network Adapter Installation" on page 9. For additional information refer to the *Token-Ring Network PC Adapter Guide To Operations* manual.

PS/2 Attached to the Network

PS/2 Models 50, 55, 60, 70 and 80 are connected to the Token-Ring Network via the Token-Ring Network Adapter/A card. The adapter card comes with a 3.5" "OPTIONS" diskette which has the necessary options to install and configure the card. This installation is described in "PS/2 Token-Ring Adapter/A Installation" on page 17.

This completes the hardware installation.

6.3.2 Software Installation

There are certain software products that are essential for the System/36 to communicate across a Token-Ring Network. They are:

1. System/36 System Support Program (5727-SS1/SS6 Rel. 5.1)
 - Base Communications Support (Feature 6001)
 - Extended Communications Support
 - LAN Communication Support
2. PC Support/36 (5727-WS1/WS6 Rel. 5.1)
 - PC Support/36 Organizer
 - PC Support/36 Shared Folders
 - PC Support/36 Expansion Feature
 - PC Support/36 IBM Token-Ring Network Support
 - PC Support/36 Workstation Feature
 - PC Support/36 Pass Through.

In addition, there are some optional features which must be added if the System/36 is to communicate across the LAN with devices other than PCs and PS/2s. These are:

- APPC Communications Support (Feature 6096)
- Base ICF Support (Feature 6266)
- Upline ICF Support (43XX) (Feature 6264)
- Finance ICF Support (4700) (Feature 6265)
- BSC/SNA Device Emulation Support (Feature 6003)
- Display Station Pass Through (Feature 6079)
- 3278/9 Device emulation support via an IBM PC.

System Configuration

Use the system procedure CNFIGSSP to load the required software and features onto the system. Instructions on how to do this can be found in the manual *IBM System/36 Changing Your System Configuration* or by referring to the help facility on the System/36. Access to the system configuration help facility is gained by entering the command CNFIGSSP and selecting option 1 on the CNFIGSSP - Main Menu (Screen 1.0). On completion of this configuration, you must re-IPL the system.

After loading all the required software, it is now necessary to configure an ICF member or members which will provide the communication support to the other units on the LAN. To do this, enter the procedure CNFIGICF and follow the prompts. Again full help support is available on the System/36 and is invoked by pressing the Help key. The following example shows the steps you will go through to provide support for the LAN-attached PCs.

1. Sign on to the system console.
2. Enter CNFIGICF to invoke the ICF configuration procedure. An alternate way to do this is to select option 6 (Communicating with Another System or User) on the main HELP menu. The menu SYSCOMM will be displayed. Select option 2 (Define Communications) and menu DEFCOMM will be displayed. Select option 2 (Define SSP-ICF, MSRJE or 3270 Configuration) and screen 1.0 will be displayed.

```
1.0                                     W1
1. CONFIGURATION MEMBER NAME ..... PCSUP36
2. LIBRARY NAME ..... #LANCOMM
3. SELECT ONE OF THE FOLLOWING
  1.CREATE NEW MEMBER
  2.EDIT EXISTING MEMBER
  3.CREATE NEW MEMBER FROM EXISTING MEMBER
  4.REMOVE A MEMBER
  5.REVIEW A MEMBER
OPTION .....1-5      1
```

- CONFIGURATION MEMBER NAME. The name you give to the member you will be working with. Try to make it descriptive of the operation it will perform.
- LIBRARY NAME. The name of the library where the member is stored. A line member and associated subsystem member must also be stored in this library.

3. Press Enter. Screen 2 will be displayed.

```
2.0                                     W1
SELECT ONE OF THE FOLLOWING
  1. INTRA
  2. BSC
  3. SNA
  4. ASYNC
  5. PC SUPPORT/36

OPTION..... 5
```

- Select option 5.

4. Press Enter. A third screen will be presented.

```
19.0                                     W1
1. MAXIMUM NUMBER OF PCs .....1-50     15
2. SOURCE SERVICE ACCESS POINT (SSAP) VALUE ... 0C
```

NOTES:

- The SSAP default value for PC SUPPORT/36 is X'0C'. It is recommended that this value be used. Selecting some other value will require changes in the CONFIG.S36 file of all the PCs connected to the LAN and using PC SUPPORT/36.
- Remember that each Token-Ring Adapter can service only a limited number of workstations (15 for the 5363). The amount you indicate here informs the System/36 how many of these workstations can be PCs.
- To activate communication on the LAN, enter:
 - ENABLE (member name),(library name),n
 - Member name in this example is PCSUP36 and library name is #LANCOMM.
 - "n" = Line number. For the Token-Ring Network Attachment feature this is "9" for the Primary Adapter and "10" for the Alternate Adapter.

This completes the installation of the System/36 on the LAN.

6.4 Basic Troubleshooting

Any malfunction detected in the System/36 after connection to the Token-Ring Network can be localized by doing the following.

- Note the problem indication.
- Disconnect the cable from the MAU.
- Power off the System/36 and the PC-AT controller.
- Carefully retrace the steps for hardware installation, or if possible have someone do this with you. Correct any errors found.
- Run the OLPD and PC diagnostics to determine the problem.

- If the problem is still not resolved, report the specific problem indication to the IBM service representative.

6.5 Where to Go for More Information

Added information can be obtained from the following sources:

- **INSTALLATION**
 - SA21-9430 Setting Up Your Computer*
 - SC21-9052 System/36 Changing Your System Configuration*
 - GG24-3207 System/36 Token-Ring Attachment*
 - SA21-9911 System/36 LAN Attachment.*
- **OPERATION**
 - SC21-9088 System/36 PC Support User's Guide*
 - SC21-9082 Using System/36 Communications*
 - SC21-7911 System/36 ICF User's Guide.*
- **DIAGNOSTICS/SERVICE**
 - SY31-9050 System/36 LAN Attachment Maintenance.*

Chapter 7. Attaching The AS/400 To A Token-Ring Network

7.1 Overview

In this chapter we will describe the physical attachment of the AS/400 to the IBM Token-Ring Network.

The AS/400 attaches directly to a 4Mbps Token-Ring Network via an integrated IBM Token-Ring Network Adapter and attachment cable which plugs into one of the Multistation Access Units (MAU) in the LAN. This will allow the AS/400 to participate in communications over the IBM Token-Ring Network with other AS/400s, System/36s or hosts via gateways using System Network Architecture (SNA). You may install up to two IBM Token-Ring Network Adapters in the AS/400, each supporting a maximum of 256 active connections to workstations on the ring. These workstations must be described by controller description definitions to the AS/400.

All the necessary software for controlling the functions of the adapter are included in the System Support Program of the AS/400.

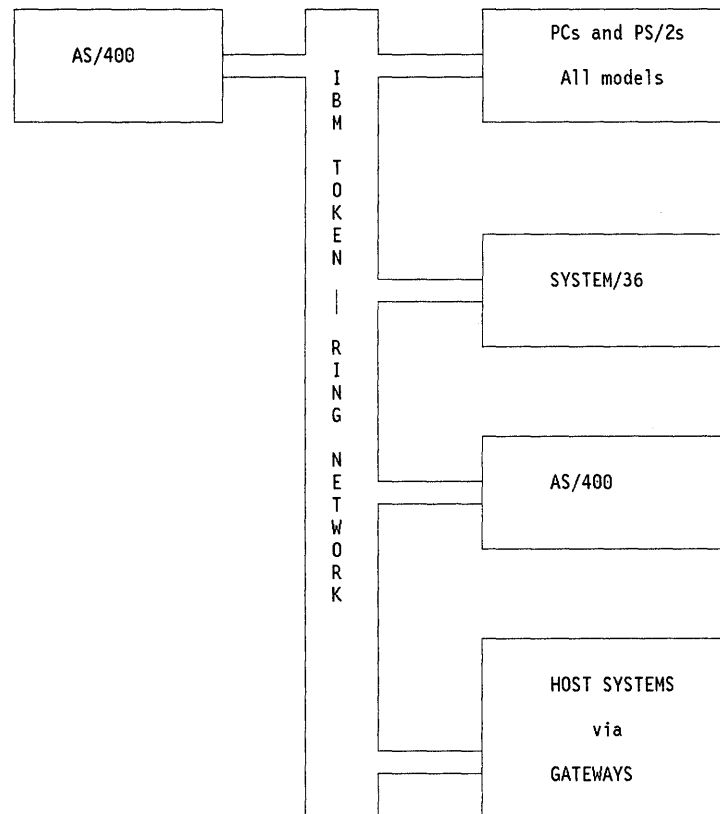


Figure 31. Attaching the AS/400 on the IBM Token-Ring Network

7.2 Planning Checklist

7.2.1 Prerequisites - Hardware

- Any model AS/400.
- Multiline Communications Controller (Feature #6130)
- IBM Token-Ring Network Adapter (Feature #6034)

Note: Up to two Token-Ring Network Adapters may be installed in each system unit.

7.3 Installation Steps

In order to make your system operational, some tasks have to be completed. They are hardware-oriented as well as software-oriented installation tasks.

7.3.1 Hardware Installation

The AS/400 attaches directly to a 4 Mbps IBM Token-Ring Network through its Token-Ring Network Adapter, feature #6034. A maximum of two Token-Ring Adapters can be installed. Your computer will be delivered from the factory with this feature already installed if it was included in your original order. This feature is not customer installable; therefore you must contact your customer service representative to install it for you.

7.4 Basic Troubleshooting

Your CE or CSR will determine and fix any hardware problems that may occur during installation. Follow the problem determination procedure in the *AS/400 Licensed Programs Installation Guide* to resolve any software problems that may be encountered.

7.5 Where to Go For More Information

Additional information pertaining to the installation of Token-Ring Network support and AS/400 PC Support on an IBM Token-Ring Network can be found in the following publications:

- SC21-9765 *AS/400 Licensed Programs Installation Guide*
- SC21-8089 *AS/400 PC Support Installation Guide*.

Chapter 8. 3174 Establishment Controller

8.1 General Overview

The IBM 3174 Establishment Controller support for Token-Ring Networks can be divided into three categories:

1. Local Gateway

An SNA channel-attached 3174-1L/11L with the IBM Token-Ring Network 3270 Gateway feature can act as a gateway from a Token-Ring Network to a VTAM host, supporting various stations on the ring as Down Stream Physical Units (DSPUs).

2. Remote Gateway

A 3174-1R/11R, 51R/61R, 2R/12R or 52R/62R with the IBM Token-Ring Network 3270 Gateway feature can act as a Token-Ring Network gateway, supporting various stations on the ring as DSPUs.

3. Downstream Physical Unit (DSPU)

A 3174-3R/13R or 53R/63R can attach directly to the Token-Ring Network and communicate to a VTAM host through either an NCP gateway or 3174 gateway.

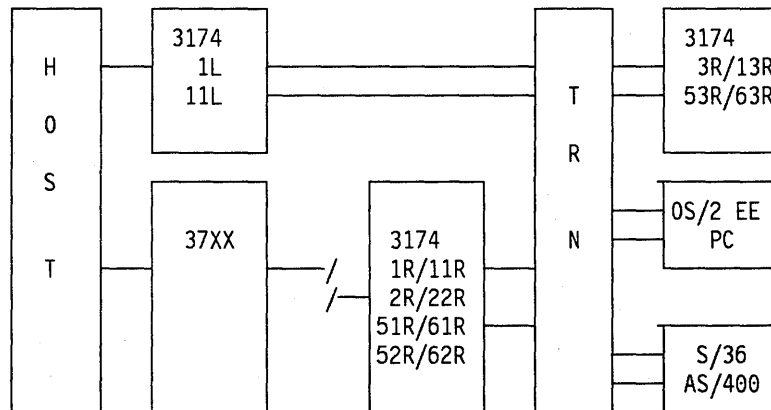


Figure 32. 3174 and The Token-Ring Network. The 3174 Remote and Local Gateway support communication from Token-Ring Network stations (3174, PC, PS/2, S/36 and AS/400) to the Host.

The installation procedures for the 3174 will be covered in three sections, one for each category.

Chapter 9. 3174 Local Gateway

This section describes the installation of a 3174 1L or 11L as a local gateway in a Token-Ring Network environment. The Model 1L is referred to as an old model and model 11L as a new model.

9.1 Overview

The IBM 3174 Establishment Controller Models 1L or 11L with the IBM Token-Ring Network 3270 Gateway feature (#3025, #3026 or #3044) installed, provides a gateway to an SNA host for workstations and cluster control units (SNA PU T2) attached to a Token-Ring Network. The control unit supports Control Unit Terminals (CUT) as well as Distributed Function Terminals (DFT) that are attached directly to it.

The 3174 1L Local Gateway supports a maximum of 140 Downstream PUs (DSPUs). The 3174 11L supports a maximum of 250 devices with configuration support B, but the possible number of active DSPUs depends on storage available in the gateway and on the response time objectives. The only type of DSPU supported is SNA PU T2.0. Any combination of the following Token-Ring Network attached devices is supported by the gateway:

- IBM 3174-3R/13R and 53R/63R
- IBM PC or PS/2 using 3270 Emulation Program Version 3
- IBM PC or PS/2 using APPC/PC (in PU T2.0 emulation mode)
- IBM AS/400 via an integrated Token-Ring Adapter
- IBM System/36 with the LAN attachment feature, and using 3270 emulation or APPC (as a PU T2.0 node)
- IBM PS/2 using IBM Operating System/2 Extended Edition Version 1.1 or Version 1.2
- IBM PC or PS/2 or 3270 PC using 3270 Workstation Program Version 1.1
- IBM PC or PS/2 using Personal Communications Program Version 1.0.

The terminals attached directly to the 3174 are not affected by the gateway feature. For performance reasons it is recommended that you attach only DFT devices to the coax ports on the gateway 3174.

The Token-Ring Network 3270 Gateway feature operates only on a 3174 working in SNA mode. The 3174 gateway is defined to VTAM and the host operating system as an SNA channel-attached control unit. Each Token-Ring-attached node (for example, a 3174 Model 3R or 13R) is also defined as an SNA channel-attached control unit. The gateway and the DSPUs should be defined in a contiguous address range to the host operating system.

9.2 Planning Checklist

- Order the hardware
 - Feature #3026 or #3044 for Models 1L and 11L. Feature #3044 requires either configuration support B or S.
 - Additional memory, based on the number of DSPUs that will be attached. Feature #1011 (512 Kb), #1012 (1 Mb) or #1014 (2 Mb) for Model 01L can be used up to a maximum of 4 Mb. For Model 11L with a base memory of 2 Mb, feature #1012 (1 Mb) and #1014 (2 Mb) can be used up to a maximum of 6 Mb.
If feature #1011 is used on Model 01L configuration support S is required.⁷
- Decide how many device addresses (in the operating system) you want to reserve for future use by the Token-Ring Network devices. Each station on the ring that is a PU must have its own device address.
- Prepare Host Environment
 - The 3174-1L/11L gateway has a special addressing requirement. The address defined in the host operating system for the 3174-1L/11L gateway should end with "0." That means that the address defined in IOCP, VM, MVS or VSE should have the format XX0.
 - IOCP or UCW definitions.
 - VM, MVS or VSE operating system definitions.
 - Check with your support organization if VTAM fixes are needed to support the gateway.
 - If the REM function of the 3174 gateway is desired, you need VTAM V3 rel 1.2 or later for NetView support.
- Install and customize the 3174 hardware and the configuration support
 - Configuration support S will work but level B together with #3044 will give better performance

The most important parameters in the definitions for a local gateway and how they must match between VTAM, operating system and 3174 customization questions are shown in "Key Parameters for a 3174-Local Gateway Supporting a 3174 DSPU" on page 580.

9.2.1 Prerequisites - Hardware

At least one Storage Expansion feature (#1011, #1012 or #1014) is required for the old models. The amount of storage required is determined by the number of DSPUs defined in the 3174 customization. These tables show the storage requirements:

⁷ Feature #1011 and configuration support B are mutually exclusive

Configuration Support S		Configuration Support B	
up to 28 DSPUs	0.5 Mb	up to 72 DSPUs	0.5 Mb
up to 72 DSPUs	1.0 Mb	up to 140 DSPUs	1.0 Mb
up to 116 DSPUs	1.5 Mb	up to 250 DSPUs	1.5 Mb
up to 140 DSPUs	2.0 Mb		

Figure 33. 3174 Gateway Storage Requirements

The storage expansion for the old models could be a combination of 0.5 Mb cards (#1011), 1.0 Mb cards (#1012) and 2.0 Mb (#1014) cards. For the new model 3174-11L feature #1011 is no longer available but feature #1012 (1 Mb) or #1014 (2 Mb) should be ordered instead. Also remember that the model 3174-11L comes standard with 2 Mb.

9.2.2 Prerequisites - Software

The 3174 gateway is supported by VTAM V2 Rel 1 and later.

9.3 Installation Steps

To get the 3174 gateway working and connected to the ring, you have to do the following steps:

1. Install the hardware.

The hardware you need is the following:

- Feature code #3025 (no longer available) for the old models and #3026 or #3044 for all the models
- Additional memory (#1011, #1012 or #1014) based on number of DSPUs
- Standard IBM Cabling System cable to connect the 3174 to the Multi-station Access Unit (MAU) or special wiring filters if you are using telephone twisted-pair (IBM type 3) wiring.

The feature #3025 consists of the following:

- A 4 Mbps Token-Ring Network Adapter
- Level S configuration support (utility and control diskettes)
- Eight-foot cable to attach the Token-Ring Network Adapter to the MAU
- Setup instructions.

The feature #3026 consists of the following:

- A 16/4 Mbps Token-Ring Network Adapter
- Level S configuration support (utility and control diskettes)
- Eight-foot cable to attach the Token-Ring Network Adapter to the MAU
- Setup instructions.

The feature #3044 consists of the following:

- A 16/4 Mbps Token-Ring Network Adapter
- B or S configuration support.⁸ Configuration B requires additional #5010 or #5060. See description below.

⁸ Specify configuration support S or B.

- Eight-foot cable to attach the Token-Ring Network Adapter to the MAU
- Setup instructions.

When you install the hardware, carefully follow the setup instructions that come with features #3026 and #3044.

Configuration support B is an optional feature and has different numbers for the different models:

- #5010 for Models 01L, 01R, 02R, 03R, 11L, 12R, 13R
- #5060 for Models 51R, 53R, 61R, 62R, 63R
- The Gateway feature #3026 and #3044 can not be installed on Models 53R, 81R/91R, or 82R/92R.

Installing the Token-Ring Network Adapter in the wrong slot of the 3174 can cause severe problems.

2. Customize the 3174

If you are currently using level A configuration support, you should be aware that the level S configuration support does not allow you to copy the existing A-level customizing files for modification.

Following is a description of only the customizing questions that are involved when adding the gateway feature to a 3174:

- Host attachment menu
 - Question 100: 3174 Model Designation
Respond with the actual model number (1L for example).
 - Question 101: Host Attachment
Respond with 5 for Local-SNA
- Local (SNA) menu
 - Question 104: Control Unit Address
Respond with the two-digit control unit address of the gateway. This is the real address defined in the host operating system. For example, if the 3174 is defined to the operating system with the address 240, the answer to Q 104 should be 40; the channel part of the address is not specified.
 - Question 105: Upper Limit Address
Respond with highest address of the gateway-supported DSPUs. For example, if you are using five Token-Ring PUs off the 3174 and want the channel and control unit address to begin at 240 then your address range will be 240 to 245. The lowest address of 240 will be used for the 3174-01L/11L's address. The addresses 241 to 245 will be used by the gateway-supported DSPUs. For the example above, the answer to this question would be 45. The address range for gateway and gateway-supported DSPUs must be contiguous.
 - Question 223: Attention Delay Value
Not used with Token-Ring Gateway feature. Response entered will have no effect.
- Token-Ring Network Gateway Menu

- Question 900: Token-Ring Network Address for the gateway

Token-Ring Address for the 3174 Gateway feature. Must be a locally administered address. The address must be unique in the Token-Ring Network. It is recommended that you create an appropriate adapter-naming convention for your installation. One example of a naming convention assigns the adapter addresses accordingly to the following format:

4000 a bb cc ddd

where 4000 is fixed,

a is a station type:

1 = 37xx gateway addr

2 = 3174 local gateway

3 = etc

bb Subarea number of NCP or VTAM

cc Ring number

ddd Serial number.

- Question 905: Ring Error Monitor (REM)

REM is a function in the Token-Ring Network that allows a station with this function enabled to receive "Soft Error Report" MAC frames. If you want this function enabled in the 3174 and the information forwarded to the host (NetView), reply with a 1. If you don't want this function enabled, respond with a 0. For a description of the REM function see "Ring Error Monitor Function" on page 467.

- Question 908: Link Subsystem Name

Respond with six alphanumeric characters. When an alert is sent to NetView, these characters identify the 3174 subsystem to the NetView Operator.

- Ring-Related Questions

- Question 911: Ring Speed of the Gateway (Configuration Support B only)

0 = 4 Mbps with normal token release

1 = 16 Mbps with normal token release

2 = 16 Mbps with early token release

- Question 940: Ring Address Assignment Menu

This question consists of a menu looking like this:

940: Ring Address Assignment									
S@	Ring@	SAP@	T	S@	Ring@	SAP@	T		
40	4000 2330 1001	04							
41	4000 4330 1002	04	1	42	4000 4330 1003	04	1		
43	4000 3330 1004	04	0	44	4000 5330 1005	04	1		
45	4000 5330 1006	04	1						

PF3=QUIT 4=DEFAULT 7=BACK 8=FWD 9=RTNH

Figure 34. Ring Address Assignment Menu

This panel allows you to map the subchannel addresses (which you have defined in Q104 and Q105) to Token-Ring Network addresses of the devices that the gateway supports. The columns in the panel are:

- S@** The range of subchannel addresses previously defined in Q104 and Q105 are automatically provided in this column.
- Ring@** In this column you must enter the 12-digit Token-Ring Network address of each device that the gateway will support (the first row is the gateway itself). For example, if you have a PC on the ring with the locally administered address 4000 3330 1004, you should enter this address here, or if you have 3174-3R on the ring, you should enter here the address you defined in question 106 at the 3R.
- SAP@** This column defines the Service Access Point (SAP) of the Token-Ring Network devices. In an SNA environment this SAP is normally hex '04'. One important exception is 3270 Workstation Program 1.1, which uses hex '08' for SNA 3270 emulation. The SAP value must be a multiple of 4 in the range of x'04' to x'EC'.
- T** This column identifies the type of the PU communicating through the gateway. The response should be 0 for a PC with IBM PC 3270 Emulation Program Version 3, and 1 for 3174, S/36, AS/400 or a PC running Workstation Program V1.1. The value entered in this column decides which values should be displayed as defaults in the next panel, question 941.

— Question 941: Ring Transmission Definition

This panel is mostly a redisplay of panel 940 and looks like this:

941: Ring Transmission Definition									
S@	Ring@	SAP@	F	W	S@	Ring@	SAP@	F	W
40	4000 2330 1001	04							
41	4000 4330 1002	04	3	2	42	4000 4330 1003	04	3	2
43	4000 3330 1004	04	3	2	44	4000 5330 1005	04	3	2
45	4000 5330 1006	04	3	2					

PF3=QUIT 4=DEFAULT 7=BACK 8=FWD 9=RTNH

Figure 35. Ring Transmission Definition

The only columns you can change are the F and W columns. The value of W is always defaulted to 2 (for performance reasons it is recommended that you use this value). The default for F is based on your entries in the proceeding panel. There is no need to change this.

3. Prepare Host Operating System.

For VM

The 3174 gateway and its DSPUs must be defined in RDEVICE macros.

A separate RDEVICE macro must be created for each address. The (CUU,NN) form of the macro will produce incorrect EP line addresses.

The gateway must also be defined in a RCTLUNIT and a RCHANNEL macro.

The FEATURE= value (on the RCTLUNIT macro) must cover the complete address range of the gateway and its supported devices. The value must be a multiple of 16. For example, if a 3174 supports 140 DSPUs you should code FEATURE=144-DEVICE.

For a VM system, the 3174 gateway and its DSPUs in our example would be defined like this:

```

RDEVICE ADDRESS=240,DEVTYPE=3705,ADAPTER=TYPE4,MODEL=E8, (GATEWAY) *
CPTYPE=NCP
RDEVICE ADDRESS=241,DEVTYPE=3705,ADAPTER=TYPE4,MODEL=E8, (DSPU) *
CPTYPE=NCP
RDEVICE ADDRESS=242,DEVTYPE=3705,ADAPTER=TYPE4,MODEL=E8, (DSPU) *
CPTYPE=NCP
:
RDEVICE ADDRESS=245,DEVTYPE=3705,ADAPTER=TYPE4,MODEL=E8, (DSPU) *
CPTYPE=NCP

RCTLUNIT ADDRESS=240,CUTYPE=3705,FEATURE=16-DEVICE (GATEWAY)
RCHANNEL ADDRESS=2,CHTYPE=BLKMPXR (GATEWAY)

```

Figure 36. VM Host Operating System Definitions

For MVS:

Each 3174 gateway and its DSPUs should be defined in a single IODEVICE macro. The 3174 gateway in our example could be defined like this:

```
IODEVICE ADDRESS(240,6),UNIT=3791L
```

Figure 37. MVS Host Operating System Definitions

For VSE (VSE/SP 2.1):

You must manually include ADD statements, one for the gateway and one each for the DSPUs like this:

```
ADD 240,3791,EML (this is the gateway)      *
ADD 241,3791,EML                            *
ADD 242,3791,EML                            *
ADD 243,3791,EML                            *
ADD 244,3791,EML                            *
ADD 245,3791,EML                            *
```

Figure 38. VSE Host Operating System Definitions

Host I/O Configuration Definitions:

Unit Control Words (UCWs) for the channel to which the 3174 gateway is attached should be set up according to this table (3174 without gateway is included for comparison):

Channel Type	3174 SNA without GW	3174 with Gateway Feature along with the addresses supported on the GW.
370 byte	Nonshared	Shared
370 block	Nonshared	Shared
370 XA byte	Nonshared	Nonshared (Byte restriction)
370 XA block	Nonshared	Shared or Nonshared

Figure 39. S/370 and 4300 Channel UCW Definitions

In IOCP the shared parameter specifies the shared status.

In S/370 mode, specify:

SHARED=Y

In S/370 XA BYTE mode, specify:

SHARED=N

In S/370 XA BLOCK mode, specify:

SHARED=YB or

SHARED=N

Each 3174 gateway and its associated address range (for DSPUs) must be specified in IOCP in a single CNTLUNIT statement. Use of multiple CNTLUNIT statements may cause errors and performance degradation.

This is an example of IOCP statements for a 3174 gateway on a S/370 block mode channel:

```
CNTLUNIT CUNUMBR=240,UNITADD=((40,6)),UNIT=3791L,SHARED=Y,  
        PROTOCL=D  
IODEVICE ADDRESS=(240,6),UNIT=3791L,STADET=N,CUNUMBR=240
```

Figure 40. IOCP Definitions for 3174 Gateway

VTAM specifications and considerations concerning the 3174-1L/11L Gateway is described in "3174 Local Gateway and Downstream PUs" on page 381.

9.4 Where To Go For More Information

For more information about the 3174-1L and the gateway feature refer to these publications:

- *GA23-0214 IBM 3174 Subsystem Control Unit Customizing Guide*
- *GA23-0218 IBM 3174 Subsystem Control Unit Functional Description*
- *GG24-3061 IBM 3174 Subsystem Control Unit Installation Guide*
- *GA23-0329 IBM 3174 Subsystem Control Unit Token-Ring Network 3270 Gateway Customer Setup Instructions.*
- *GA27-3862 3174 Establishment Controller Planning Guide*
- *GG24-3061 3174 Establishment Control Unit Installation Guide .*

Chapter 10. 3174 Remote Gateway

This section describes the installation of a 3174-1R/11R, 2R/12R, 51R/61R and 52R/62R as a gateway in a Token-Ring Network environment.

The Models 1R, 2R, 51R and 52R are referred to as old models; the Models 11R, 12R, 61R and 62R as new models.

10.1 Overview

The IBM 3174 Establishment Controller Models 1R/11R, 2R/12R, 51R/61R and 52R/62R with the IBM Token-Ring Network 3270 Gateway feature (#3026 or #3044) installed, provides a gateway to a SNA host for workstations and cluster control units (SNA PU T2) attached to a Token-Ring Network. The controller also supports Control Unit Terminals (CUT) or Distributed Function Terminals (DFT) that are attached directly to it.

The 3174 Remote Gateway supports a maximum of 140 Downstream Physical Units (DSPUs). The new models supports a maximum of 250 devices with configuration support B, but the possible number of active DSPUs depends on storage available in the gateway and on the response time objectives. The only type of DSPU supported is SNA PU T2.0.

Any combination of the following Token-Ring Network attached devices is supported by the gateway:

- IBM 3174-3R/13R and 53R/63R
- IBM PC or PS/2 using PC 3270 Emulation Program Version 3
- IBM PC or PS/2 using APPC/PC (in PU T2.0 emulation mode)
- IBM AS/400 via an integrated Token-Ring adapter
- IBM System/36 with the LAN attachment feature, and using 3270 emulation or APPC (as a PU T2.0 node)
- IBM PS/2 using IBM Operating System/2 Extended Edition Version 1.1 or Version 1.2
- IBM PC or PS/2 or 3270 PC using 3270 Workstation Program Version 1.1
- IBM PC or PS/2 using Personal Communications/3270 Version 1.0.

The terminals attached directly to the 3174 are not affected by the gateway feature. For performance reasons it is recommended that you attach DFT devices only to the coax ports on the 3174 gateway.

The 3174 gateway is connected to the host via a leased SDLC line. Switched SDLC is **not** supported.

Each DSPU attached to the Token-Ring (for example, a 3174 model 3R) is defined to VTAM and NCP as a PU on a multipoint SDLC link, which can cause a lot of overhead due to unproductive polls.

When using configuration support level B, **Remote Gateway Group Poll** support is included. The remote Token-Ring gateway can be polled with a single poll command on behalf of all its DSPUs. Whenever input is pending from a Token-Ring-attached device the gateway will respond positively to that poll. In this way long polling lists are avoided within the NCP and the number of unproductive polls is reduced drastically on the line. This in turn will shorten the

response times for the DSPUs or will allow more DSPUs to be attached to the remote ring. Up to 16 3174 Remote Gateways can be attached to one line, communicating in half-duplex flip/flop mode on half or full-duplex communication facilities. To support group polling "Small Program Enhancements" (SPE) must be applied to NCP as well as to SSP. They are available in the form of a PTF for NCP V4-R3.1, NCP V5-R2.1 and SSP V3-R4.1.

10.2 Planning checklist

- Order the Hardware
 - Feature #3026 or #3044 for all the models. Feature #3044 requires either configuration support B or S.
 - Additional memory, based on the number of DSPUs that will be attached. Feature #1011 (512 Kb), #1012 (1 Mb) and #1014 (2 Mb) for the old models can be used up to a maximum of 4 Mb. For the new models with a base memory of 2 Mb feature #1012 (1 Mb) and #1014 (2 Mb) can be used up to a maximum of 6 Mb. If feature #1011 is used on the old models, configuration support S is required.⁹
- Prepare Host Environment
 - Update NCP definitions
 - Check with your support organization if VTAM fixes are needed to support the gateway
 - If the REM function of the 3174 Gateway is desired, you need VTAM 3.1.2 or later for NetView support.
- Install and customize the 3174 hardware and the configuration support
 - Configuration support S will work but level B together with #3044 will give better performance.

The most important parameters in the definitions for a remote gateway and how they must match between NCP and 3174 customization questions are shown in "Key Parameters for a 3174-Remote Gateway Supporting a 3174 DSPU" on page 582.

10.2.1 Prerequisites - Hardware

These tables show the storage requirements for the Remote Gateway.

⁹ Feature #1011 and configuration support B are mutually exclusive

Configuration Support S

up to 72 DSPU	0.5 Mb
up to 140 DSPU	1.0 Mb

Configuration Support B

up to 28 DSPUs	0.5 Mb
up to 72 DSPUs	1.0 Mb
up to 116 DSPUs	1.5 Mb
up to 140 DSPUs	2.0 Mb
up to 200 DSPUs	2.5 Mb
up to 250 DSPUs	3.0 Mb

Figure 41. 3174 Remote Gateway Storage Requirements

The storage expansion for the old models could be a combination of 0.5 Mb cards (#1011).

For the new models feature #1011 is no longer available but feature #1012 (1 Mb) or #1014 (2 Mb) should be ordered instead. Also remember that the new models 3174 come standard with 2 Mb.

10.3 Installation Steps

To get the 3174 gateway working and connected to the ring, you have to do the following steps:

1. Install the Hardware

- Feature code #3025 (no longer available) for the old models and #3026 or #3044 for all the models
- Additional memory (#1011, #1012 or #1014) based on number of DSPUs
- Standard IBM Cabling System cable to connect the 3174 to the Multi-station Access Unit (MAU) or special wiring filters if you are using telephone twisted-pair (IBM Cabling System type 3) wiring.

The feature #3025 consists of the following:

- A 4 Mbps Token-Ring Network Adapter
- Level S configuration Support (utility and control diskettes)
- Eight-foot cable to attach Token-Ring Network Adapter to the MAU
- Setup instructions

The feature #3026 consists of the following:

- A 16/4 Mbps Token-Ring Network Adapter
- Level S configuration support (utility and control diskettes)
- Eight-foot cable to attach Token-Ring Network Adapter to the MAU
- Setup instructions

The feature #3044 consists of the following:

- A 16/4 Mbps Token-Ring Network Adapter
- B or S configuration support.¹⁰ Configuration B requires in addition, #5010 or #5060 (see description below).
- Eight-foot cable to attach Token-Ring Network Adapter to the MAU
- Setup instructions.

¹⁰ Specify configuration support S or B.

When you install the hardware, carefully follow the setup instructions that come with features #3026 and #3044.

Configuration support B is an optional feature and has different numbers for the different models:

- #5010 for Models 01L, 01R, 02R, 03R, 11L, 12R, 13R
- #5060 for Models 51R, 53R, 61R, 62R, 63R
- Gateway features #3026 and #3044 can not be installed on Models 53R, 81R/91R, or 82R/92R.

Installing the Token-Ring Network Adapter in the wrong slot of the 3174 can cause severe problems.

2. Customize the 3174

If you are currently using level A configuration support you should be aware that configuration support S does not allow you to copy the existing A-level customizing files for modification.

Following is a description of only the customizing questions that are involved when adding the gateway feature to a 3174:

- Host attachment menu
 - Question 100: 3174 Model Designation
Respond with the actual model number (1R for example).
 - Question 101: Host Attachment
Respond with 2 for SDLC Remote Gateway
- SDLC menu
 - Question 104: Control Unit Address
Respond with the SDLC address (ADDR= parameter in NCP definition) that is assigned in NCP for the 3174 gateway.
 - Question 105: Upper Limit Address
Respond with highest address for the SDLC stations defined in NCP. For example, if you responded C1 in question 104 and want the gateway to support five DSPUs, you should respond C6 to this question.
- Token-Ring Gateway Menu
 - Question 150: Token-Ring Network Controller gateway. Specify 0 if this controller is not a gateway; specify 1 if this controller is the gateway.
 - Question 900: Token-Ring Network Address for the gateway
Token-Ring Address for the 3174 Gateway feature. Must be a locally administered address. The address must be unique in the Token-Ring Network. It is recommended that you create an appropriate adapter-naming convention for your installation. One example of a naming convention assigns the adapter addresses accordingly to the following format:

4000 a bb cc ddd

where 4000 is fixed,

a is a station type:

1 = 37xx gateway addr

2 = 3174 local gateway

3 = etc

bb Subarea number of NCP or VTAM

cc Ring number

ddd Serial number.

– Question 905: Ring Error Monitor (REM)

REM is a function in the Token-Ring Network that allows a station with this function enabled to receive “Soft Error Report” MAC frames. If you want this function enabled in the 3174 and the information forwarded to the host (NetView), reply with a 1. If you don’t want this function enabled, respond with a 0. For a description of the REM function see “Ring Error Monitor Function” on page 467.

– Question 908: Link Subsystem Name

Respond with six alphanumeric characters. When an alert is sent to NetView, these characters identify the 3174 subsystem to the NetView Operator.

• Ring-Related Questions

– Question 911: Ring Speed of the Gateway (Configuration Support B only)

0 = 4 Mbps with normal token release

1 = 16 Mbps with normal token release

2 = 16 Mbps with early token release.

– Question 912: Group Poll Address

Specify a two-character hexadecimal group poll address that is less than or greater than the range specified for questions 104 and 105, but not equal to x’FF’.

The default is 00 (no group polling).

– Question 940: Ring Address Assignment Menu

This question consists of a menu looking like this:

_____ 940: Ring Address Assignment _____									
S@	Ring@	SAP@	T	S@	Ring@	SAP@	T		
C1	4000 2330 1001	04		C2	4000 4330 1003	04	1		
C3	4000 4330 1002	04	1	C4	4000 5330 1005	04	1		
C5	4000 3330 1004	04	0	C6	4000 5330 1006	04	1		

PF3=QUIT 4=DEFAULT 7=BACK 8=FWD 9=RTNH

Figure 42. Ring Address Assignment Menu

This panel allows you to map the NCP-defined SDLC addresses of Token-Ring attached devices (which you have defined in Q104 and Q105) to the Token-Ring Network addresses of the devices that the gateway supports. The columns in the panel are:

S@ The range of SDLC addresses previously defined in Q104 and Q105 are automatically provided in this column.

Ring@ In this column you must enter the 12-digit Token-Ring address of the devices that the gateway will support (the first row is the gateway itself). For example, if you have a PC on the ring with the locally administered address 4000 3330 1004, you should enter this address here, or if you have a 3174-3R on the ring, you should enter the address you defined in Question 106 (Token-Ring Network Address of 3174) at the 3R here.

SAP@ This column defines the Service Access Point (SAP) of the Token-Ring Network devices. In an SNA environment this SAP is normally X'04'. One important exception is 3270 Workstation Program 1.1, which uses X'08' for SNA 3270 emulation. The entered SAP value must be a multiple of four in the range X'04' to X'EC'.

T This column identifies the type of the PU communicating through the gateway. The response should be 0 for a PC with Emulation Program Version 3 or Workstation Program V1.1, and 1 for 3174 or S/36. The value entered in this column decides which values should be displayed as defaults in the next panel, question 941.

— Question 941: Ring Transmission Definition

This panel is mostly a redisplay of panel 940 and looks like this:

941: Ring Transmission Definition													
S@	Ring@			SAP@	F	W	S@	Ring@			SAP@	F	W
C1	4000	2330	1001	04			C2	4000	4330	1003	04	3	2
C3	4000	4330	1002	04	3	2	C4	4000	5330	1005	04	3	2
C5	4000	3330	1004	04	3	2	C6	4000	5330	1006	04	3	2

PF3=QUIT 4=DEFAULT 7=BACK 8=FWD 9=RTNH

Figure 43. Ring Transmission Definition

The only columns you can change are the F and W columns. The value of W is always defaulted to 2 (for performance reasons it is recommended that you use this value). The default for F is based on your entries in the preceding panel. There is no need to change this.

- Define and generate new NCP

For information on VTAM/NCP definitions for the 3174 Remote Gateway, see "3174 Remote Gateway and Downstream PUs" on page 382.

10.4 Where To Go For More Information

For more information about the remote 3174 and the gateway feature refer to these publications:

- *GA23-0214 IBM 3174 Subsystem Control Unit Customizing Guide*
- *GA23-0218 IBM 3174 Subsystem Control Unit Functional Description*
- *GG24-3061 IBM 3174 Subsystem Control Unit Installation Guide*
- *GA23-0329 IBM 3174 Subsystem Control Unit Token-Ring Network 3270 Gateway Customer Setup Instructions*
- *GG24-1557 Advanced Communications Function Products Installation Guide*
- *GA27-3862 3174 Establishment Controller Planning Guide*
- *GG24-3061 3174 Establishment Control Unit Installation Guide* .

Chapter 11. 3174 Downstream

This section describes the installation of a 3174-3R/13R and 53R/63R as a PU in a Token-Ring Network, using a 3174 or 37XX gateway to an SNA host.

When # 3044 is installed in 3174 Models 1R, 2R, 51R, and 52R these 3174s can be attached to the Token-Ring Network and communicate as if they were 3174 Models 3R or 53R. The user would have two diskettes: one configured to communicate as a 3174 model 1R, 2R, 51R or 52R and the other configured as a 3R or 53R control diskette.

11.1 Overview

The IBM 3174 Establishment Controller Models 3R/13R and 53R/63R can attach directly to a Token-Ring Network and communicate to the host through either a 3174 gateway or a 37XX (3720, 3725, 3745) gateway.

The 3174 Downstream Physical Units (DSPUs) appear to the host access methods and application subsystems as currently supported PU T2.

Depending on the 3174 model, one or two Concurrent Communication Adapters can be installed. In addition to the primary host link adapter, which is inherent to the model, a second or third adapter with the same or different host link protocols as the primary adapter (SNA/non-SNA, channel-attached, BSC, SDLC or Token-Ring) can be installed. Each CCA provides an additional 3174 controller appearance in a single 3174. This is accomplished by having a separate micro-processor, control storage and a TP interface in the adapter.

Single link multi-host support is a microcode function for controllers attached to the IBM Token-Ring Network as a downstream physical unit (DSPU). This function allows terminals attached to a controller access to multiple gateways on a single physical link. The controller and the S/370 host gateway must be connected to the same Token-Ring Network. Communication with each S/370 host is accomplished through a gateway. Access up to eight S/370 hosts can be configured. However, each terminal can have sessions with only five of those S/370 hosts. Please note that the single link multi-host support is only available in Configuration support B. It does not require the use of the Concurrent Communication Adapter although the CCA can be used in conjunction with single link multi-host support. Figref refid = slmh. is an illustration of single link multi-host connectivity.

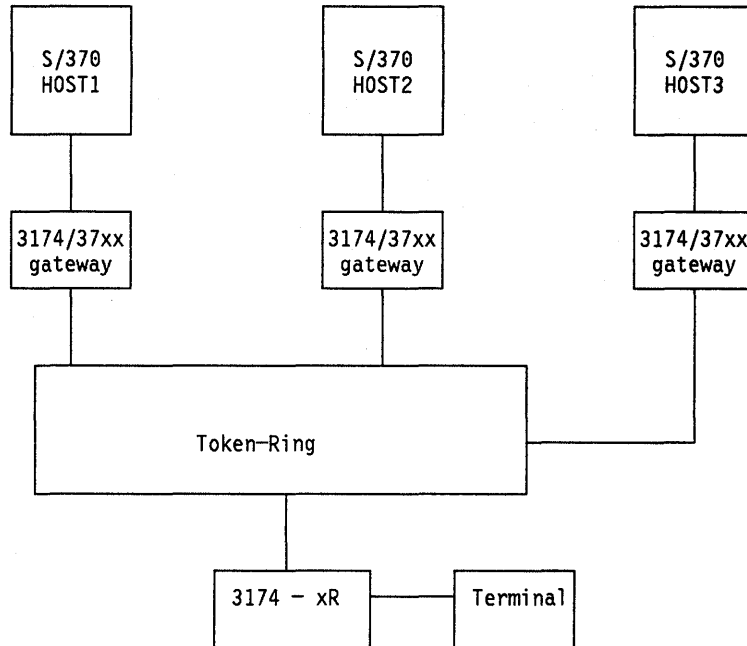


Figure 44. Single Link Multi-Host Connectivity

11.2 Planning Checklist

- Configuration support for Models 3R and 53R
 - The 3R and 53R use standard configuration support at level A
 - The most current level of configuration support A is recommended.
- Configuration support for Models 13R and 63R
 - Level A Release 5 if #9010 is specified
 - Level S Release 5 if the 3270 Token-Ring Network gateway feature #3026 is specified.
- Configuration support level B is an optional feature and has different numbers for the different models:
 - #5010 for Models 01L, 01R, 02R, 03R, 11L, 12R, 13R
 - #5060 for Models 51R, 53R, 61R, 62R, 63R
- Additional controller storage if Multiple Logical Terminals (MLT) and single link multi-host support is required.¹¹

¹¹ Configuration support level B is required.

11.3 Installation Steps

To get the 3174 DSPU working and connected to the ring, you have to do the following steps:

1. Install the hardware

Connect the adapter cable from the 3174 to an 8228 Multi-Station Access Unit. An adapter cable is supplied with these models. If you are using telephone twisted-pair (IBM Cabling System type 3) wiring you need special wiring filters.

2. Customize 3174

The following is a description of the customizing questions that are involved only in the Token-Ring Network attachment of the 3174:

- Host Attachment menu
 - Question 100: 3174 Model Designation
Respond with the actual model number (3R as an example)
 - Question 101: Host Attachment
Respond with 7 for Token-Ring Network or M if multi-host support is required on the Token-Ring Network.
- Token-Ring Network Menu
 - Question 106: Token-Ring Network Address of 3174
Respond with the Token-Ring Network address of the 3174 you are customizing. The address must be unique in the Token-Ring Network. It is recommended that you create an appropriate adapter-naming convention for your installation. One example of a naming convention assigns the adapter addresses accordingly to the following format:

4000 a bb cc ddd

where 4000 is fixed,
a is a station type:
1 = 37xx gateway addr
2 = 3174 local gateway
3 = PC-type downstream
4 = for 3174 03R/13R or 53R/63R DSPU

bb Subarea number of NCP or VTAM

cc Ring number

ddd Serial number.
 - Question 107: Token-Ring Network Address of the gateway
Respond with the Token-Ring address of the 3174 or 37XX that is serving as a gateway.
- Single link multi-host support related questions

If you have specified M in question 101 you are required to fill out worksheets for EACH host attachment. Think of each attachment to a host as a separate controller configuration. In the *3174 Establishment Controller Planning Guide* you will find the necessary worksheets and a detailed description of all the questions.

Here we will indicate which questions must be answered, and we will give a short description of what is to be filled out or where to find more information about them.

After answering question 101 with M the following screen will be displayed for you to define the "Adapter Type," "Host Attach," "Hardware Group," "Include in IML," and "Host Descriptor" for each additional host to which you are attaching.

MULTI-HOST DEFINITION					
Host ID	Adapter Type	Host Attach	Hardware Group	Include in IML	Host Descriptor
1A		7			3725 TRN Gateway
2A	2	2	51	1	X21CCA
3A	1	3	52	1	X25CCA
1B				1	AS400 Gateway

Figure 45. An Example of the Multi-host Definition Panel

Per Host ID the next panel has to be filled out.

Host ID: 1A = 3725 TRN Gateway					
TOKEN-RING NETWORK					
106 - 4000 0000 3174 04	107 - 4000 0124 0001 04	108 - DSPU13R			
110 - 2	116 - 2				
121 - 01 123 - 0	125 - 00000000	126 - 00000000	127 - 00		
132 - 23	136 - 1001	137 - 0000	138 - 0		
141 - A	165 - 0	166 - A	168 - 0		
173 - 00000000	175 - 000000				
213 - 1	215 - 20001	220 - 2			
380 - 0	381 - 1	382 - 0521	383 - 4		
384 - 0					

Figure 46. An Example of the Primary Host Token-Ring Network Definition panel

Note that the host ID in the upper left corner of the panel specifies the host as **1A**.

— Question 108: Unique Machine Identifier

Respond with seven alphanumeric characters of the controller's serial number or your unique identifier.

- Question 110: MLT configured level

In the *3174 Establishment Controller Planning Guide* is a description of the procedure that will help you to determine which MLT level you will require. The descriptions of the possible responses are described in the *3174 Establishment Controller Planning Guide*

- Question 116: Individual Port Assignment

Port Addresses can be individually or automatically assigned. In the *3174 Establishment Controller Planning Guide* the possible responses are described.

- Token-Ring Network Menu (continued)

- Question 215: Physical Unit Identification

If you are using a 37XX gateway, this parameter is very important. The characters coded here have to match the characters coded in the IDNUM parameter in the Switched Major Node definition in VTAM. Although this parameter is not significant if you are using a 3174 gateway, it is recommended that you code a unique ID for the controller here.

- Question 380: Maximum Receive I-Frame Size

Respond with the default value of 2042. If you are using a 3174 gateway, the F-value in the gateway's customization question 941 must be 3.

DSPUs equipped with the 16/4 Mbps Token-Ring Adapter (for example 3174-13R/63R) can RECEIVE I-frames of up to 4105 (4096+TH+RH) bytes in length in combination with configuration support level B.

- Question 381: Token-Ring Network Maximum In

Respond with the default value of 2. This is the number of frames the 3174 receives before it is forced to send a response.

- Question 382: Maximum Transmission I-Frame Size

This is the maximum I-frame size the 3174 will send to the gateway. Respond with the value 1033; it will give you good performance.

If you are using a 3174 Remote Gateway, respond with 1801.

DSPUs equipped for 16/4 Mbps with the 16/4 Mbps Token-Ring Adapter can SEND I-frames up to 2057 (2048+TH+RH) bytes in length.

- Question 383: Token-Ring Network Maximum Out

This is the number of frames transmitted to the gateway before the 3174 will wait for a response. The default value of 2 is acceptable.

- Question 384: Ring Speed (Configuration Support B only). Possible responses are:

0 = 4 Mbps with normal token release
1 = 16 Mbps with normal token release
2 = 16 Mbps with early token release.

3. Generate and load new NCP

The NCP definitions for a 3174-3R DSPU, using a 3174 gateway is described in the chapters "3174 Local Gateway" on page 43 and "3174 Remote Gateway" on page 53, for local and remote gateway respectively.

The NCP definitions for a 37XX gateway are described in the section "3720" on page 69.

11.4 Where To Go For More Information

For more information about the Token-Ring-connected 3174 refer to these publications:

- *GA23-0214 IBM 3174 Subsystem Control Unit Customizing Guide*
- *GA23-0218 IBM 3174 Subsystem Control Unit Functional Description*
- *GG24-3061 IBM 3174 Subsystem Control Unit Installation Guide*
- *GG24-1557 Advanced Communications Function Products Installation Guide*
- *GA27-3862 3174 Establishment Controller Planning Guide*
- *GG24-3061 3174 Establishment Control Unit Installation Guide*

Chapter 12. 37XX Communication Controllers

12.1 General Overview

The IBM 37XX Communication Controllers can be used as gateways to SNA host by different stations on a Token-Ring Network. Depending on the model of communication controller and the level of NCP, different functions are supported. The following matrix shows the different combinations of IBM Communication Controllers and Network Control Program (NCP) that support connections to a Token-Ring Network.

Communication Controller Hardware	Token-Ring Function				
	PU T2.0 sessions	PU T2.1 sessions	PU T4 and PU T5 sessions	Ring Data Rate	
				4 Mbps	16 Mbps
3720	V4 Subset V4R2 V5 all rels	V5R2 V5R2.1 V5R3	V5R2.1 V5R3	V4 Subset V4R2 V5 all Rel	None
3725	V4R2 V4R3 V4R3.1	V4R3 V4R3.1	V4R3.1	V4R2 V4R3 V4R3.1	None
3745 Models 210 410	V5 all rels	V5R2 V5R2.1 V5R3	V5R2.1	All V5 Releases	V5R3
3745 Models 130 150 170	V5R2.1 V5R3	V5R2.1 V5R3	V5R2.1 V5R3	V5R2.1 V5R3	V5R3

Figure 47. 37XX and NCP Token-Ring Network Support

The physical connection to the Token-Ring Network (or the Token-Ring Interface Coupler) is defined in NCP as a leased, full-duplex, point-to-point line.

Each PU communication from the ring via NCP to the host, is defined as being connected by a switched, half-duplex, point-to-point line.

The PU T4-to-T4 and PU T4-to-T5 session capability allows for NCP-to-NCP communication through a Token-Ring Network and NCP-to-VTAM communication for the IBM 9370. These INN links are defined in the NCP as leased, half-duplex, point-to-point lines.

The Token-Ring Network and the NCP/NTRI is transparent to VTAM and application subsystems that use VTAM.

The installation procedures for general (PU T2) support are covered in three different sections, one for each type of communication controller.

The installation for supporting PU T2 sessions is the same for all releases of Version 4 and 5.

The installation for supporting PU T4 and T5 sessions will be covered in the section "INN Sessions over Token-Ring Network" on page 394.

The most important parameters in the definitions for a 37XX gateway and how they must match between VTAM, NCP and 3174 customization questions are shown in "SNA Token-Ring Environment" on page 579

Definitions for INN communication sessions between 37XX communication controllers, between 9370 systems or between 37XX and 9370 systems, are shown in "SNA Token-Ring Environment" on page 579.

Chapter 13. 3720

This section describes how the IBM 3720 Communication Controller attaches to a Token-Ring Network, what is needed for that attachment, and how to install it.

13.1 Overview

The 3720 attaches only to a 4 Mbps Token-Ring Network. The attachment is through the Token-Ring Network Attachment Subsystem (TRSS). The TRSS hardware consists of a Token-Ring Multiplexor (TRM) and one or two optional Token-Ring Interface Couplers (TIC). The TIC is a feature (#4991) of the 3720 Models 11 and 12.

The combination of TRM and TIC is called a Token-Ring Adapter (TRA). The TRM is a standard component in 3720 Models 11 and 12. These two models are the only ones which support connection to a Token-Ring Network.

Model conversions from Models 1 and 2 to Models 11 and 12 respectively are available.

This is an overview picture of the TRA:

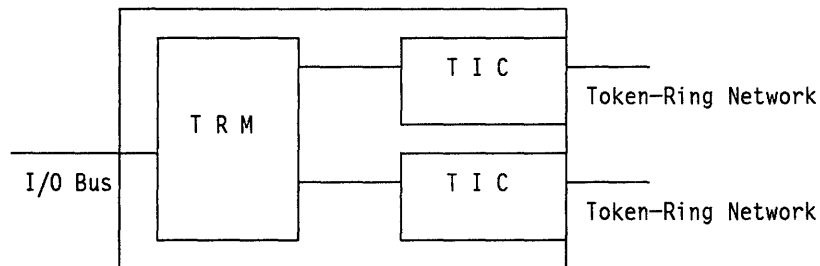


Figure 48. Token-Ring Adapter for IBM 3720 (Maximum of one TRA and Two TICs)

The TRSS allows a host computer to attach to the Token-Ring Network through a 3720 running one of these NCP versions:

- NCP V4 or a subset for MVS and VM.
- NCP V4R2 VM and MVS.
- NCP V4R3 VSE, VM and MVS
- NCP V4R3.1 VSE, VM and MVS
- NCP V5R1 MVS
- NCP V5R2 VSE, VM and MVS
- NCP V5R2.1 VSE, VM and MVS
- NCP V5R3 VSE, VM and MVS

For information on the differences in Token-Ring Network support between these versions, see "37XX Communication Controllers" on page 67.

13.2 Planning Checklist

- The 3720 TRA can support a maximum of two rings and a total of 520 PUs.
- To attach the 3720 to a Token-Ring Network and get it operational, you must do the following things:
 - Upgrade the 3720 with the TIC (#4991)
 - Upgrade the 3720 software to the appropriate NCP level
 - Connect the TIC via a cable to an 8228 Multistation Access Unit on the Ring
 - Add and update a number of NCP generation macros. For VTAM/NCP specifications and considerations see “37XX Gateway and Downstream PUs” on page 386.

13.2.1 Prerequisites - Hardware

The 3720 must be a Model 11 or 12 to support the installation of the TIC (#4991).

13.2.2 Prerequisites - Software

The 3720 requires NCP V4 Subset, or NCP V4R2 or later to connect to the Token-Ring Network.

13.2.3 Coexistence and Compatibility

The NTRI is a function within the NCP. It can coexist with all software that coexists with NCP.

13.3 Installation Steps

1. Upgrade the 3720 with the TIC (#4991), and you should also have one cable group #1666 per TIC.

The TIC has to be installed by the customer following the installation procedures that are shipped with the feature.

2. Connect the outlet on the TIC to a 8228 Multistation Access Unit. The TIC is located in position 1 or 2 in the LIC/TIC frame. The address of the TIC must be 16 or 17.
3. Generate new NCP.

For VTAM/NCP specifications and considerations see “37XX Gateway and Downstream PUs” on page 386.

13.4 Where To Go For More Information

For more information on installing 3720 Token-Ring Adapter and NTRI refer to these publications:

- *GA33-0063 IBM 3720/3721 Communication Controller Configuration Guide*
- *SC30-3447 NCP V5 Resource Definition Guide*
- *SC30-3448 NCP V5 Resource Definition Reference*
- *GG24-3098 IBM 3720 Communication Controller Guide*
- *GG24-1557 Advanced Communications Function, Product Installation Guide.*

Chapter 14. 3725

This section describes how the IBM 3725 Communication Controller attaches to a Token-Ring Network, and what is needed for that attachment, and how to install it.

Though the 3725 is withdrawn its installation is covered because of the large amount of existing machines. This section describes support for 4 Mbps Token-Ring Networks.

14.1 Overview

The 3725 attaches to the Token-Ring Network through the Token-Ring Network Attachment Subsystem (TRSS). The TRSS hardware consists of a Token-Ring Multiplexor (TRM) and up to four Token-Ring Interface Couplers (TIC). The TRM is included in the Line Attachment Base C (FC #4774). The LAB C also contains a Communication Scanner Processor (CSP) and up to four Line Interface Couplers (LIC).

The TIC attaches to the TRM on the LAB C and has feature code #4991.

The combination of a TRM and one-to-four TICs is called a Token-Ring Adapter (TRA). The 3725 supports up to two TRAs, one in the base frame and one in the 3726 expansion unit, or two in the 3726. This makes it possible to have a maximum of eight TICs on the 3725/3726.

This is an overview picture of the LAB C with the TRA consisting of the TRM and TICs:

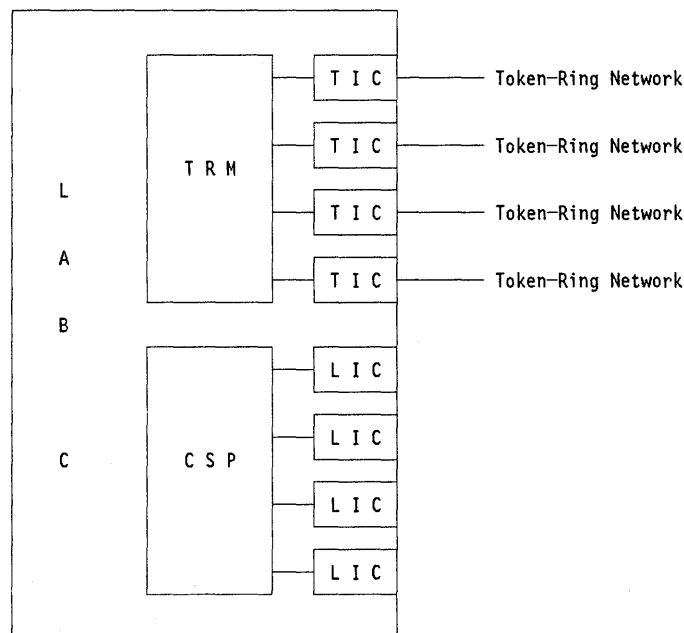


Figure 49. IBM 3725 Token-Ring Adapter

The TRSS allows a host computer to attach to the Token-Ring Network through a 3725 running one of these NCP versions:

- NCP V4R2
- NCP V4R3
- NCP V4R3.1

For information on the capabilities of these versions, refer to "37XX Communication Controllers" on page 67.

14.2 Planning Checklist

- The 3725 can support a maximum of eight rings and a total of 1500 PUs.
- To attach the 3725 to a Token-Ring and get it operational, you must do the following things:
 - Upgrade the 3725 with a LAB C (FC #4774).
 - Upgrade the 3725 with TIC (FC #4991).
 - Connect the TIC to a 8228 Multistation Access Unit on the ring.
 - Add and update a number of NCP generation macros.

For VTAM/NCP specifications and considerations see "37XX Gateway and Downstream PUs" on page 386.

14.2.1 Prerequisites - Hardware

- The 3725 must have a LAB C (FC #4744) installed to support the installation of the TIC (#4991).
- The 3725 must be at Release 4 (EC 873055 or later).
- The NTRI code requires about 85 Kbytes of memory in the 3725, and each logical connection requires 276 bytes of memory.

14.2.2 Prerequisites - Software

The 3725 requires NCP V4R2 or later to connect to the Token-Ring Network.

14.2.3 Coexistence and Compatibility

The NTRI is a function within the NCP. It can coexist with all software that coexists with NCP.

14.3 Installation Steps

1. Upgrade the 3725 with the LAB C (FC#4774).
2. Upgrade the 3725 with the TIC (#4991), and you should also have one cable group #1666 per TIC available.
3. Connect the outlet on the TIC to a 8228 Multistation Access Unit. The TIC is located in position 80-83, 112-115, 144-147, 176-179, 208-211 or 240-243.
4. Generate new NCP.

For VTAM/NCP specifications and considerations see "37XX Gateway and Downstream PUs" on page 386.

14.4 Where To Go For More Information

For more information on installing an 3725 Token-Ring Adapter and NTRI refer to these publications:

- *SA33-0012 IBM 3725 Model 1 Communication Controller Configuration Guide*
- *SA33-0022 IBM 3725 Model 2 Communication Controller Configuration Guide*
- *SC30-3349 NCP V4 Resource Definition Guide*
- *SC30-3254 NCP V4 Resource Definition Reference*
- *GG24-3110 IBM 3725 Network Control Program, Token-Ring Interface Planning and Implementation*
- *GG24-1557 Advanced Communications Function, Product Installation Guide.*

Chapter 15. 3745

This section describes how the IBM 3745 Communication Controller attaches to a Token-Ring Network, the 3745 components needed for that attachment and how to install it.

15.1 Overview

The 3745 attaches to the Token-Ring Network through the Token-Ring Network Attachment Subsystem (TRSS). The TRSS consists of a maximum of four Token-Ring Adapters (TRAs). There are two types of TRAs. TRA1 is designed for 4 Mbps and TRA2 for 16/4 Mbps. A TRA consists of a Token-Ring Multiplexor (TRM) and two Token-Ring Interface Couplers (TIC). TRA1 and TRA2 are special features of the 3745 and have feature code #4760 and #4770 respectively. This is an overview picture of a TRA:

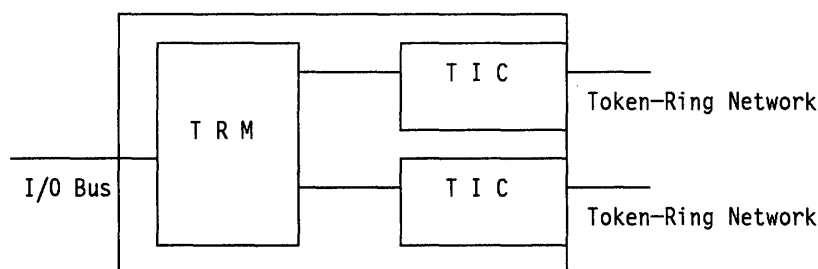


Figure 50. Token-Ring Adapter for IBM 3745 (Maximum of four TRAs and Eight TICs)

The TRSS allows a host computer to attach to the Token-Ring Network through a 3745 running NCP V5R1, NCP V5R2, NCP V5R2.1 or NCP V5R3.

4 Mbps ring attachment uses any of the NCPs mentioned above. 16 Mbps ring attachment requires NCP V5 R2.1 and later. NTRI function of the NCP provides the connection to the ring. For a description of the capabilities of these different releases, refer to "37XX Communication Controllers" on page 67.

15.2 Planning Checklist

- Check that NCP, SSP and VTAM are at compatible levels.
- 3745 TRAs can support a maximum of eight ring connections with a total of 9999 PUs.
- To attach the 3745 to a Token-Ring and get it operational, you must do the following things:
 - Upgrade the 3745 with a TRA (#4760 or #4770) and two cable groups #1666 per TRA.
 - Connect a TRA via a cable to the 8228 Multistation Access Unit on the ring.
 - Add and update a number of NCP generation macros.

For VTAM/NCP specifications and considerations see "37XX Gateway and Downstream PUs" on page 386.

15.2.1 Prerequisites - Hardware

The 3745 must have the Option Code 9763 (TRA-Option) specified to support the installation of the TRA adapter, TRA type 1 (#4760) for 4 Mbps adapter and TRA type 2 (#4770) for the 16/4 Mbps adapter. If it is configured with the option code 9723 (No TRA-Option) it will not support the TRA. Changing from No TRA-Option to TRA-Option may require reconfiguration of the 3745.

15.2.2 Prerequisites - Software

The 3745 requires NCP V5 or later to operate and to support Token-Ring Network attachment.

15.2.3 Coexistence and Compatibility

The support for the Token-Ring Network in an NCP is given by the NCP Token-Ring Interface (NTRI). NTRI is a standard function of the NCP. It can coexist with all software that coexists with NCP.

15.3 Installation Steps

1. Upgrade the 3745 with the Token-Ring Adapters #4760 or #4770 and if necessary with TRA-Option (#9763).
2. Connect the outlet on the TICs via a cable to a 8228 Multistation Access Unit. The TICs are located in the rear of the base frame. The TRAs can be located at line adapter position 1,2,5 or 6. The address of the TIC (defined in the address parameter in NCP) is in the range from 1088-1095.
3. Generate new NCP.

For VTAM/NCP specifications and considerations see "37XX Gateway and Downstream PUs" on page 386.

15.4 Where To Go For More Information

For more information on installing 3745 Token-Ring Network Adapter and NTRI refer to these publications:

- *GA33-0095 3745 Configuration Guide*
- *SC30-3447 NCP V5 Resource Definition Guide*
- *SC30-3448 NCP V5 Resource Definition Reference*
- *GG24-1562 IBM 3745 Communication Controller Guide.*

The following publications refer to the IBM 3725 Communications Controller, but can be useful to understand and implement NTRI functions on 3745.

- *GG24-3110 IBM 3725 Network Control Program, Token-Ring Interface, Planning and Implementation*
- *GG24-1557 Advanced Communications Function, Product Installation Guide.*

Chapter 16. 9370 Hardware

16.1 Overview

This section describes how to attach the 9370 to a Token-Ring Network, what you need, and how to install it.

The 9370 attaches to the Token-Ring Network via the 9370 Token-Ring Subsystem, which consists of the 9370 Token-Ring Subsystem Controller and the 9370 Token-Ring Subsystem Support Program (included in 9370 microcode). The IBM Token-Ring LAN Subsystem Controller consists of one Communication Processor Card (#6130) and one (one is maximum per Communication Processor Card) Token-Ring Network Adapter Card (#6034) for 4 Mbps or the Token-Ring Network Adapter Card (#6134) for both 4 Mbps and 16 Mbps.

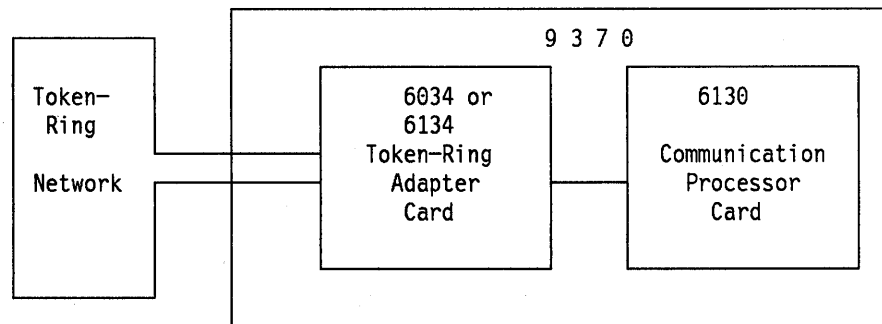


Figure 51. 9370 Token-Ring LAN Subsystem Controller

The Token-Ring Subsystem Controller appears to the 9370 host software as a 3088 device connected to a byte multiplexor channel.

16.2 Planning Checklist

- The 9370 Token-Ring Subsystem Controller supports a maximum of 64 PUs concurrently.
- The following steps have to be performed to correctly install the components needed to connect the 9370 to the Token-Ring Network:
 - Upgrade the 9370 with the 6130, and with a 6034 or 6134 card.
 - Upgrade the 9370 microcode to level GA3 or later.
 - Connect the 9370 to the 8228 Multistation Access Unit.
 - Specify required parameters to the Token-Ring Subsystem Support Program in the 9370 to reflect the new I/O configuration.
 - Update the DMKRIO definitions for the VM operating systems I/O configuration.

16.2.1 Prerequisites - Hardware

- The 6130 card requires one free slot in the 9370.
- The 6034 or 6134 card requires the 6130 card and one free slot.
- EC level #62440 is recommended. This EC should **only** be used with VTAM V3R1.2.
- The 9370 microcode must be at GA3 level or later.
- The 9370 microcode should be updated with the latest microcode patches. These can be obtained through your local service organization.

16.2.2 Prerequisites - Software

To use the Token-Ring Network Adapter card you will have to define it card the operating system, which must be one of the following:

- VM/SP4
- VM/SP5
- VM/SP6 for 16/4 Mbps adapter support
- For VSE the support for the Token-Ring Network will be included in VSE/VTAM. VSE is not covered in this manual.

At least one of the following products is needed to actually use (send data) through the 9370 Token-Ring Subsystem.

- VM/VTAM V3R1.2
- VM/VTAM V3R2 for 16/4 Mbps with TSAF, TCP/IP or AIX/370 with TCP/IP

All these products will be covered in "9370 Software" on page 399.

16.2.3 Coexistence and Compatibility

The Token-Ring Network Adapter card can be shared by up to three applications using different SAPs, for example VTAM, TSAF, and TCP/IP.

16.2.4 Configuration Parameters

The following parameters are involved in configuring the 9370 to support the Token-Ring Subsystem:

- 9370 I/O configuration
 - S/370 Address
 - Number of Users
 - Node Address
 - Inactivity Timer
 - Enable Ring Error Monitor
 - Line Speed
 - Early Token Release Disable
- VM DMKRIO
 - RDEVICE macro
 - ADDRESS
 - DEVTYPE
 - RCTLUNIT macro
 - ADDRESS
 - CUTYPE
 - FEATURE
 - RCHANNEL macro
 - ADDRESS
 - CHTYPE

16.3 Installation Steps

1. Prepare the system for installation:

- Upgrade the microcode to level GA3 or later.
This will be done by your customer service representative on request.
- Apply the latest microcode patches.
This will be done by your customer service representative on request.
- If you are going to use VTAM V3R1.2 you should upgrade the system to EC level #62440. **Important:** If you are currently running VTAM V3R1.1 you should *not* upgrade to this EC level. In that case you should first install VTAM V3R1.2.
- Assure that the 6130 card and the 6034 or 6134 card are available for installation. Your customer service representative will do the actual hardware installation.

2. Connect the cable:

- The 6034 card should be attached to the 8228 Multistation Access Unit via a standard IBM Cabling System cable with Part No.6339098. The 6134 card is connected to the 8228 via the adapter cable #9213. The Type 3 media (telephone twisted-pair) is also supported for 4 Mbps only. For detailed information on this refer to *IBM Telephone Twisted Pair Media Guide (GA27-3714)*.

3. Change the 9370 I/O Configuration Data:

- a. Select "Manual Operations" mode from the 9370 "Session Selection" Screen at the 9370 processor console. The general selection screen will then be displayed. The layout of this screen is shown next.

```
                                GENERAL SELECTION

C Clear System Reset           A Compare/Trace
J Interval- Timer Switch      B Problem Analysis
P Program Reset               D Display/Alter
R Restart                     F Configuration
S Store Status                G System Power Off
Y Time-of-Day Enable          H Mode Selection
                              I I/O Facilities
                              K Check Control
                              L Program Load
                              O Operation Rate
                              T Remote Facilities
                              U User Survey

F1=Help                        F4=PrvCmd
F6=Index
Command: Q_
```

Figure 52. General Selection Screen

- b. From this screen add the letters 'F1' on the command line and press Enter to get to the Configuration Next I/O screen. This screen displays the S/370 channel address corresponding to the 6130 I/O Processor, the

feature number and the physical location of the 6130 card, and looks like this:

```

Configuration                NEXT I/O                page 1
                               of 1
Select an S/370 address to display/alter I/O configuration

S/370 CHANNEL I/O RACK
ADDRESS FEATURE - UNIT
                - CARD

0             6020          A - 17A - 03
              6130 - 0030  B - 01A - 07
5             6003          A - 17A - 09
6             6003          A - 17A - 10
A             6030 - 0000  B - 01A - 03
B             6030 - 0000  A - 17A - 05
C             6010          A - 17A - 02
D             6010          B - 01A - 02

                               Last change: 89/10/27 04:13:45

F1=Help F2=MainMenu          F4=Prvcmd   F5=PrvMenu
F6=Index                               F10=Alter

Command: QFI_

```

Figure 53. Next I/O Screen

The Token-Ring Subsystem, is displayed as '6130-0050' at this screen. To assign a channel address to the Token-Ring Subsystem, follow these steps:

- 1) Press F10=Alter. The S/370 channel addresses becomes highlighted indicating that they can be changed.
- 2) Type in the address you want to assign at the space on the line where the '6130-0050' I/O feature appears.
- 3) Press the Enter key.

Each channel must have a unique address. The S/370 channel address must conform to the definitions in DMKRIO as in the following example:

If the S/370 channel address is 4, then the DMKRIO definitions have to be like this:

- RDEVICE ADDRESS=(400,12)
- RCTLUNIT ADDRESS=400
- RCHANNEL ADDRESS=4

That is, the highlighted digit must conform to the S/370 address.

- c. Type in the number of the channel corresponding to the 6130-0050 feature after the letters QFI at the command line and press Enter. This will get you to a detailed display of the feature with additional information on the S/370 address range and the number of users. The screen looks like this:

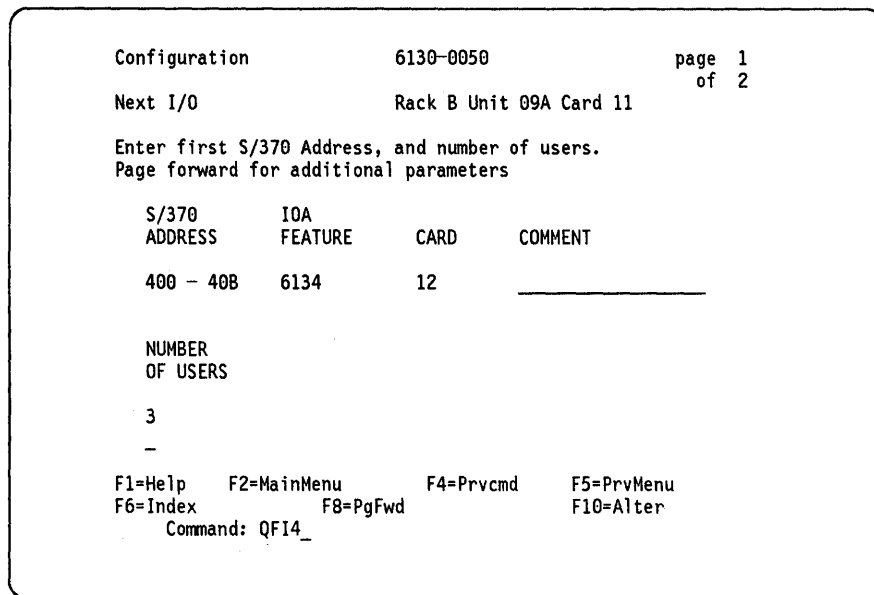


Figure 54. 6130-0050 Configuration Screen, Page 1

The field "IOA feature" indicates the type of adapter, in this case #6134 which means a 16/4 Mbps adapter for the Token-Ring Network.

The field "Number Of Users" in the screen above shows how many groups of subchannel addresses are allocated to the Token-Ring Subsystem. A user in this case is a program using the 9370 Token-Ring Subsystem, for example VTAM, TSAF or TCP/IP. Four addresses should be assigned to any application, because the communication to the Token-Ring Subsystem in the 9370 is handled by the Continuously Executing Transfer Interface (CETI). This interface permanently executes Micro Channel programs on four subchannel addresses, or ports. The ports are:

- Inbound Data Port
- Outbound Data Port
- Control Port
- Interrupt Port

This group of four ports is often called a "CETI group".

If you type in the number 3 in the Number Of Users field in this panel it means that three programs can share the Token-Ring Subsystem, each using a CETI group (consisting of four subchannel addresses) for a total of 12 subchannel addresses. This means that the S/370 address range must contain 4, 8 or 12 addresses respectively, depending on how many number of users you define (1, 2 or 3). For example, if you want three users to share the Token-Ring Subsystem, you must specify a range of 12 contiguous addresses in the S/370 Address field. If the first address is 400, the range would be 400-40B. In this case the 12 addresses 400-40B corresponds to the three users.

The underscoring indicates where you can type in the values you wish to use. To do this perform the following steps:

- 1) If you are not already in "Alter" mode, press F10=Alter.
- 2) Type in your values.

3) Press the Enter key.

NOTE: The maximum number of users (CETI groups) per Token-Ring Adapter Card is three. The S/370 addresses must be consecutive.

d. If you press F8=PgFwd the second page of the 6130-0050 configuration screen will be displayed. It looks like this:

```
Configuration          6130-0050          Page 2
Next I/O              of 2

To modify a parameter, type over the current value.

Node Address (hexadecimal).....4000 0011 4014
Inactivity Timer (30-32767, 100 ms units)....30
Enable Ring Error Monitor (0=No 1=Yes).....0
Line Speed (0=4 Mbps 1=16 Mbps).....1
Early Token Release Disable (0=No 1=Yes).....1

Note: Disabling Early Token Release could
      result in decreased performance

F1=Help   F2=MainMenu   F4=Prvcmd   F5=PrvMenu
F6=Index  F7=Pgbk       F10=Display

Command: QFI4_
```

Figure 55. 6130-0050 Configuration Screen, Page 2

The five parameters you could change are:

1) **Node Address**

This is the 9370 Token-Ring Network adapter address. If you leave this field with all zeroes, the universal address will be used.

Note: VTAM is able to specify this address at adapter open time, and override any other value specified.

2) **Inactivity Timer**

If this time interval is exceeded without an interrupt at the adapter, the Medium Access Control (MAC) interface will poll the adapter to check if it is still functional. The interval is specified in units of 100 milliseconds. You can specify values between 30 and 32767.

The default value of 30 will do for a start.

3) **Enable Ring Error Monitor**

This specifies whether the Ring Error Monitor should still be active in those instances in which the host software does not request it.

Normally you would like to have this function in any case, so put in a "1". For a description of the Ring Error Monitor capability, see "9370 REM Function" on page 467.

If you want to change any of these parameters, perform the following steps:

- a) If you are not already in "Alter" mode, press F10=Alter.
- b) Type over the old value with the new.
- c) Press the Enter key.

To get back to the General Selection screen, press the F2 key.

4) **Line Speed**

Indicates the speed of the ring.

5) **Early Token Release Disable**

This applies only to 16 Mbps ring operation and by specifying 1 (=yes) the early token release function is disabled.

4. VM DMKRIO Definitions

The Token-Ring Subsystem has to be defined to VM operating system in order to get functional. The Token-Ring Subsystem must be defined to CP as a group of 3088 devices on a separate channel. This is done by specifying entries in DMKRIO.

The macros concerned are RDEVICE, RCTLUNIT and RCHANNEL and they should be specified as follows:

- **RDEVICE** macro

This macro specifies the subchannel addresses you defined in the I/O configuration, and the device type for these addresses.

IF you specify "S/370 Address" as 400-40B, and "Number Of Users" as 3 in the 9370 I/O Configuration, the RDEVICE macro should look like this:

```
RDEVICE ADDRESS=(400,12),DEVTYPE=3088
```

This specifies 12 consecutive addresses starting at 400 and that the device type is 3088.

- **RCTLUNIT** macro

This macro specifies the first address of the defined subchannels, and the control unit type.

With the 9370 I/O configuration mentioned above the RCTLUNIT macro should look like this:

```
RCTLUNIT ADDRESS=400,CUTYPE=3088,FEATURE=32-DEVICE
```

This specifies that the subchannel addresses start at 400, that the control unit is a 3088 and that it has a 32-DEVICE feature.

- **RCHANNEL** macro

This macro specifies the channel address and the type of channel.

With the 9370 I/O configuration mentioned above the RCHANNEL macro should look like this:

```
RCHANNEL ADDRESS=4,CHTYPE=BLKMPXR
```

This specifies that the channel address is 4, and that the channel is a block multiplexor channel.

16.4 Where To Go For More Information

For more information on the 9370 Token-Ring LAN Subsystem installation, refer to these publications:

- *SA24-4033 9370 Information System, Installing the System*
- *SA24-4037 9370 Information System, Using the System Programmer Function*
- *SA09-1738 9370 Information System, Using the Token-Ring Subsystem*
- *SA09-1739 9370 Information System, Token-Ring Subsystem Description*
- *GG24-1544 9370 Installation Hints and Tips*
- *GG24-3240 IBM 9370 LAN, Volume 1: Token-Ring Support*
- *GG24-3227 IBM 9370 LAN, Volume 2: IEEE 802.2 Support.*

PART B. Software Installation for Token-Ring Network Products

Chapter 17. LAN Support Program V1.1

17.1 Overview

In order for a PC to operate on a Local Area Network several products may be required in addition to the PC unit:

- LAN software or application
- Application interface, for example NETBIOS
- Logical Link Control such as IEEE 802.2
- LAN Adapter.

The LAN Support Program provides the Network Basic Input/Output System (NETBIOS) and IEEE 802.2 programming interfaces for each of the IBM LAN offerings.

Do not confuse this with the PC LAN Program (PCLP) which is an application using the LAN. See "PC LAN Program V1.3" on page 107.

Interfaces in general are very important; they protect applications from the different network hardware and access protocols (such as Token Passing and CSMA/CD). NETBIOS is one such interface, allowing us to take software written to this interface from one environment to another as in the case of the PC LAN Program which can be used both on a Token-Ring Network and a PC Network or PC Network (Baseband).

Applications can access the network using one of several different protocols:

- Directly (that is, address the adapter hardware directly)
- IEEE 802.2 Logical Link Control (LLC) Protocol
- NETBIOS Protocol
- Other High Level Protocols other than NETBIOS such as
 - APPC/PC
 - TCP/IP

The application's access to the network is illustrated in Figure 56 on page 88.

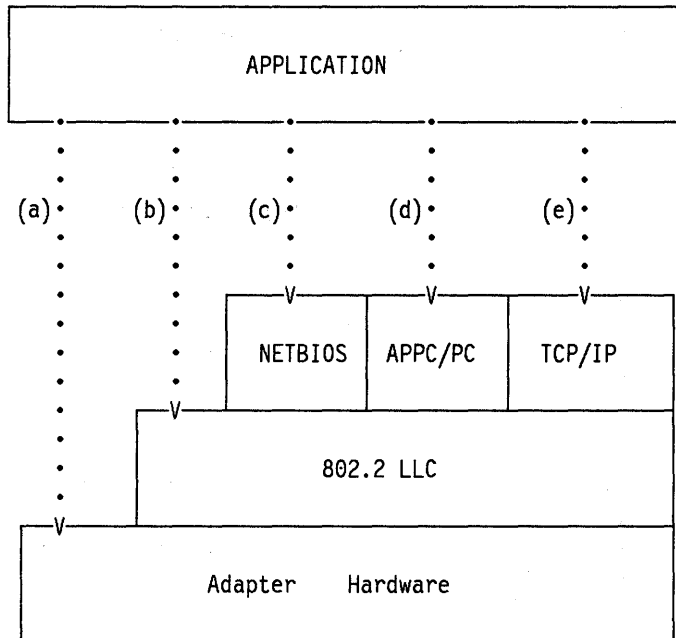


Figure 56. LAN Interfaces. Applications can use the network through several different protocols. Examples of each are:

- a) Token-Ring Network Bridge Program
- b) WSP or 3270 Emulation "Stand-alone" configurations communicate directly with the host gateway.
- c) PC LAN Program or 3270 Emulation using a PC Gateway.
- d) APPC/PC
- e) TCP/IP Applications

The LAN Support Program provides some of these interfaces; its structure and relationship to different adapters is shown in Figure 57 on page 89.

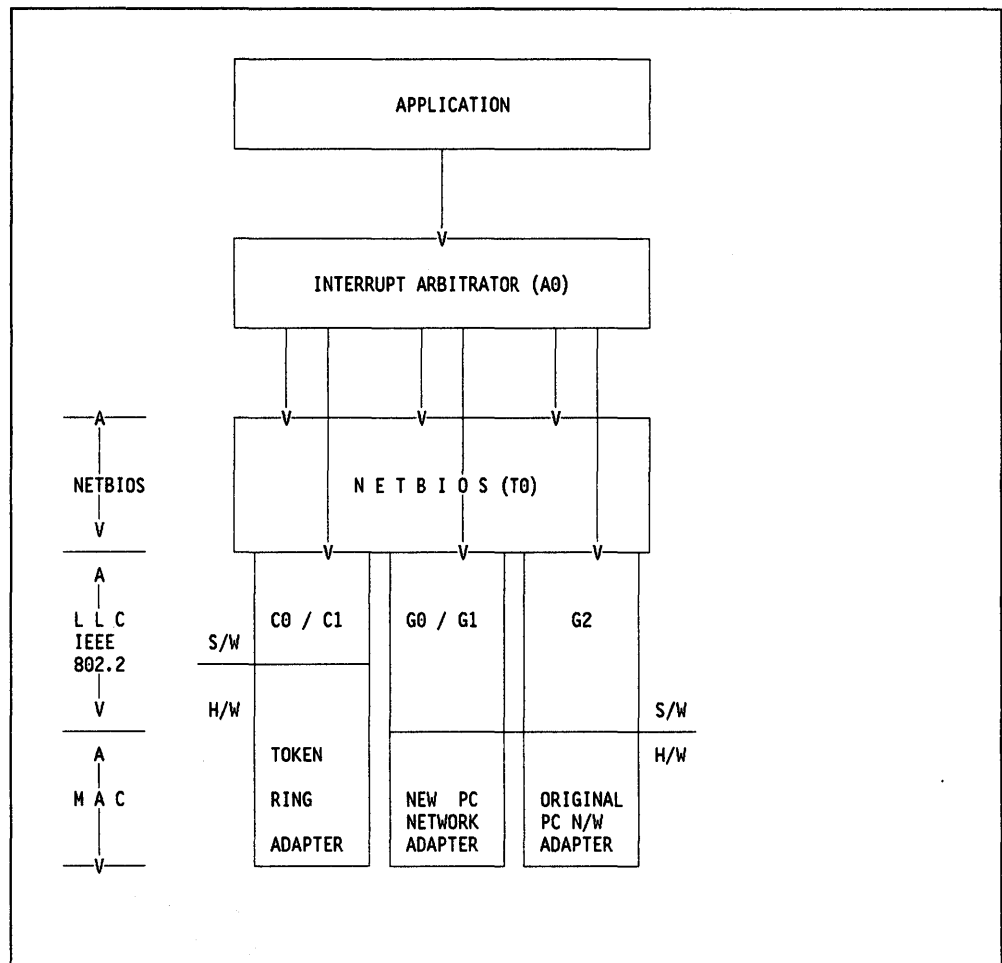


Figure 57. LAN Support Program Interfaces. This shows the LAN Support program interfaces, NETBIOS (T0), the IEEE 802.2 Interfaces - Token-Ring Adapter (C0, C1) and PC Network Adapter (G0, G1, G2) Device Drivers.

The diagram also shows how applications can use (through the interrupt arbitrator) either the NETBIOS interface or the LLC interface directly.

17.2 Planning Checklist

17.2.1 Prerequisites - Hardware

- One of: PC-XT, PC-XT/286, PC-AT, Industrial Computer, PS/2
- With at least 128KB of memory¹²
- A diskette drive
- A display
- Attachment to an IBM Local Area Network using one or two of the following adapters:

¹² If the configuration aid will be used to configure the computer, it will need at least 256KB of memory.

- Token-Ring Adapter - I, II, /A, 16/4, 16/4/A
- PC Network Adapters - original¹³, and new adapters¹⁴
- PC Network (Baseband) Adapters - Adapter, Adapter/A

17.2.2 Prerequisites - Software

- DOS 3.3 or higher

17.2.3 Coexistence and Compatibility

PC Network

If you are adding new PS/2s or PCs to an existing PC Network the original PC Network cards and resident microcode versions of NETBIOS will NOT communicate with the new cards running LAN Support Program. To communicate, you must either upgrade the original cards to use the G2 Driver of the LAN Support Program (LSP)¹³ (note that DOS 3.3 is required), or, to avoid upgrading to LSP and DOS 3.3, you can use a product called the PC Network Protocol Driver in the new stations instead of LSP.

The PC Network Protocol Driver is designed to run on a PS/2 or a PC with a new PC Network Adapter card¹⁴. It is the equivalent of the NETBIOS Interface that exists in the ROM of the original PC Network adapters. It is a device driver similar to the LSP and is loaded by a statement in the CONFIG.SYS.

Using Old NETBIOS Parameters with LSP

If you are migrating from previous NETBIOS releases, there is an option in the T0 device driver to use the OLD parameters. Code the following:

```
DEVICE = DXMT0MOD.SYS OLD.PARMS.0=x y z
```

where

x = PC RAM, default is 9 Kb. This may need increasing for larger systems

y = Extra SAPS

z = Extra link stations.

For more information on these terms see the following sections.

Token-Ring Network

¹³ If the LAN Support program is used to support the original adapter then this adapter must be the only communications adapter in the computer; for example, the Token-Ring Network Adapter, 3278/79 card, SDLC card, etc, cannot co-exist. This option will also have limited performance and is not recommended for use in a server. This adapter will not support the Workstation Program.

¹⁴ References to new PC Network Adapters will mean the following: II, II/A, II-freq2, II/A-freq2, II-freq3, II/A-freq3.

The LAN Support Program, when used with Token-Ring Network Adapters, provides compatibility with all versions of NETBIOS which may be present on other network stations.

Migration To OS/2.

Support for IEEE 802.2, APPC/PC, and NETBIOS protocols are included in OS/2 Extended Edition Version 1.1 and follow-on.

17.3 LAN Support Program Structure

The LAN Support program files are a group of device drivers.¹⁵ Each of these device driver files has the ".SYS" extension. These drivers are loaded into memory from the configuration file CONFIG.SYS. Here is a description of the device drivers. They are usually referred to by the two-character combination formed by the fourth and fifth characters in the name (for example, T0 for DXMT0MOD.SYS).

- DXMA0MOD.SYS** Interrupt Arbitrator is required in **all** installations
- DXMC0MOD.SYS** Supports the Token-Ring Adapters I, II, /A, 16/4 and 16/4/A
- DXMC1MOD.SYS** Use instead of C0 when the 3270 Workstation Program is to be used
- DXMG0MOD.SYS** Supports the new PC Network adapters ¹⁴ and also the PC Network BASEBAND adapters
- DXMG1MOD.SYS** Use instead of G0 when the 3270 Workstation Program is to be used
- DXMG2MOD.SYS** Supports the ORIGINAL PC Network Adapter ¹³
- DXMT0MOD.SYS** This is the NETBIOS interface device driver.

17.3.1 Token-Ring Adapter Support - DXMCnMOD.SYS (or 'C0', 'C1')

There are three parameters that can be coded with C0/C1 drivers. These parameters, depending on their position, can refer either to a primary or secondary adapter.

1. Adapter Address

If you wish to change the universal address to be a locally administered address then include the address as a C0/C1 parameter¹⁶.

2. Shared RAM

¹⁵ A device driver provides a software interface for a device, such as printer, keyboard or adapter.

¹⁶ Specific details on coding - permissible values and recommended values are covered in DXMINFO.DOC file on the LAN Support Program Diskette which can be printed out on a PC Printer.

The shared RAM address is the address of PC storage used by the adapter. There is a default setting which is "D800" for the primary adapter. "D400" should be used for the alternate adapter.

The referenced RAM addresses belong to the hidden memory which extends from 640 Kb to 1 Mb. Memory within this range has been assigned to different devices. If the user wants to modify the default addresses for a particular adapter card, he should consult the Memory Map listings and select non-assigned memory.

3. Early Token Release

This option increases the utilization of the network by reducing the token latency time. This parameter is ignored if the adapter data rate is 4 Mbps.

The CONFIG.SYS statement for C0 and C1 would look like this¹⁶.

```
DEVICE=DXMCnMOD.SYS addr0, mem0, etr0, addr1, mem1, etr1
```

Where

- addr0** Replace with the locally administered address for the primary or only adapter
- mem0** Replace with the RAM location for the primary or only adapter
- etr0** 0=use early token release, 1=don't use early token release
- addr1** Replace with the locally administered address for the secondary adapter
- mem0** Replace with the RAM location for the secondary adapter
- etr1** 0=use early token release, 1=don't use early token release

For example, to specify a locally administered address and a new shared RAM address for both adapters:

```
DEVICE=DXMCnMOD.SYS 400000000001,C200,,400000000002,AA00
```

Note: These are positional parameters and the commas must be used to denote omitted parameters.

17.3.2 PC Network Adapter Support - DXMGnMOD.SYS (or 'G0', 'G1', 'G2')

There are two parameters that can be coded with G0/G1/G2 drivers:

1. Adapter Address

This follows the same rules as for the TRN adapter¹⁶.

2. Work Area Size

This is the workspace allocated internally for the use of the device driver. The default value is 8KB. If your workstation has more than 16 stations (for example, a server), then this needs to be a higher value. The following are recommended:

Requirements for Adapter	Work Space
Default	8K
up to 16 sessions	8K
16 - 23 Sessions	12K
23 - 32 Sessions	16K

For more sessions, increase the workspace required.

The CONFIG.SYS statement for G0, G1, G2 would look like this:¹⁷

'DEVICE = DXMGnMOD.SYS addr0, wrk0, addr1, wrk1' ..where

- addr0** Replace with the locally administered address for the primary or only adapter
- wrk0** Replace with the work area for the primary or only adapter
- addr1** Replace with the locally administered address for the secondary adapter
- mem0** Replace with the work area for the secondary adapter

Example: To specify a work area different from the default, add the parameter as shown

DEVICE = DXMGnMOD.SYS ,20

Note: These are positional parameters and the commas must be used to denote omitted parameters.

17.3.3 NETBIOS Support - DXMT0MOD.SYS (or 'T0')

NETBIOS applications are:

- PC LAN Program
- 3270 Emulation V3 (not in standalone configuration)

As NETBIOS is a very important interface, and has the most parameters of all the device drivers, the next section will cover this in more detail.

¹⁷ Driver 'G2' supports only ONE adapter.

17.4 NETBIOS - DXMT0MOD.SYS

This is a very important section. It covers the NETBIOS parameters that need to be coded when using NETBIOS applications either on their own or with other non-NETBIOS LAN applications.

NETBIOS is not required if you are just using non-NETBIOS applications.

There can be a lot of confusion over NETBIOS (T0) parameters; what to code, where to code it, how this relates to PCLP parameters, etc.

In most instances of workstation attachment to the LAN, the default parameters can be used. However, if you have any of the following workstation configurations or situations, then you should read this section to understand how to set the correct parameter values.

- Where performance is of concern
- A server
- A gateway
- A combination of server / gateway
- A workstation using the LAN for multiple applications for example, 3270 emulation and PCLP.

Understanding these parameters will also help you prevent setting them too high as can often happen, which will affect performance.

If you use the installation aid to install the LAN Support Program then all the DEFAULT parameters will be used. You will have to edit the CONFIG.SYS file on the PC fixed disk, or on the system diskette to include or change the parameters you require.

It is very difficult to give algorithms and rules to help determine the NETBIOS and PC LAN Program "NET START" parameters for every permutation of workstation configuration. This section introduces the major parameters, explains their function and how they are related, and gives some suggested values¹⁸. There are some worksheets at the end to help you calculate the T0 parameters you require.

17.4.1 How Does It Work

The LAN adapter is opened when the first command is issued by an application to use the LLC (802.2) interface through NETBIOS (or directly as in the case of APPC/PC or the Workstation Program when running by themselves).

Device drivers are loaded when the computer is started.

If T0 has parameters, then the adapter is opened at this stage unless OPEN_ON_LOAD=N has been coded in the list of parameters. If T0 has no

¹⁸ Although the 'NET START' command is not part of the LAN Support Program, it is important to include it here as it requests NETBIOS parameters. Therefore it has a direct impact on how the NETBIOS (T0) parameters are set.

parameters set, then the adapter is not opened until an application gives the command (for example, the "NET START" command is issued by the PC LAN Program).

If the adapter was opened using the T0 device driver, a command issued later (for example, when the "NET START"), will request control of some (or all) resources from T0 (NETBIOS) as explicitly specified in the command's parameters (or defaults).

Note, that if T0 (NETBIOS) has no parameters, then NETBIOS will start using the OLD NETBIOS values such as maximum of 32 sessions, 32 commands, etc.

17.4.2 Terminology

NETBIOS parameters refer to some fundamental characteristics of LAN communications. Some of the terminology is explained below. See also Figure 58 on page 96.

- SESSION

A session is a logical connection between two NETBIOS names. For example, a user running PCLP on computer-A is using resources on computer-B running PCLP; they each have a session defined to each other.

- SAP

The DLC Service Access Point (SAP) represents a communications port between the DLC layer and higher layer services. For example SAP X'F0' interfaces to NETBIOS services; SAPs X'04', x'08' and x'0C' interface to SNA Path Control Services.

- LINK STATION

The link station is one end of a formal connection between two devices across a LAN (that is, implies implementation of a buffer capability).

- NAMES

A name is a NETBIOS concept referring to a distinct subaddress of the link station. For example, a PC is acting as a 3270 gateway and also as a server with the PCLP. These are both NETBIOS applications. Therefore a workstation communicating with the server/gateway has one SAP for NETBIOS, one link stations for the server/gateway computer, but TWO names - one to address the 3270 Emulation Program V3 and the other to address the PCLP program.

A session is a formal NETBIOS level connection between two names.

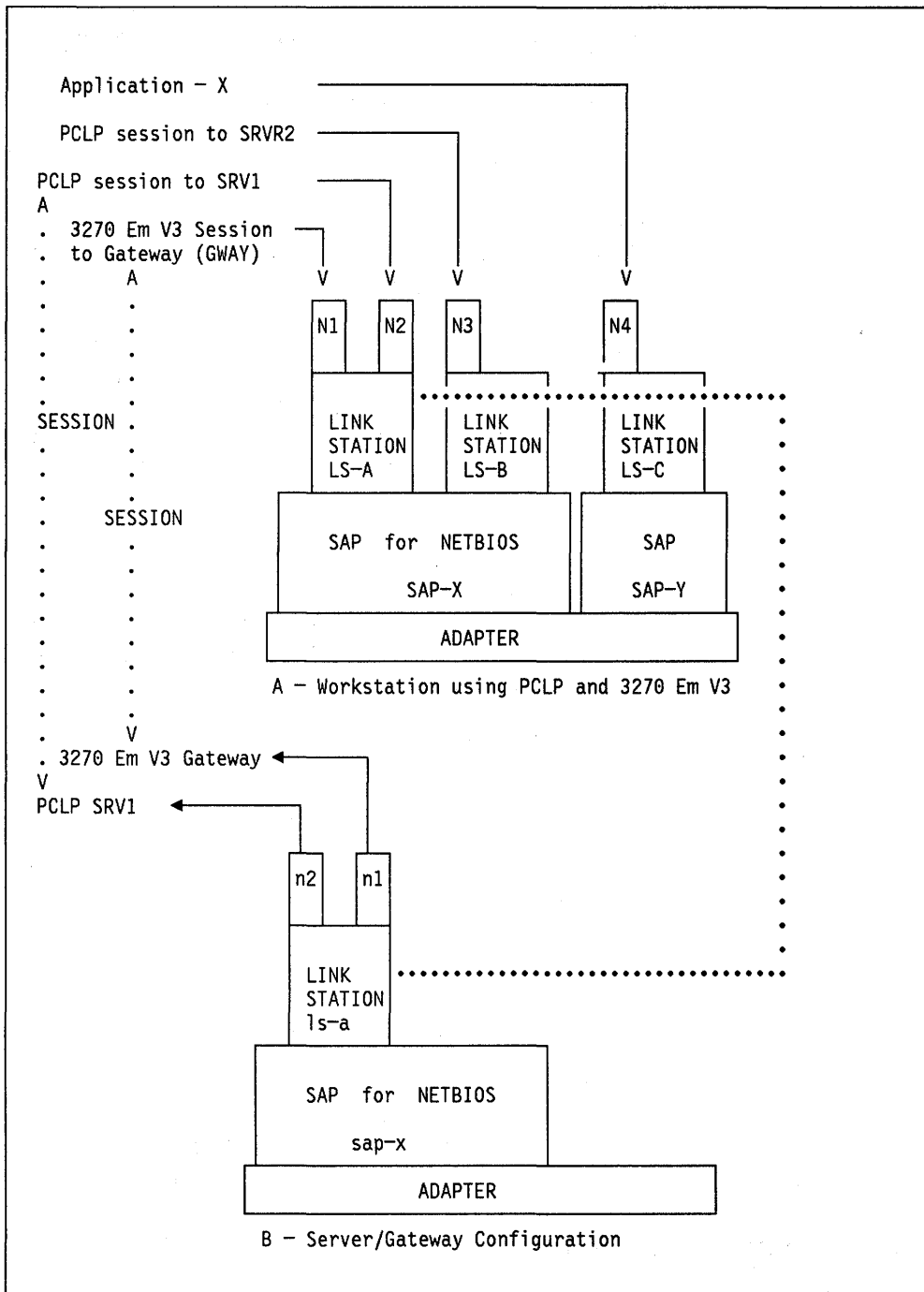


Figure 58. Service Access Points, Link Stations and Names. This shows the relationship between NETBIOS and other IEEE 802.2 applications to the IEEE 802.2 resources.

Figure 58 illustrates the resources and connections made. Workstation-A is running PCLP and 3270 Emulation to workstation-B which is BOTH the server and the 3270 gateway. NETBIOS has been allocated a SAP (X'F0'). Both these applications are NETBIOS applications and both use the NETBIOS SAP.

Each connection between workstations needs to be terminated by a link station. However, both applications on workstation-A are "connected" to workstation-B and so only one link station is required (LS-A). If the user on workstation-A

wishes to use another server, then another link station will be required (shown as LS-B). The thick-dotted line shows the link station connection (LSA-Isa).

Each application using the link station needs to be separately addressable and so each has its own name defined (N1, N2 etc). The sessions are established between names.

If another application 'talks' to the IEEE 802.2 (LLC) interface then another SAP is required. This is shown by the Application-X which has its own SAP (SAP-Y) and link stations(LS-C) defined.

As you can see in Figure 58 on page 96, each application will require resources from the adapter and PC memory; indeed, the SAPs and link stations, etc, are all control blocks in memory. These resources are allocated in different ways depending on how the adapter is opened. Understanding this is the key to calculating the correct parameters required.

- Case 1 - NET START opens adapter

When PCLP opens the adapter, NETBIOS will start in its OLD PARMS mode if no parameters were coded to DXMT0MOD.SYS. This means that the default resources it has allocated will be only 32 sessions, 32 commands, one SAP (for NETBIOS), etc. Consequently, if NET START has parameters which are requesting resources GREATER than those available (such as /SES=33 or more) it will only receive what NETBIOS has to offer and no more. This may result in some sessions being established, while others will fail.

- Case 2 - DXMT0MOD.SYS opens adapter

When the adapter is opened using the T0 device driver (that is one or more parameters are coded) the parameters specified are establishing a base structure for the adapter environment. This may be any number of SAPs, link stations, sessions, etc., depending upon the parameters you specify.

Then, for example, when NET START is issued, it takes for itself resources it requires from those already defined.

What this means is, if you have coded extra resources, then after NET START has taken its share, you will still have (depending on the parameters you have coded) the resources you require for other applications such as APPC/PC, 3270 Workstation Program, etc.

17.4.3 NETBIOS 'T0' Parameters

NETBIOS can operate in one of two modes as previously stated:

1. OLD PARMS mode (The DEFAULT mode)

The OLD PARMS mode for NETBIOS is activated by either coding NO parameters for T0, or by using the keyword OLD.PARMS.

Note, that if you use the installation aid without any changes then you will be using NETBIOS in the OLD.PARMS mode. If you have a server configuration or a gateway then you will probably not want this option.

2. FULL-FUNCTION mode. This is a more flexible mode for NETBIOS. There are many more parameters allowing more sessions and commands to be specified. This mode is used when you code at least one parameter for the

DEVICE = DXMT0MOD.SYS statement. The following table highlights some key parameters:

KEYWORD	ABBR	VALID VALUES	MINIMUM	DEFAULT
STATIONS	ST	0 - 254 (a)	1	16
SESSIONS	S	0 - 254	1	16 (b)
COMMANDS	C	0 - 255	1	12
NAMES	N	0 - 254	2	17
OPEN.On.LOAD	O	Y/N	-	Y
EXTRA.SAPS	ES	0 - 99 (a)	0	0
EXTRA.STATIONS	EST	0 - 99 (a)	0	0

NOTES

- (a) If this value is too large, the adapter open will fail.
Note, the maximum value allowed here typically exceeds current adapter maximum values.
- (b) The default value set by NETBIOS is based upon the number of link stations (STATIONS) defined.

Figure 59. NETBIOS Device Driver Keyword Table (DXMT0MOD.SYS)

17.5 Setting Parameters

This section will assist in coding only the parameters given in the table in Figure 59. This is because other parameters are for more detailed coding and it is assumed that the reader requires assistance on getting started, not on detailed NETBIOS parameter setting¹⁶.

To assist you in determining the correct values for T0 parameters, you should complete the charts which follow.

Where applicable, the equivalents to "NET START" parameters are shown to assist you to code these correctly, too.

17.5.1 Configuration Charts

There are four charts: two are for use with PCLP 1.2 or PCLP 1.3 Base Services and the other two are for use in an Extended Services environment. In each case, one chart is for a server/gateway station, the other for a network station (that is, a device using the resources of another machine on the LAN).

It is assumed that the network stations are either receiver or redirector configurations. If you are using the message-forwarding functions of PCLP 1.2 then you may need to change some of the default values given in the charts.

Complete one chart for each device as follows:

NOTE: If your application is the only application using the network in this device, and it is not using NETBIOS, you do not have to complete these charts, as the T0 module will not be used.

1. Decide which chart to use:
 - A or B for PCLP 1.2 or Base Services
 - C or D for PCLP 1.3 Extended Services
2. A and C are for network stations
3. B and D are for server stations
4. Answer each question, and put the result in any boxes which are in the same row.
5. If there are VARIABLES X,Y, etc, in the row, then select the appropriate value as given in the question.
6. If a particular section is not relevant, and defaults are given, **CROSS OUT THE DEFAULTS** so that you do not include them in your sums.

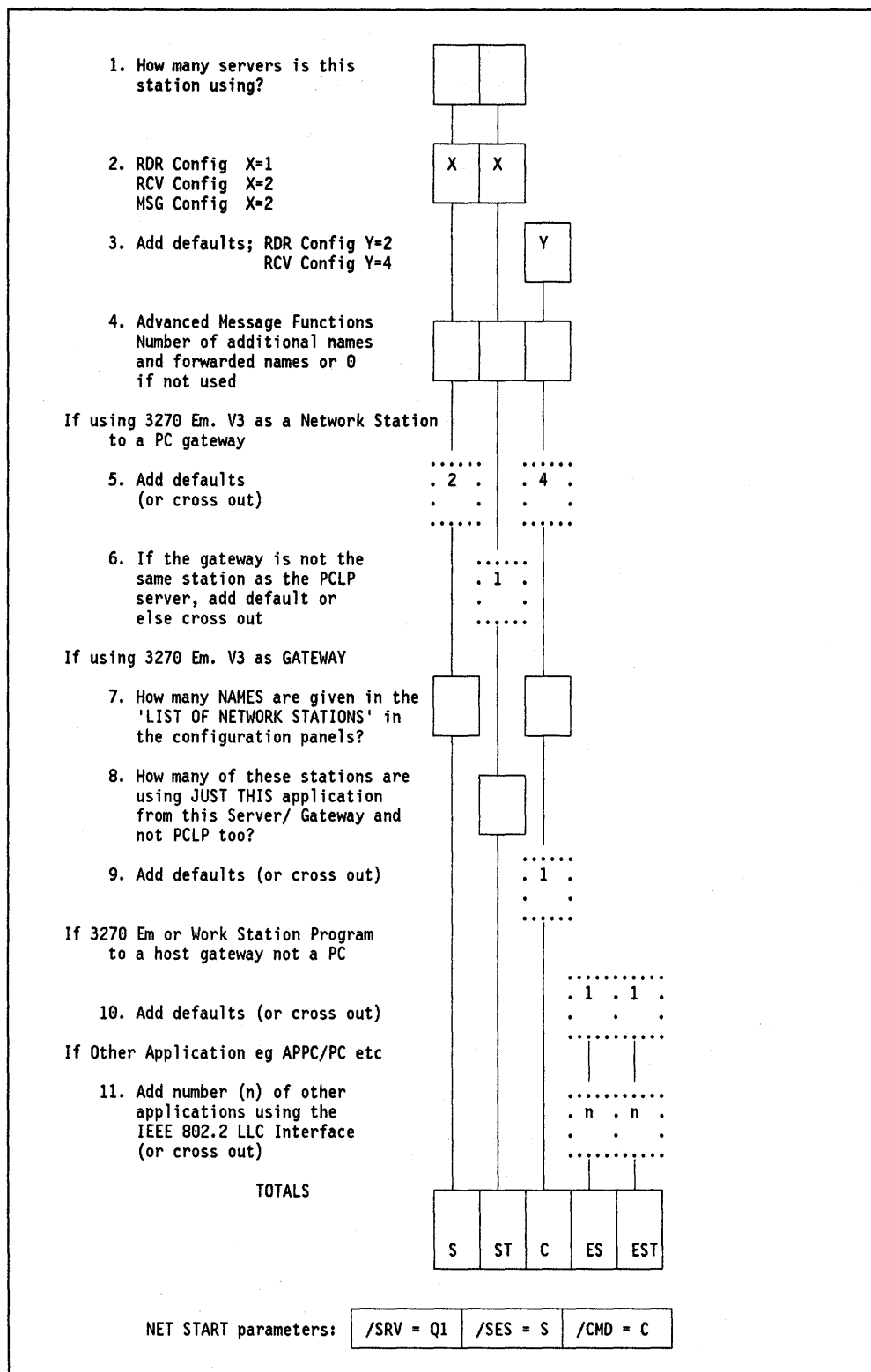


Figure 60. CHART-A. Use this Chart for Network Stations (PCLP 1.2 or 1.3 BS)

1. How many other servers is this Server using (=1 if dedicated)	<input type="text"/>	<input type="text"/>			
2. How many devices are using this as a server?	<input type="text"/>	<input type="text"/>			
3. Add defaults; (or cross out)	.....	3	2	11	.....
4. Advanced Message Functions: Number of additional names and forwarded names 0 if not used	<input type="text"/>	<input type="text"/>	<input type="text"/>		
If using 3270 Em. V3 as a Network Station to a PC Gateway	.....			.....
5. Add defaults (or cross out)	.....	2		4	.....
6. If the gateway is not the same station as the PCLP server, add default or else cross out	.....		1		.....
If using 3270 Em. V3 as GATEWAY					
6. How many NAMES are given in the 'LIST OF NETWORK STATIONS' in the configuration panels?	<input type="text"/>		<input type="text"/>		
7. How many of these stations are using JUST THIS application from this server/gateway and not PCLP too?			<input type="text"/>		
8. Add defaults (or cross out)				1	.....
If 3270 Em or Work Station Program to a Host Gateway not a PC					
9. Add defaults (or cross out)				1	1
If Other Application eg APPC/PC etc					
10. Add number (n) of other Applications using the IEEE 802.2 LLC Interface (or cross out)				1	1
TOTALS					
	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
	S	ST	C	ES	EST

NET START parameters:	/SRV = Q1	/SES = S	/CMD = C	/RDR = Q2
-----------------------	-----------	----------	----------	-----------

Figure 61. CHART-B. Use this Chart for Gateways and Server Stations (PCLP 1.2 or 1.3 BS)

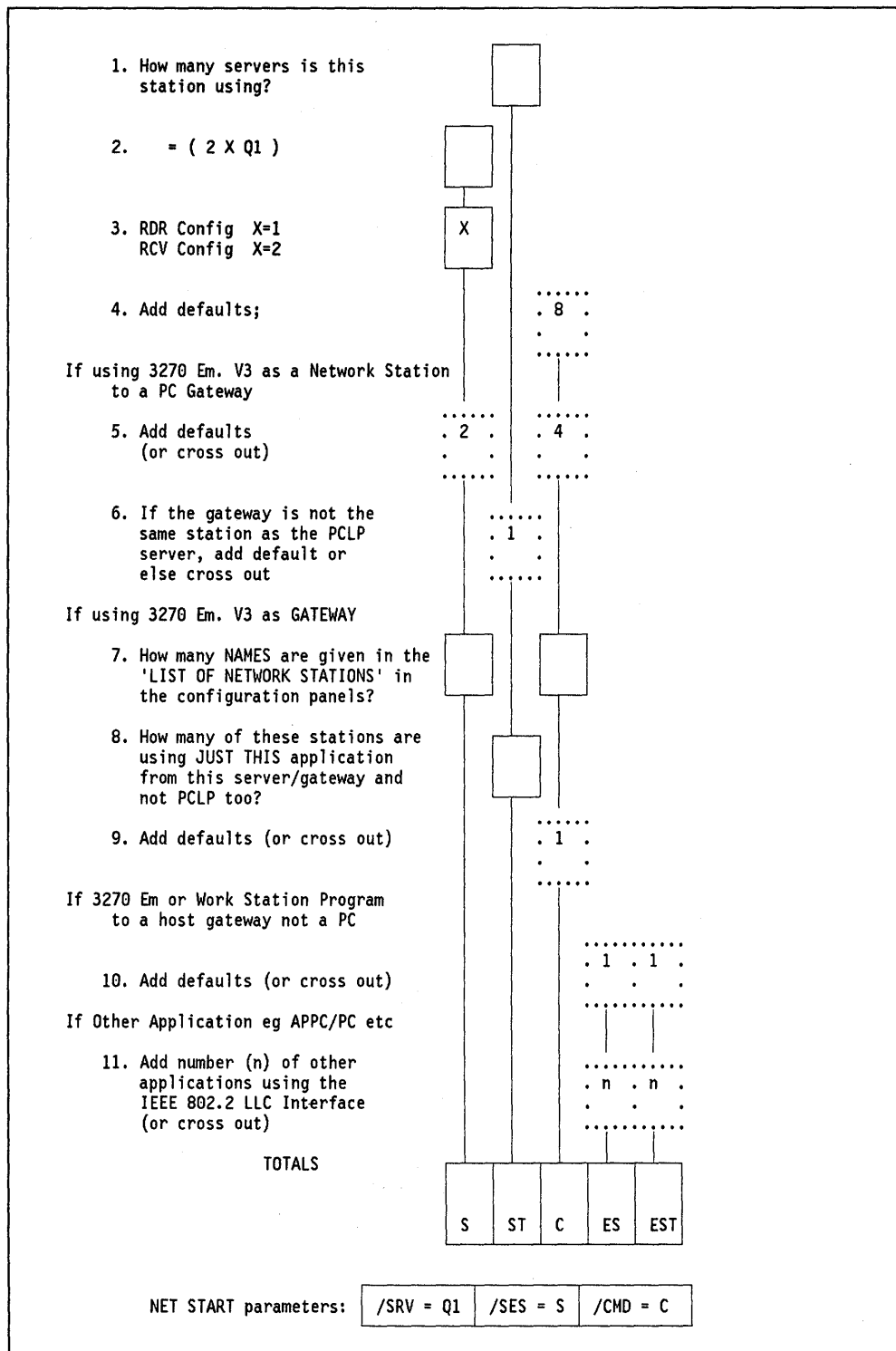


Figure 62. CHART-C. Use this Chart for Extended Services Workstations - PCLP 1.3

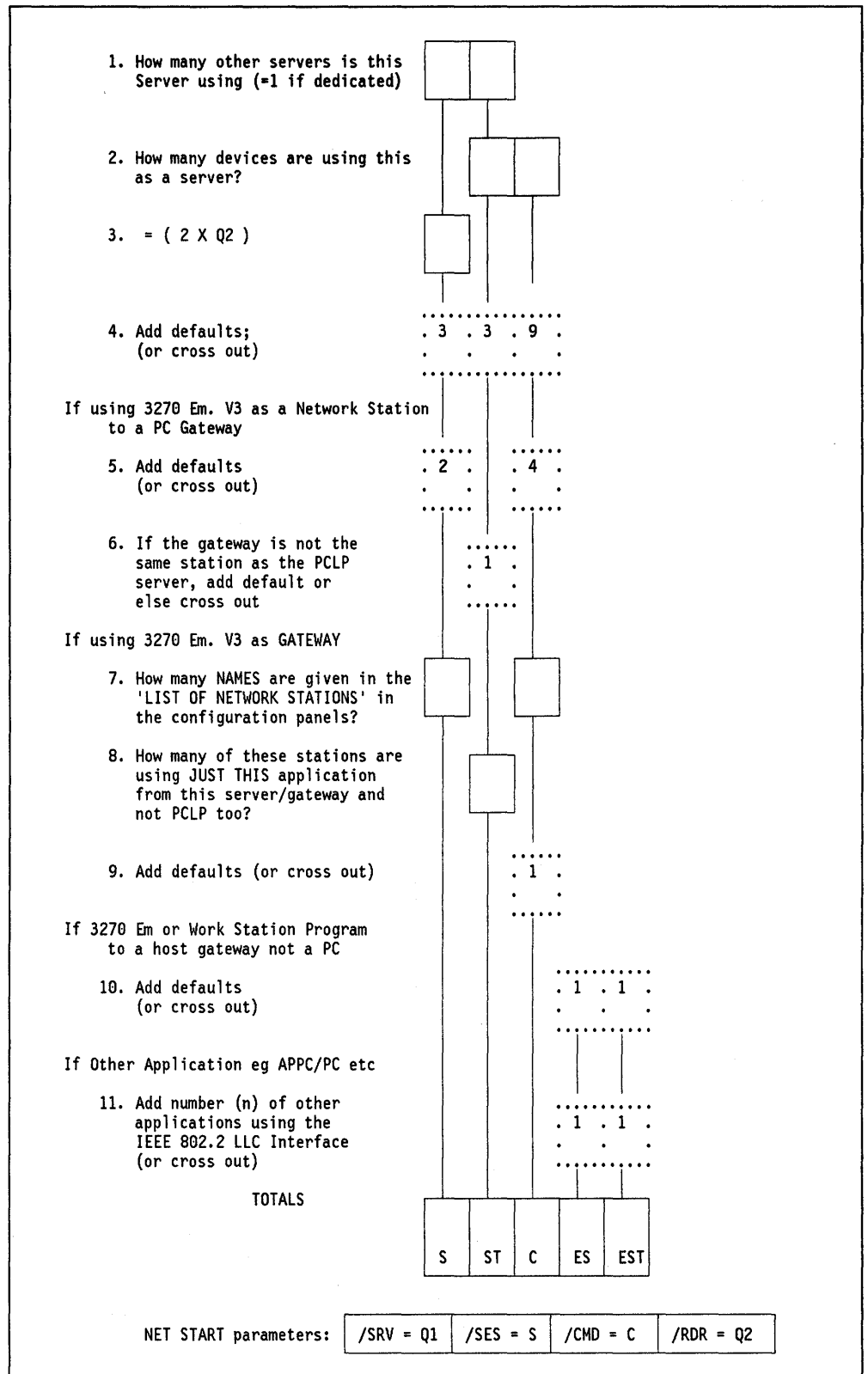


Figure 63. CHART-D. Use this Chart for Extended Services Server and Gateway Stations - PCLP 1.3

17.6 Installation Steps

The LAN Support Program comes with an installation aid on the program diskette. This aid helps you to select the modules of the LAN Support Program that you require. It does not set or change any parameters.

The selected device drivers will be installed to the root directory and a new CONFIG.SYS is created. The old one is renamed CONFIG.001 and you may need to edit the new file.

1. Insert the LAN Support Program diskette into the A-drive and type:
DXMAID
2. The question **Will this copy of the program be used in THIS computer?** appears after the copyright statement. If your answer is "Y", then the configuration aid will not ask you about the adapters you are to use as it can determine those present in your system.
3. The next question is **Do you want program support for the original PC Network Adapter? (Y/N)**. If you answer 'Y' here, then DXMG2MOD.SYS is used.
4. The next question is **Will the Workstation Program be used? (Y/N)**. If your answer is "Y", DXMC1MOD.SYS is used instead of DXMC0MOD.SYS.
5. The next question is **Will programs that need NETBIOS interface be used? (Y/N)**. If your answer is "Y", then DXMT0MOD.SYS is used.

Programs such as PC LAN Program V1.2, V1.3, 3270 Emulation Program V3 in network or gateway mode use the NETBIOS interface.

6. The next question is **What drive do you want the Support Program copied onto? (A, B, C, ...)**. If this configuration is for this system, and this system has a fixed disk, then specify "C" here. This will place all the modules onto your C-drive in the root directory. The CONFIG.SYS file in that location will also be updated.
7. The instruction **Choose which adapters you want the Support Program for** appears only if you previously specified that you were configuring LSP for another PC.
8. The instruction **Place a formatted system diskette in Drive A. The configuration you requested will be created on this diskette** appears only if you have previously chosen a drive other than C.
9. Now that the LAN Support Program has been installed, you may need to change some of the parameters as outlined in previous sections. Or, you may wish to move the LAN Support Program modules to a subdirectory; if so, you must change the CONFIG.SYS statement to include the new path, for example:

```
device=c:\LSP11\DXMT0MOD.SYS
```

To use the LAN Support Program, you must now re-IPL your system. The LSP modules are automatically loaded.

17.7 Basic Troubleshooting

The majority of problems that occur with the LAN Support Program are due to the NETBIOS parameters being set incorrectly. While every effort has been made to assist in determining these parameters by the use of the configuration charts, it is recommended that you attempt to understand the way in which NETBIOS uses resources. Once this is understood, it is simple to manually calculate resource requirements correctly.

The PC LAN Program and the 3270 Emulation Program user's guides both have sections on how to determine NETBIOS resources. For more information see below.

17.8 Where To Go For More Information

- *GG22-9430 Guidelines For Setting IBM LAN Support Program Parameters for use with Selected IBM Products*
- *DXMINFO.DOC* found on diskette with the LAN Support Program Code
- *IBM Token-Ring Network Architecture Reference P/N 6466689*
- *GG24-1737 PC Token-Ring Network and NETBIOS Applications.*

Chapter 18. PC LAN Program V1.3

18.1 Overview

The PC LAN Program Version 1.30 is a major enhancement to the PC LAN Program V1.20. It provides, through the network, the sharing of resources among many workstations. Some of the enhancements over Version 1.2 are:

- Superior management of resources
- High security
- Support of medialess workstations.

This guide is written primarily for the administrator who is setting up the LAN environment.

There are two ways in which you can use PCLP 1.3: Base Services (BS) or Extended Services (XS).

18.1.1 Base Services

This option gives the basic functions provided with PCLP V1.2 with performance enhancements.

18.1.2 Extended Services

The PCLP Extended Services introduces new concepts and services not available with PCLP 1.2 or Base Services.

Users are able to transparently access resources (data, applications, printers, disks, etc), whatever system they may be on, wherever they may be on the network, while being totally hidden from the underlying communications and administration.

Users of the LAN resources now have user IDs. They can log onto the LAN using any Extended Services workstation. Their logon is processed by the domain controller which controls access to LAN resources. If the logon is successful, the user's profile is retrieved from a server which holds this user's profiles and other personal data in their "home fileset." The user is then presented with his Application Selector menu which lists the resources and applications he is authorized to use.

These functions make the Extended Services *user-oriented* rather than *machine-oriented* as in PCLP 1.2 or the Base Services.

The establishment of sessions between the user and the resource, the authorization of access to applications and data and the repository of all the user IDs and passwords, etc, are done as a centralized function on a domain controller.

The domain controller controls access to ALL system resources defined to it. Thus a user requesting an application from his menu has the request checked by the domain controller, which then allows the establishment of a session between workstation and server. The user then has access to the application

unaware of the underlying process of the LAN. Note that this process is performed for a user ID, not a machine ID.

Apart from the users of the LAN, there needs to be a person who sets up the authorization of access on the domain controller. This is the system administrator's function. The administrator's task is to manage the access and authority that LAN users have to LAN resources.

Base Services do not provide these functions; instead, users can share their resources with each other on an informal basis. If you want to use someone's printer, you ask them to share it, they issue a command to share it on the network, and you issue a command to use it.

Alternatively, using Extended Services, one skilled administrator can provide users with formal structured access to specific resources and can free users from the network commands, allowing them to simply use the applications they require.

The following is a definition of some of the concepts of Extended Services.

Before planning, migrating or installing your LAN, you will need to understand the following concepts with which you will be working.

- **Domain** A domain is a self-contained group of servers, applications and users on a LAN.

An organization with different departments could divide the LAN into logical work groups by defining one domain for each.

- **Domain controller** There is only **one** domain controller per domain. It is the primary server in the domain, holding definition information on all the users, applications, and other resources within its domain. It also coordinates its users and resources as one single set, regardless of where they are located. The machine ID of the domain controller is also the name of the domain in which it resides.

A domain controller is a server but with extra responsibilities. It can function as a regular server on its domain if necessary.

Only an administrator can log onto a domain controller, but an administrator can log on anywhere to manage the domain controller information. In order for the resources on its servers to be made available, this machine must be the first to be started on the domain.

- **Servers** In each domain there may be one or more additional servers. These may be sharing disk resources and applications; they may be printer and/or remote program load servers, remotely loading up RPL workstations as assigned to them by the system administrator.

Each server is defined in the domain controller, and only an administrator belonging to the home domain can log onto a server.

Although a user's applications and directories may be physically located on multiple servers, he is unaware of this. The connection between server resources and users is always made by the domain controller. Although technically a server does not have to be dedicated, memory requirements limit what can be done with such a configuration. An administrator can at least log on and carry out administrative LAN tasks.

A server can only be defined in one domain controller, that is, it cannot belong to more than one domain.

- **Workstations** While every user of the LAN is defined to a domain, the workstations themselves are not. When you log on from a workstation, you have to specify your user ID and the domain you require. Your domain controller looks up your user ID for validation. It has no interest in the machine you are working on (unless it is a server).

The only machine IDs that are defined in the domain controller are those of its servers, and those of RPL workstations for assignment to an RPL server.

Under PCLP 1.3 Extended Services, workstations can be configured as redirectors or receivers; the messenger configuration is only valid under Base Services. Receivers can send and receive messages using the LAN message facility as in PCLP 1.2. Redirectors can only send messages. Because this configuration is determined in the machine's "NET START" parameters, a user's message function is not related to user ID, but to the machine being used. Therefore it makes sense in an installation to set a standard configuration for all workstations.

- **Remote Program Load** A workstation that is remote program loaded means that its initial startup files are sent to it from a remote machine without it reading from, or needing to have its own disk media.

Medialess workstations can be started up on the LAN by just being switched on. Each RPL workstation requests its start-up image file from its defined RPL Server.

- **System Administrator** Each domain requires a system administrator. With special administrator status, this person defines which users can log onto the domain, how network resources are to be shared, and with what level of access. This person can manage the LAN in this way in addition to carrying out his own user tasks.

The administrator can log onto the domain controller from any workstation or server in the domain. You should have at least one administrator per domain; the system does not stop you from creating more than this, but will only allow one administrator to use the administration services at any one time.

- **User and User ID** With PCLP 1.3 a user logs onto the LAN in order to use its resources. All the applications reside on servers on the LAN, on a shared or private directory, so that the user can work from any Extended Services workstation.

At the logon screen, the user is prompted for a user ID and domain ID. He may then be required to give a password. If the domain specified recognizes the user ID and password, the user is logged on. Otherwise their logon attempt fails. A user can log onto his home domain from any workstation on the LAN, but not from a server which is reserved for administrator use only. A user can also be defined to more than one domain, but can only be logged onto one at a time, since the user ID must be unique on the whole LAN.

- **Passwords** Passwords are required at logon time. When the system administrator defines a new user to a domain, the use of a password is offered as an option. Once the user has been assigned a password, he can change it himself using PCLP "User Services."

Security of the domain's resources is controlled through the administrator's assignment of specific resources to individual users. The only time password access to resources might still be used is in the accessing of a resource outside the user's domain where a user is accessing external rather than internal resources.

- **Internal Resources** These are resources which are defined and controlled within the domain. They may be programs, data files, directories or printers which physically exist on any of the servers defined in the domain.

To give a user access to these resources, the system administrator defines them in the domain controller, and can then assign the user to each one individually, specifying read only or update access for each resource-user relationship.

- **External Resources** These exist outside the home domain, whether that be on a server in another domain or on a Base Services server. They are controlled and defined from outside the domain, but are also defined on the home domain controller, as an external resource. The sharing-out of resources across domains is a function of Base Services, since the resource to be shared requires the appropriate "NET SHARE" command, and the users need corresponding NET USE commands to be issued.
- **Filesets** A fileset is a name used to identify a disk, directory or subdirectory, including all programs and/or data files under it. Before allowing application access to users, the system administrator needs to define the relevant filesets, and then assign them to individual users.

With DW4 for example, the program may be in one subdirectory, and the library of shell documents in another; by identifying each of these as a fileset and assigning them to a user, the system administrator can give users controlled and transparent access to the programs and data they need.

Filesets can exist on different servers, even within the same application, but are still defined and assigned in the domain controller. Thus a user has no need to know where the filesets are located, since the system takes care of that for him.

Filesets are defined to be static or dynamic. Static filesets are assigned to users when they log on, while dynamic ones are only assigned on request.

- **Application Selector** When you logs onto the LAN as a user or administrator, you will initially see a menu called the "Application Selector." Once applications have been added, they will also appear as options on this menu. Users can go straight to applications without having to go through DOS. Similarly, ending an application will bring the user back to this menu.

As an administrator you will have an extra option on your application selector, which takes you into administrative services. It is through the screens behind this that you will perform most of your administrative tasks.

18.2 Planning

18.2.1 Prerequisites - Hardware

There are different requirements for hardware depending upon whether you install Base or Extended Services.

18.2.1.1 Base Services

- One of PC, PC-XT, PC-AT, AT/370, AT/G, AT/GX, PS/2 Mod 30, 50, 60, 70, 80
- A diskette drive
- Optionally printers, optical disks, additional fixed disks
- For the server
 - Fixed disk
 - 350 Kb of RAM
- LAN adapter cables

The different configurations of the Base Services require the following memory:

- Server 350 Kb
- Messenger 160 Kb
- Receiver 68 Kb
- Redirector 50 Kb

18.2.1.2 Extended Services

At least one station must be a server; the other stations can be either additional servers or workstations.

- For the server
 - PC-AT or PS/2 Mod 50, 60, 70, 80
 - Diskette drive
 - Fixed disk
 - 640 Kb of RAM
 - LAN adapter
- For the workstation
 - PC, PC-XT, XT-286, PS/2
 - 512 Kb of RAM
 - Appropriate LAN adapter (with RPL if required).

18.2.2 Prerequisites - Software

- LAN Support Program V1.02 or the IBM PC Network Protocol Driver program
- DOS V3.3 or higher.

18.2.3 Migration from PCLP V1.2

If you are migrating from older versions of PCLP, check the following:

- You should rename your current AUTOEXEC.BAT file. Once PCLP 1.3 is installed, you can then edit the new file to include the old AUTOEXEC.BAT commands you desire - this is especially true for PATH statements.
- If you are the system administrator, then you need to determine how the current use of resources will be established under an Extended Services environment.

- If you are installing Base Services only, then PCLP Version 1.3 appears very similar to PCLP Version 1.2, especially from a user point of view.

You can still use the Base Services to share resources from a Version 1.3 server to Version 1.2 workstations. This means that you can still issue "NET SHARE," "NET USE," etc, in the AUTOEXEC.BAT file if you wish to do so. You do not require the old PCLP V1.2 code to do this, this function is provided by Base Services, which is also included when you install Extended Services.

18.2.4 Migration To OS/2

OS/2 Extended Edition (V1.1 or V1.2) has the LAN support integrated as LAN Requester. OS/2 LAN Server (V1.0 or V1.2) is an optional program product that provides the LAN server function in OS/2 LAN environment. So, OS/2 Extended Edition and the OS/2 LAN Server program together incorporate the functions provided on PCLP V1.3.

PCLP V1.3 Requesters can access OS/2 LAN Server V1.0. There is no real migration from PCLP V1.3 to the OS/2 LAN products.

18.2.4.1 Compatibility

If you are moving from PCLP V1.3 to OS/2 LAN products, it may happen that you need to have some stations with PCLP V1.3 and some other stations with OS/2 LAN products. In such situation, **only** PCLP V1.3 workstations can access the OS/2 LAN Server V1.0 and **no other** combination is officially supported.

18.2.5 Installation Planning

It is very easy to install PCLP 1.3 on a few machines. However, as the size of your network increases, and the number of objects such as users, applications, servers and filesets increases, the administrator will have an increasingly important role to play in the management and security of the LAN environment.

It is vital that you plan your network. By setting up a few rules now and establishing a structure for naming and access, etc, you will make your LAN environment very simple to control as it expands. Here is a checklist of some of the things you as administrator should think about:

- What machines can share applications?
- What machines can share printers?
- What machines can provide RPL support?
- What machines must be RPLed?
- What machines belong to each domain?
- What applications can be shared?
- On what machines do the applications reside?
- In what directories are the applications installed?
- Who can use those applications?
- What type of access does each user have to each application?
- Who can use each printer?
- Who else can act as an administrator?
- What resources can be outside a domain?
- The unique ID of each user, machine, printer and fileset?

18.3 Installation Steps

There are several different machine options you can install with PCLP 1.3. They are:

1. Domain controller
2. Extended Services additional server
3. Extended Services workstation
4. Administrative Installation options

In addition to installing the PCLP code onto the specific devices, we also need to administer the network. Some of the administrative installation options are:

- Defining Extended Services servers to the domain controller
- Defining users to the domain controller
- Installing applications.

5. Base services

- Server
- Workstation.

This section will cover a brief description of the installation steps for the above items except for Base Services.

You should install the domain controller first as all other Extended Services resources need to be defined to it. This is not essential but it helps to avoid confusion and unnecessary error messages.

The order of installation should be as follows:

1. Install PCLP Version 1.3 to a domain controller.
2. Define additional servers to the domain controller.
3. Install PCLP in the additional servers.
4. Define additional users.
5. Install applications.

There are some similar steps that need to be done for all options.

The section below covers those general steps that begin all installations.

18.3.1 General Considerations

PCLP 1.3 comes on eleven 5.25" diskettes, or five 3.5" diskettes.

1. Preparation.

You should check the following:

- When the program loads, it will look for a NETBIOS interface; you should ensure that this is present. For more information, see "LAN Support Program V1.1" on page 87.
- If this station is to be a server (or domain controller) you should know if cache is to be used.

- If this station is to be a server (or domain controller) ensure that no memory-resident programs are loaded in the AUTOEXEC.BAT - this application uses a lot of memory.
 - If you are installing a server which will be using the LAN Support Program interfaces you will also need the LAN Support Program diskette at hand.
 - Write down the PATH of the directory that DOS is installed in. You will need this information later.
2. To install the program, insert diskette-0 and type:

A> INSTALL.

Make sure that you are using DOS 3.3¹⁹ or higher and that in the CONFIG.SYS file you have specified at least:

FILES=20

If this value is not big enough, then the following message is displayed:

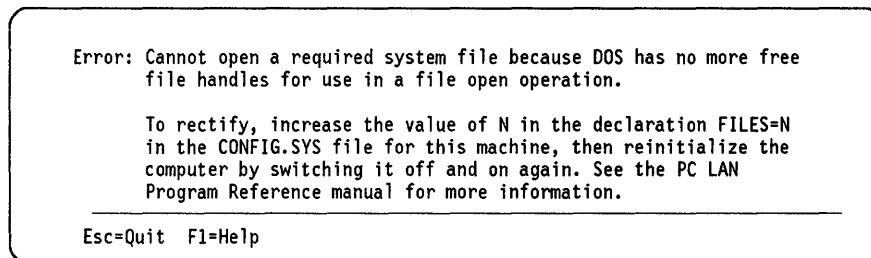


Figure 64. PCLP 1.3 Error Screen

3. After the IBM copyright panel is displayed you will then get two more information panels explaining the options available to you and assumptions it is making about the environment.
4. Now you are asked to "Select the level of function to be installed," Base or Extended Services. In this instance we are installing Extended Services.
5. Having chosen Extended Services, you are then asked to "Select the Extended Services configuration type for this machine." Will it be a workstation or a server?

At this point you should select the following options:

- Server

This configuration is chosen for both a domain controller and a server station.

- Workstation

This option is chosen for a device that is to be a workstation and will not be sharing (via Extended Services) its resources.²⁰

¹⁹ You must ensure that all the DOS files are installed. If some are missing an error message will be displayed.

²⁰ All devices are able to use Base Services to share their resources on the LAN at anytime by using the appropriate NET command as in PCLP V1.2.

Do not install PCLP Version 1.3 onto a workstation that is to be loaded with RPL.

6. You are then prompted with **DOS path** to specify the path to the DOS directory.
7. The last step in this section is to specify this machine ID and the domain ID in which the machine participates.

If you are installing a domain controller, then the domain ID **must** be the same as the server ID²¹.

8. If you are installing a server configuration, you will now be prompted to insert the LAN Support Program diskette. The installation utility copies the relevant files to disk and adds some parameters to the device drivers²².
9. You will now be prompted to insert the remaining diskettes. In the case of the servers, all the diskettes are used; the workstation configurations use slightly less.
10. Whenever, during this next phase of installation, a piece of "user-defined" code needs changing or adding to, then the installation aid displays a pop-up panel showing the current line and the line that replaces it.

After the last diskette is copied, there will be a bit of extra processing. If the new path command differs from the current one, you will be prompted to accept the change or make additions. If the recommendation is the same as existing code, or did not exist before, then the pop-up panel is not displayed as the command is inserted regardless. These are typically statements in AUTOEXEC.BAT or in CONFIG.SYS but other things are checked, too.

11. Installation is now complete and you are given the option either to re-IPL your system with the new network options or return to DOS.

It is probably best to go back to DOS and check your AUTOEXEC.BAT and CONFIG.SYS files to ensure that they do contain the commands you require.

That concludes the general installation steps.

18.3.2 Domain Controller

To install the domain controller, follow the steps below:

1. Install the PCLP V1.3 code onto a suitable system (see the "Planning" on page 111).

During the installation phases outlined in the "General Considerations" on page 113 section above, you should have taken the following options.

- Extended Services
- Server station
- Server ID to be the SAME as the domain ID.

At the end of the initial phase you will have been prompted to change your FILES = statement to FILES = 100 if it was not already at that value.

²¹ This is the only place where you specify that this is to be a domain controller configuration.

²² For an explanation of these LAN Support Program parameters see "LAN Support Program V1.1" on page 87.

2. Re-IPL the system.

The system then initializes itself. You will see various panels appear as this is done.

3. As a domain controller, you will then be presented with the option panel. Note that this panel and subsequent panels will "time-out" and proceed with the default installation of the domain controller.

If you want to do any work on the system, like install a new application or define a user, etc, then you may not wish to start the network until this administrative task is completed. No one can use the domain resources until the domain controller is started.

If you choose not to start the network, then proceed to the administrative functions. See the section on "Administrative Functions."

4. If you choose to start the network, then you are prompted to specify if cache is to be used. Note, this screen also times-out after 30 seconds. If you do not want cache, press ESC.

5. Once the network is started, you are then presented with a logon panel.

If this is the **initial** creation of the network or domain controller, then a standard ID is already allocated to allow you to gain access to the system. Log on using the ID "ADMIN."

This default user ID requires no password.

Notice that the logon is validated by the domain controller and your environment is then established. After successful logon, you will be presented with the "Application Selector" menu.

If you experience problems here due to lack of memory, a message is displayed. Make sure that you have no memory-resident applications loaded in the AUTOEXEC.BAT. Alternatively, you can reduce the FILES=n statement in the CONFIG.SYS, but watch out for performance degradation.

Problems due to lack of memory may be caused by the use of memory assigned to the use of buffering data (cache). When in Base Services, cache is assigned a default value of 112 Kb and in Extended Services 0 Kb is the default value.

Now proceed to the "Administrative Functions" section where you will start to define the network.

18.3.2.1 Administrative Functions

The tasks of an administrator are as follows:

- Starting and shutting down the system from the domain controller
- Defining users
- Defining printers
- Defining applications
- Defining filesets
- Defining images
- Defining who can use each of these resources
- Setting the system date and time
- Managing the print queues
- Providing system security.

See "Planning" on page 111 for a planning checklist.

Once you have defined the system, you can print out a copy of the domain data base using the "PRINTDDF" command.

A major part of the administrator's role is to protect the programs and data held within the system and preserve the user's privacy.

Having installed the domain controller, you should now start to define some of the base resources that will make up your LAN environment.

This section will cover the following:

1. Defining an additional server to the domain controller²³
2. Defining a user who can use the domain resources
3. Installing an application for use on the domain.

To perform these functions you need to be a system administrator. When you first install a domain controller there is a default administrator ID already set up for you to use.

General Steps

1. Log on using the ID "ADMIN" in the "User Logon" panel, you will eventually be presented with the "Application Selector" menu.

To perform any PCLP tasks, you choose option "PCLP" from this menu to get to the "PCLP Functions" menu.

2. To perform administrative tasks you should choose the "ADMINSRV" option.
3. You will see a panel that gives you several options in the action bar at the top of the panel. You should choose "Manage" if you want to add system definitions, etc. This panel also shows you a list of users logged onto the system at that time and the domain applications they are using.

If you choose the "Manage" option then another pop-up appears. You should press Enter to continue.

4. Now the "System Management Services" panel is presented which shows all the resource types that you may want to administer. **It is from this point that all the other tasks of defining machines, user IDs, and applications, etc, start from.**

Select from the action bar at the top of the screen the function you require.

Defining Additional Servers

The first thing you should do is define other servers that you have in the system.

1. Choose the option "Machines" from the action bar on the "Systems Management Services" panel. You will then have to decide if you will maintain

²³ Note that you only need to define a workstation to the domain controller when it is a RPL workstation. Otherwise, the domain controller does not care about workstations, only users and resources.

machine details or work with new machines (this is a pop-up panel). You should select "NEW."

2. Give the machine ID name and specify it as a server.
3. Now you have the option to type in some details about the device, a descriptive name so that you can identify it more easily. Also, you can decide here whether or not this server will support RPL for medialess or other workstations.

This is all that is required to define a server to the domain controller. Now, when you start the server, it will be accepted into the domain.

Installing a User

Again, you must begin from the "Systems Management Services" panel.

This time, to illustrate the function of PCLP1.3, let us assume that you have logged off the domain controller, that you have already installed the PC LAN Program 1.3 onto a server (the installation of code to a server is covered in the next section) and you have logged onto that server as "ADMIN."

This is to illustrate that a user ID is independent of particular machines, and that the function and resources you can access is also independent of individual machines.

1. From the "Management Options" menu, choose the option "USERS" and you will then get another pop-up menu asking if you wish to add new users or maintain users. We will select option "NEW."
2. The next option asks for a user ID. Type in the user ID that you are adding.
3. PCLP will then allow you to model this user ID on existing user IDs, or create your own profile for this user. We will select NEW in this case.
4. Having chosen this to be a NEW user model type, you will then be asked to select a server on which all this user's profiles, other administrative data, files and home filesets will be created and stored.
5. The next stage is to complete the details about this user, what privileges he is to have, whether he will require a password (or not) to log on.
6. If PASSWORD is specified, you will then have to set the password.
7. Finally, if you wish to change any of the details for this user then you are given this option next.
8. You will now have finished installing the new USER.

If you wish, you can now continue and install more users.

Installing an Application

It is the administrator's job to ensure that applications are installed on the network servers and are shared between users in a correct fashion.: The sequence of actions for installing an application are:

1. Decide on which server in the domain the application is to reside
2. Create a subdirectory for the application
3. Install the application into that subdirectory

4. Define a fileset to hold the application
5. Define user access to that fileset
6. Define the application to the domain
7. Add the application to the "Application Selector" menus of the selected users.

You should perform these tasks in order.

1. First, you must create a fileset for the application. Choose the "Filesets" option from the "Systems Management Services" panel. Then choose "New Fileset Details."
2. You must specify the name of the fileset. This should be unique within the domain.
3. You can now include a description of the fileset, and specify if it is to be internal or external²⁴. If the fileset's directory is on one of the servers in the domain, then this fileset is internal.
4. All the servers that you have defined to the system will be shown in the next panel. You can assign this fileset to any listed server; however, you should choose the server on which you installed (or intend to install) the application.
5. You now assign a drive on which this fileset will reside and the path to the fileset on that drive. The "share mode" prompt asks you to indicate how this fileset will be shared. If you choose static, then the fileset is shared when the network starts, if you specify dynamic, then it is not shared until the user requests it. If you share an A drive, then you should specify this to be a dynamic share mode. Choosing dynamic also helps conserve network resources.
6. You are then presented with a list of users that are defined to the system. Select users who will have access to this fileset.
7. You then have the option to decide upon the access each of the users you have selected will have to this fileset. If you choose "R," then "Read-Only" access is granted; however, if you wish to give someone "Update" access, change this to "U."
8. You have now completed the definition of a fileset. You are returned to the "Systems Management Selection" panel.

The next stage is to define the application. From this panel select "Applications."

9. A pop-up panel appears; you should choose NEW application details.
10. Type in the name you want this application to be known by.
11. Specify how the application is to be used.

Type in a description of the application, and also the DOS command required to invoke it. If you specify "YES" to collect parameters, then when the application is started, a pop-up panel will ask the user to type in any additional parameters - this could be the name of a file to be edited, for example. The "current fileset" is the place where you are going to be

²⁴ An external fileset is one that does not reside on one of the servers in this domain.

working from. If you specify "NO," then when a user uses the application, the application will take his current fileset (that is, directory, drive, subdirectory, etc) as the one to look for data/files, etc, unless otherwise specified. If you specify "YES" then you have to choose a fileset to be made current when this application is invoked. Utilization of additional filesets can also be indicated.

12. Next, select the fileset which contains the application.
13. Specify the path to the application within the chosen fileset. Also specify the drive. "NO" takes the defaults.
14. The installation aid builds a batch file that is used to invoke the application when a user requests it. You are given the option to change this. In this example, no modifications have been made.

This completes the question-and-answer section for installing an application. The installation aid now builds a batch file based on your responses that is used to invoke the application.

15. As an administrator, you can then add this application to the user's "Application Selector" menus. This is achieved by "Maintaining User Details" from the "Management Services" menu; select a user to update. From the "User Details" menu, select "MORE" and the "Application Selector." This will then allow you to add the application to the user's "Application Selector" menu. Repeat for all the users. Alternatively, the users themselves could do it. This is now shown in more detail. They perform this function using the "User Administration" selection from the PCLP functions menu.
16. You can change several different assignments including your default drives and filesets; however, you need to work with the "Application Selector."
17. Your current application selector menu (the items you can change) is presented with several options listed in the action bar. Choose to ADD.
18. An application that is added to the application selector can be either private or shared. In this case we are adding a shared application. A private application is one that only you can use and consequently is installed in one of your filesets. Note that a private application is not local, that is, it still resides on a fileserver in one of your allocated filesets; it does not reside on your local disk.
19. You will then be given a list of all the applications which you are authorized to access. In this case, only one application has been added and this is all that you see. Select the application and it will be added to your "Application Selector" menu.
20. You are then returned to a screen that shows you what your new "Application Selector" menu looks like. You now can rearrange the order, etc, if you wish.
21. This is the end of the procedure for installing an application. More complicated applications can also be installed using this technique. Please refer to the *International Technical Support Center - PCLP V1.3 Guide* for more examples.

This is the end of "Administrative functions."

18.3.3 Installation of Additional Servers

Now that you have defined a server to the domain controller, you can install PCLP Version 1.3 onto a machine to create this server.

This server is in addition to the domain controller. It is probably advisable to install additional servers for different applications to enhance performance.

Installing the server is similar to installing a domain controller. The difference is in the server ID used.

1. Install the PCLP V1.3 code onto a suitable system (see the "Planning" on page 111) by following the steps as outlined in the "General Considerations" on page 113 section. You should have taken the following options.

- Extended Services
- Server station
- Server ID to be the different from the domain ID.

2. Re-IPL the system.

The system then initializes itself; you will see various panels appear as this is done.

3. You may experience several problems when starting the server configuration. These problems are highlighted below.

- Domain controller Not operational

On starting the server, you get an error message. As this station is an additional server, it needs to have the domain controller online to find out about its operating environment. An additional server cannot operate without its domain controller being active. The solution is to ensure you have a domain controller defined and make it operational.

- Server not defined to the domain controller

Although the domain controller is online and this station can communicate with it, the domain controller does not recognize this station as one of its additional servers and this message is displayed. The station can start up but will operate just as a workstation.

You need to define this server to the domain controller; log on as an administrator and perform this task.

After successful logon, you will be presented with the "Application Selector" menu.

- If you experience problems here due to lack of memory, a message is displayed. Make sure that you have no memory-resident applications loaded in the AUTOEXEC.BAT. Alternatively, you can reduce the FILES=*n* statement in the CONFIG.SYS, but watch out for performance degradation.

Problems due to lack of memory may be caused by the use of memory assigned to the use of buffering data (cache). When in Base Services, cache is assigned by default a value of 112 Kb and in Extended Services 0 Kb is the default value assigned to cache.

4. If all proceeds well, with none of the above messages, then you will get a logon screen appearing. You can then log on to the LAN services with any valid user ID.

Applications and resources that this server is to share must be defined and allocated by a system administrator. See the above section on "Administrative Functions" on page 116.

18.3.4 Workstation Installation

This section describes how to install the PC LAN Program 1.3 onto a workstation that has a fixed disk.

Installing a workstation follows the same general steps as outlined in "General Considerations" on page 113, the difference being in the selection of a workstation configuration rather than a server.

1. Install the PCLP V1.3 code onto a suitable system (see "Planning" on page 111) by following the steps as outlined in "General Considerations" on page 113. You should have taken the following options.
 - Extended Services
 - Workstation option.
2. On selecting workstation, a new panel is shown. You have to choose one of the two different types of workstations. The different configurations use different amounts of memory. The memory used by the send message configuration is 50 Kb and for the send, receive and log messages it is 68 Kb.
3. The next panel asks for a workstation ID and the domain in which it is to operate. Although you have to specify the domain ID, this is only for establishing a default domain for users who log on using this workstation.
4. When this is completed, re-IPL the system.
5. You will then see a LOGON screen. Notice that the default domain is set for you; this can be changed by overtyping.

18.4 Where To Go For More Information

- *IBM PC LAN Program Version 1.3 Getting Started: Installation and Configuration*
- *IBM PC LAN Program Version 1.3 Reference.*

Chapter 19. PC 3270 Emulation Program Version 3

19.1 Overview

For the purposes of simplicity, "PC 3270 Emulation Program Version 3" will be shortened to "3270 EP". The current version, Version 3.05, is covered in this section.

3270 EP provides emulation and host communications capabilities using several different configurations. These are:

Stand-alone A stand-alone station 3270 EP configuration looks to the host like a 3174 with one display session or one printer session. It communicates directly with the host either with the use of a modem and a direct connection, a coax connection, or across a local area network. This guide will only consider LAN attachment of the stand-alone configuration.

Gateway The 3270 EP gateway configuration looks to the host like a 3174 device supporting multiple display or printer sessions. It communicates to the network stations on one side (providing the controller function) and to the host on the other. This host connection can either be via a DFT port, SDLC line or across the LAN to another host gateway such as a 3174, 9370, 37XX or OS/2 EE 1.2.

Network Station A network station is one that emulates a display or printer session. It communicates with the host via the 3270 EP gateway which provides the controller functions. A "gateway" station can also provide a "network station" display session for its own use.

This guide will cover all these options. The following figure shows these different configurations attached to the LAN.

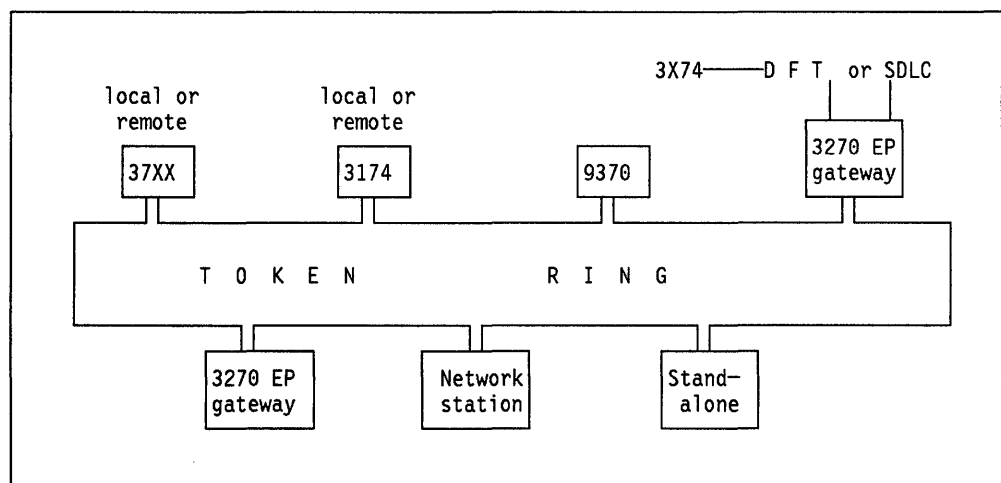


Figure 65. 3270 Emulation Version 3.0 Configurations

19.2 Planning Checklist

19.2.1 Prerequisites - Hardware

- One of the following PCs

PC, PC-XT, PC-AT, PS/2 Mod 30, 50, 55, 60, 70, 80

Depending on the configuration you require, the hardware prerequisites will be different.

- Stand-alone

This can only be stand-alone in a Token-Ring Network, not a PC Network.

- Required memory - 169 Kb
- Connection to a Token-Ring Network
- Token-Ring Network Adapter Support Interface OR the LAN Support Program (modules A0 and C0).

- Network station

This can be on both a PC Network or a Token-Ring Network.

- Required memory
 - Token-Ring Network- 209 Kb
 - PC Network - 156 Kb
- Appropriate connection to a LAN²⁵

- Gateway

- Memory requirements

PC Network

- SDLC-attached - 195 Kb
- DFT-attached - 200 Kb
- Attached through a gateway to a Token-Ring Network, then to a 37XX or 3174 gateway - 248 Kb

Token-Ring Network

- SDLC-attached - 248 Kb
- DFT-attached - 253 Kb
- Token-Ring-attached to a 37XX or 3174 gateway - 248 KB
- Appropriate LAN attachment²⁵
- Appropriate host attachment
 - SDLC adapter Version 2 or Multi-protocol adapter (PS/2 Micro Channel)
 - 3278/79 Emulation adapter or 3270 Emulation adapter.

- Gateway with network station

²⁵ Connection to a LAN may also require some interface software such as the Adapter Support Interface for the Token-Ring adapter, or PC Network Protocol Driver program or the LAN Support Program (which contains all these modules).

- Memory requirements

PC Network

- SDLC-attached - 225 Kb
- DFT-attached - 230 Kb
- Attached through a gateway to a Token-Ring, then to a 37XX or 3174 gateway - 278 Kb

Token-Ring Network

- SDLC-attached - 278 Kb
- DFT-attached - 283 Kb
- Token-Ring-attached to a 37XX or 3174 gateway - 278 Kb
- Appropriate LAN attachment²⁵
- Appropriate host attachment.

19.2.2 Prerequisites - Software

- DOS 3.3 and later.
- For "network station" or "gateway" Configurations the LAN Support Program is required.

For more information see "LAN Support Program V1.1" on page 87.

19.2.3 Coexistence and Compatibility

19.2.3.1 3270 Connection Card (or 3278/79 Emulation Card)

The 3270 connection card and Token-Ring Network adapter require different interrupt levels. For more information on interrupt levels see "PC Token-Ring Network Adapter Installation" on page 9. The process of altering the interrupt levels is documented in that section, and for the PS/2 card is covered in "PS/2 Token-Ring Adapter/A Installation" on page 17.

19.2.3.2 SDLC Card

If you have an SDLC gateway and are using the SDLC card, make sure that the Token-Ring Network adapter does not use interrupt level 3. For more information see "PC Token-Ring Network Adapter Installation" on page 9.

19.2.3.3 PCLP 1.3

When using 3270 EP with PCLP V1.2, make sure that you calculate correctly the NETBIOS and NET START parameters. If you have a joint server/gateway, then be especially careful when calculating these parameters. Specifically, check:

- Number of sessions
- Number of commands (network control blocks)
- Number of link stations
- The relationship between NETBIOS and NET START parameters.

You should refer to "LAN Support Program V1.1" on page 87.

19.2.3.4 PCLP 1.3

The 3270 EP will work in all configurations with a PCLP 1.3 extended services workstation configuration.

19.2.4 Configuration Parameters

This guide will not cover the basics of 3270 EP customization. To understand how to configure your workstation for general 3270 emulation tasks, see the *3270 Emulation Program System Planners and User's Guide*, which comes with the program.

The use of 3270 EP as a gateway or stand-alone configuration across the Token-Ring Network to a gateway controller (of any type) depends upon the configuration of the controller or processor it attaches to. Therefore total customization must be a joint effort between the controller customizer, the planning coordinator and the 3270 EP customizer.

Customization of 3270 EP as a network station is not as complex.

For attachment of the 3270 EP in gateway or stand-alone configuration across a LAN to a host or host gateway, you will need to know the following (also, ensure that your host programmers have coded these parameters).

19.2.4.1 Host Parameters

The general VTAM/NCP parameters that need coding for the Token-Ring Network are covered in complete detail in "VTAM and NCP Definitions" on page 381.

If you are using a 37XX gateway or a 9370, then the 3270 EP gateway or stand-alone node is supported by VTAM as a station on a switched line and is defined in a switched major node.

PU Parameters	Recommended Value	Notes
IDBLK=	017	For 37XX and 9370 connection Hard coded in the PC 3270 Emulation Program Must match the PU-ID used in the 3270 EP Required by 3270 EP
IDNUM=	xxxxx	
PUTYPE=	2	

LU Parameters	Recommended Value	Notes
LOCADDR=	2 to 33	Corresponds to the number of sessions through the gateway.

Figure 66. VTAM/NCP Parameters for 3270 EP - Gateway or Stand-alone Configuration

If you are using a remote 3174 gateway, then these definitions are in the NCP under a half-duplex leased multipoint line definition.

19.2.4.2 3174 Parameters

When you customize the 3174 you will need the following parameters:

- The locally administered address of the 3174 gateway
- The Token-Ring Network adapter address of the PC gateway or Stand-alone stations (the downstream PUs - DSPUs).
- The DLC SAP address of the 3270 EP, which is X'04'.

19.2.4.3 3270 EP gateway or stand-alone parameters

When you customize the 3270 EP you will need to know the following parameters:

- The locally administered address of the gateway controller (3174, 37XX, 9370 or OS/2 E.E. 1.2.).
- If using a 37XX or 9370 gateway, then you will need to know the IDNUM assigned to your station (in the VTAM switched major node).
- The Token-Ring Adapter address that the host gateway is using for **your** node.
- The remote SAP ID for the gateway or host. This is typically X'04' for a 3174 or 37XX. If you are connecting to a 9370, check with the host programmers for the value of the SAPADDR= parameter.

19.2.4.4 3270 EP Network Station Parameters

When customizing a "network station," you need to know the NETBIOS name that you should use for your station. This name is specified in the "gateway station" that is supporting this "network station".

19.3 Installation Steps

This installation section will be organized as follows:

1. General installation options required for 3270 EP
2. General gateway configuration considerations
3. SDLC gateway installation
4. Token-Ring Network gateway installation
5. Stand-alone configuration
6. Network station configuration.

19.3.1 General Installation Options for 3270 EP

1. Check the LAN Support Program parameters in your CONFIG.SYS file.

For a complete discussion of LAN Support Program Parameters see "LAN Support Program V1.1" on page 87. This section also contains worksheets to help you determine these parameters correctly.

The specific scenarios covered in "PC 3270 Emulation Program Version 3 Scenarios" on page 471 will show these parameters.

- Stand-alone configuration. The NETBIOS interface is not used by the 3270 EP in this mode. However, it may be used by another application in this PC such as the PC LAN Program, in which case you will need to code the extra parameters shown in Figure 67.
- Network station. The NETBIOS interface is used in this configuration.

If you are concurrently using the LAN Support Program and your server is **also** your gateway, additional parameters may not be needed. Check the worksheets in "LAN Support Program V1.1" on page 87 to determine the "S=" and "C=" parameters.

However, if your gateway is not your server, you should review the configuration charts in "LAN Support Program V1.1" on page 87 in order to establish the correct value for the "ST=" parameter. If you are using one server and one gateway, code ST=3.

- Gateway configuration. There are several LAN Support Program parameters that need to be coded; these depend on the number of network stations the gateway is supporting. If you are mixing PC LAN Program with a 3270 EP gateway, then you should review "LAN Support Program V1.1" on page 87.

The number of NETBIOS sessions and commands used by 3270 EP needs to be coded as a DXMT0MOD.SYS parameter. Figure 68 on page 129 shows the resources required.

Configuration	Additional "DXMT0MOD.sys" Parameters
Stand-alone only	(not required)
Stand-alone + PC LAN Program	ES=1, EST=1
Network station only	no extra parameters
Network station + PCLP using one SERVER/GATEWAY	'C=' and 'S=' requirements? (a)
Network station + PCLP using separate SERVER/GATEWAY gateway - DFT and SDLC only	ST=2 (at least) 'C=' and 'S=' requirements? (a)
gateway via Token-Ring only	'C=' and 'S=' requirements? (a) ES=1, EST=1 'C=' and 'S=' requirements? (a)

Figure 67. 3270 EP - NETBIOS Parameters.

NOTES:

- (a) See LAN Support Program and Figure 68 on page 129 below.

	No. of Names in List of Network Stations	SESSIONS	COMMANDS
GATEWAY or GATEWAY with Network station	1	1	2 (a)
	2	2	3 (a)
	3	3	4
	.		
	.		
	31	31	32
	32	32	(b)
Stand-alone		0	0
Network station		2	4

Figure 68. 3270 EP - NETBIOS Command and Session Requirements.

NOTES

- (a) When using 3270 EP with PCLP, this should be a minimum value of 4.
- (b) This value is 32 not 33.

2. Insert the 3270 EP, Volume 2 diskette into your A drive and type:

A: SETUP

This copies the program from diskettes to your fixed disk. You can specify a subdirectory during the procedure.

3. Once the program is installed, to start it type:

C: PSCPG

4. After the "READ.ME" file has been displayed, you will see the main options panel. Select option "b" to get to the "Communications Profile Tasks" menu.

19.3.2 General Gateway Considerations

The gateway, however it is connected to the host, has certain definitions which are common.

We define at the gateway all the other network stations that can access the host through this gateway. You can define up to 32 sessions to be supported through this gateway. These sessions can be either display sessions or printer sessions. One of the display sessions (and/or a printer session) can be assigned to the gateway itself allowing someone to use it for a 3270 session (called a "gateway with network station").

If you want a "network station" to have both a display session and a printer session, then the network station name is entered twice in the list of network stations. You then need to assign the network station to either a printer or a display station by cross referencing the station name in option "i."

If you choose gateway with network station you will also need to customize the network station by selecting option "f."

The requirements for a Token-Ring- or SDLC-type gateway are discussed below. The following are the steps required for "Gateway Setup" which is option "h" from the "Communications Profile Tasks" menu. A gateway requires a "Gateway Setup", common for all gateways, which defines the network stations.

1. Select a name for this gateway (for instance "GATEWAY"). If you are using the PC LAN Program as well, the name you choose here should be different from the name of this computer as defined in PCLP. You also specify the number of sessions that this gateway will support. This will be in multiples of 8.

When you press Enter, the next screen will be presented.

2. You now need to create a list of names that will be assigned to each of the display or printer sessions. In this case, as the gateway will also be a network station, the gateway name must be included here. The network station names that you specify here will be used during the customization of the network station using this gateway.

19.3.3 SDLC Gateway Installation

This section will cover the customization of the 3270 EP panels.

1. Select option "b" from the initial menu to get the "Communications Profile Tasks" menu.
2. Select from the displayed panel option "a" for "Configuration" and enter 3 for gateway (or 4 if you wish to use the gateway as a network station also).
3. Select from the displayed panel option "b" for "Communication Attachment" and enter 1 for SDLC attachment.
4. Select option "g" to get the menu for "Create or Revise Modem and Line Setup."
5. To complete the "Modem and Line Description" panel you will need to know the following values from your host programmers:

PU ID This is not required unless you have a switched connection, in which case it must match the IDNUM parameter in the host.

Network Facility This defines the type of connection you have.

SDLC Station Address This must match the ADDR= parameter in the host definitions.

Continuous Carrier This is a characteristic of the line you are using. See your host programmers for assistance.

Half Speed A characteristic of the line you are using. See your host programmers for assistance.

NRZI Encoding This must match the corresponding definition in the host.

Answer Tone Relevant only for switched connections.

End with REQDISCONT Code as YES.

Destination Address For a SDLC connection, this is irrelevant. Code as 0.

Having established these parameters, the definition of the gateway from this point is a standard procedure which has been covered previously in "General Gateway Considerations" on page 129.

19.3.4 Token-Ring Network Gateway Installation

This configuration is one that provides 3270 controller functions for network stations, but its attachment to the host is also via the Token-Ring Network to a host gateway such as a 3174, 9370, 37XX or OS/2 EE 1.2. To the host (or the Host gateway) it looks like a 3174 control unit (in fact on a Token-Ring Network it is similar to a 3174-3R)²⁶. In this way it is acting as a concentrator for the network stations. It is seen by the host as one PU (physical unit) with many LUs (logical units) attached - the network stations.

This section will cover the customization of the 3270 EP panels. It will not cover in detail the host requirements. The scenarios presented later in "PC 3270 Emulation Program Version 3 Scenarios" on page 471 will show the correspondence between host and 3270 EP parameters.

The following steps describe how to install a Token-Ring Network gateway:

1. Select option "b" from the main menu to get the "Communications Profile Tasks" menu.
2. Select from the displayed panel Option "a" for "Configuration" and enter 3 for gateway (or 4 if you wish to use the gateway as a network station also).
3. Select from the displayed panel Option "b" for "Communication Attachment" and enter 3 for IBM Token-Ring Network.
4. Select now Option "g" to get the menu for "Create or Revise Modem and Line Description" where you will provide further specifications about the Token-Ring Network attachment.
5. To complete the "Modem and Line Description" panel you will need to know the following values from your host programmer:

PU ID This is a unique number to identify this device to VTAM. It must match the IDNUM definition. This is not required if you are using a 3174 or OS/2 EE 1.2 as a host gateway.

SDLC Station Address This is the DLC SAP address of the host gateway. For example, a SAP address of 4 must be used for a 3174, 37XX or OS/2 EE 1.2. If a 9370 is the host gateway, see your host programmer for the value of the SAPADDR= parameter coded in VTAM.

Destination Address This is the host gateway Token-Ring Network adapter address, which could be the locally administered address or the universal address.

²⁶ This type of device is known as a "downstream PU (Physical Unit)". A DSPU device is one that is Token-Ring-attached to a host gateway such as a 3174 with Token-Ring gateway feature, 37XX using a Token-Ring attachment or a 9370 directly connected to the Token-Ring Network.

This panel also contains other definition fields (like Network Facility, Continuous Carrier, Half Speed, NRZI Encoding, Answering Tone and Request disconnect) that in the case of a Token-Ring Network are irrelevant.

Having established these parameters, the definition of the gateway from this point is a standard procedure which has been covered previously in "General Gateway Considerations" on page 129.

19.3.5 Stand-alone Configuration

A stand-alone configuration on a Token-Ring Network is one that communicates directly with the host gateway, not through a 3270 EP Gateway. The stand-alone configuration is therefore seen as a '3174' type of device on the Token-Ring Network²⁸.

An important thing to note about the stand-alone configuration is that it allows only one session.

This section will cover the customization of the 3270 EP panels. It will not cover in detail the host requirements. The scenarios presented later in "PC 3270 Emulation Program Version 3 Scenarios" on page 471 show the correspondence between host and 3270 EP parameters.

The following steps describe how to install a stand-alone station.

1. Select option "b" from the main menu to get the "Communications Profile Tasks" menu.
2. Select from the displayed panel option "a" for "Configuration" and enter 1 for stand-alone station.
3. Select from the displayed panel option "b" for "Communication Attachment" and enter 3 for IBM Token-Ring Network.
4. Select now option "g" to get the menu for "Create or Revise Modem and Line Description."
5. To complete the "Modem and Line Description" panel you will need to know the following values from your host programmers:

PU ID This is a unique number to identify this device to the NCP. It must match the IDNUM definition. This is not required if you are using a 3174 or OS/2 EE 1.2 as a host gateway.

SDLC Station Address This is the DLC SAP address of the host gateway. For example, SAP address of X'04' must be used for a 3174 and 37XX. If a 9370 is the host gateway, see your host programmer for the value of the SAPADDR= parameter coded in VTAM.

Destination Address This is the host gateway Token-Ring Network adapter address which could be the locally administered address or the universal address.

This panel also contains other definition fields (like Network Facility, Continuous Carrier, Half Speed, NRZI Encoding, Answering Tone and Request disconnect) that in the case of a Token-Ring Network are irrelevant.

19.3.6 Network Station Configuration

A 3270 EP network station is one that uses a 3270 EP gateway for access to the host.

The name of the network station is the name specified in the customization. You do not specify the name of the 3270 EP gateway. The 3270 EP gateway must have already included the name of your network station in its "List of Network Stations".

The gateway will contact your network station (when you start the network station, you will see a message "Msg 85: Wait, gateway has not called network station" until the gateway contacts the station).

A network station can also have a printer session defined to it. In this case, the specified printer then becomes a host addressable printer which can be used by anyone on the SNA network. Of course, if you are using the PC LAN Program, it is possible to re-direct this printout to a shared LAN printer.

The following steps describe how to install a network station:

1. Select option "b" from the main menu to get the "Communications Profile Tasks" menu.
2. Select from the displayed panel option "a" for "Configuration" and enter 2 for network station.
3. Select from the displayed panel option "b" for "Communication Attachment" and enter 3 for IBM Token-Ring Network.
4. Select now option "f" to get the menu for "Create or Revise Communication Description."
5. The panel for "Communication Description" is common for all network sessions. If you have a gateway with network station then you will also need to customize this panel.

Select option "e" for station name and specify the name of this network station. This name must match one of the network stations names specified in the gateway definition. You do not need to specify the name of the 3270 EP gateway.

NOTE: A network station user cannot query across the LAN the gateway name(s) to which it has been defined in the gateway table.

Chapter 20. IBM 3270 Workstation Program Version 1.1

20.1 Overview

The IBM 3270 Workstation Program (WSP) replaces and enhances the function of the 3270-PC Control Program. Version 1.1 now allows workstations to be host-connected across a Token-Ring Network using IEEE 802.2 protocols.²⁷

Host access can be done using the following host gateways:

- 37XX, 9370
- 3174L, 3174R, OS/2 E.E. 1.2.
- Personal Communications/3270

Briefly, the Workstation Program provides the following:

- Multiple host (from 0 to 4) sessions
- Multiple DOS (from 1 to 6) sessions
- Two notepad sessions
- Attachment to 3X74 or controllers or 9370 workstation adapters in DFT or CUT mode
- Supports Token-Ring Network attachment of workstations to communicate with S/370 hosts via the 37XX or the 3174 gateways, or directly to the 9370.

Note that the WSP does not provide host-printer emulation like the 3270 Emulation Program.

This guide will cover the Token-Ring Network attachment of Workstation Program to hosts through the different gateways.

20.2 Planning Checklist

20.2.1 Prerequisites - Hardware

- One of the following: PS/2 Models 30, 50, 55, 60, 70 and 80, and selected models of PC-XT and PC-AT.
- Appropriate Token-Ring Network Adapter and cables; see "PC Token-Ring Network Adapter Installation" on page 9 and "PS/2 Token-Ring Adapter/A Installation" on page 17.

²⁷ This LAN connection supports only the Token-Ring Network. The PC Network is NOT supported because no host communication gateways are available.

20.2.2 Prerequisites - Software

- DOS 3.3 or higher
- LAN Support Program; see "LAN Support Program V1.1" on page 87.

20.2.3 Coexistence and Compatibility

20.2.3.1 XMA

A common option is the Expanded Memory Adapter (XMA), which can be used in all machines, but a potential problem can arise in the PS/2 when using this option. Make sure that you understand the ranges of shared RAM address that can be used, and ensure that these do not conflict with the Token-Ring Network Adapter shared RAM requirements. When updating the reference file, any potential addressing conflict could be reported to the user and a different selection should be made accordingly.

When using a PS/2 Model 80 an XMA card is not needed because you can use the XMA-emulation, which provides you up to 2 Mb.

20.2.3.2 3278/79 Emulation Adapter

If this adapter is used (unlikely in this environment) with the Token-Ring Network Adapter, you must ensure that the interrupt levels are set differently from each other. See "PC Token-Ring Network Adapter Installation" on page 9 and "PS/2 Token-Ring Adapter/A Installation" on page 17 for a discussion of what interrupt levels are compatible and how to set them²⁸.

20.2.3.3 PS/2 Without 3278/79 Emulation Card

If you are using Workstation Program on a Token-Ring-attached PS/2 Model 50, 60, 70 or 80, you should use the system reference diskette to customize the Token-Ring Network Adapter with the following values:

ROM Address Set the adapter's ROM address at X'CA000'

RAM Address Set the adapter's RAM address at X'CC000'.

20.2.3.4 PC LAN Program

If using the PC LAN Program with the Workstation Program, make sure that you load PCLP first so that the LAN services are made available to all of the Workstation Program DOS sessions. If you are using PCLP 1.3, load the Workstation Program after Base Services and before Extended Services. In addition, you may need to change some parameters in the CONFIG.SYS file as shown in Figure 70 on page 139.

²⁸ Note that this adapter is not required if you are communicating to a host through a Token-Ring-attached gateway.

20.2.4 Configuration Parameters

This guide will not cover the basics of Workstation Program customization. To understand how to configure your workstation see the *3270 Workstation Program Setup and Customization Guide*.

The use of the workstation depends upon the configuration of the controller or processor it attaches to. Therefore total customization must be a joint effort between the controller customizer, the planning coordinator and the Workstation Program customizer.

For attachment of the Workstation Program across a Token-Ring Network to a host or host gateway, you will need to know the following parameters (also, ensure that your host programmers have coded these parameters).

20.2.4.1 Host Parameters

The VTAM/NCP parameters that need coding are covered in complete detail in "VTAM and NCP Definitions" on page 381.

If you are using a 37XX gateway or a 9370, then the Workstation Program node is supported by VTAM as a station on a switched line and is defined in a switched major node.

PU Parameters	Recommended Value	Notes
IDBLK= IDNUM= MAXDATA= PUTYPE=	05E xxxxx 2042 2	For 37XX and 9370 Connection Hardcoded in 3270 WSP 1.1 Must match the PU-ID used in the WSP. Required by WSP

LU Parameters	Recommended Value	Notes
LOCADDR=	2 to 5	Corresponds to the number of sessions

Figure 69. VTAM/NCP Parameters for WSP 1.1

If you are using a remote 3174 gateway, then these definitions are in the NCP under a half-duplex leased multipoint line definition.

20.2.4.2 3174 Parameters

When you customize the 3174 you will need the following parameters:

- The locally administered address of this 3174.
- The Token-Ring Network Adapter Address of the attaching workstations (the Downstream PUs - DSPUs).

20.2.4.3 Workstation Program Parameters

When you customize the Workstation Program you will need to know the following parameters:

- The locally administered address of the gateway controller (3174, 37XX, 9370 or OS/2 E.E. 1.2.).
- If using a 37XX or 9370 gateway, then you will need to know the IDNUM assigned to your station (in the VTAM switched major node).
- The Token-Ring Network Adapter address of the Workstation Program's station.
- The Remote SAP ID for the gateway or host. This is typically X'04' for a 3174, 37XX or 9370.

20.2.4.4 LAN Support Program

Make sure that you use module "DMXC1MOD.SYS" and not "DXMC0MOD.SYS"; otherwise the Workstation Program will not communicate across the LAN.

20.2.5 Migration From PC 3270 Emulation Program Version 3

If you are migrating, then be aware that:

1. The IDBLK of the Workstation Program is 05E, whereas the IDBLK for PC 3270 Emulation Program V3 is 017.
2. The SAP address of Workstation Program is 08; the SAP address of the IBM 3270 Emulation Program V3 is X'04'.

20.3 Installation Steps

The required installation steps for the Workstation Program are described below. Specific configuration options for different scenarios can be found in "Workstation Program Connectivity Scenarios" on page 483. This section will include:

1. Attachment through a remote 3174 gateway
2. Attachment through a local 3174 gateway
3. Attachment to a Token-Ring Network connected 9370
4. Attachment through a local or remote 37XX gateway.

20.3.1 General Installation Options for Token-Ring Network Attachment

```

CONFIG.SYS:

device=dxmA0mod.sys

device=dxmC1mod.sys xxxxxxxxxxxx

```

Figure 70. Workstation Program - CONFIG.SYS File Statements.

NOTES:

xxxxxxxxxxxx = 12 digit local administered address of the Token-Ring Network adapter.

1. Figure 70:

Check your CONFIG.SYS file on the PC or PS/2. You should check that the device driver **DXMC1MOD.SYS** is loaded during the system IPL. This module is used instead of dxmC0mod.sys.

If this does not exist, you should install the LAN Support Program and specify that Workstation Program is to be used. See "LAN Support Program V1.1" on page 87.

If you are using PCLP 1.2 or PCLP 1.3 Base Services as well, then you should verify that the DXMT0MOD.SYS statement is included and has the parameters as shown.

2. Insert the first workstation diskette in drive A: and type:

A: (enter)

INDCFIG (enter)

You will then be presented with the first customization panel.

Home Panel		IBM 3270 WORKSTATION PROGRAM CUSTOMIZATION Version 1.11 Copyright IBM Corp. 1983, 1988		
Move cursor under the desired option. Press PF2 to scroll through and select options, or type the required information.				640 K Allocated 0 K Free
DRIVE OPTIONS	Preset Options	Keyboard	Target C	
HARDWARE OPTIONS	System Unit PS/2 Model 80	XMA No	Storage 640K	
PRINTER OPTIONS	Printer None	Line	Time Out	Serial Port
WORKSTATION PROGRAM OPTIONS	Copy No	Autokey No	Autokey area K	
	Connectivity Facilities No	System Extensions 0_		
PF1=Help PgDn=Next		End=Last Esc=Quit		

Figure 71. Workstation Program - Customization Panel-1

3. Figure 71 shows the first of four panels. The options for changing here are:

- Drive options (where the customization profile is to be stored)
- Hardware options
- Printer options
- Workstation options.

Most of these are self-explanatory. If you press PF1, a help screen is displayed for the current selection. Use PF2 to scroll through the choices available for each option. For a detailed guide to these options see the *3270 Workstation Setup and Customization Guide* that comes with the product.

Panel 2		HOST OPTIONS			
Move cursor under the desired option. Press PF2 to scroll through and select options, or type the required information. Enter a unique one letter short name for each session desired.					640 K Allocated 0 K Free
CONTROL UNIT OPTIONS	Terminal Type T/R	Protocol	EDS Yes	Form Feed	Advanced Display Option No
	UNSUP CC Error	SCS No	VMClear	ODSP No	PU ID E0011
	Send Buffer Size 1024	Receive Buffer Size 256	Adapter Number 0	Remote SAP ID 4	Destination Address 01130000
HOST SESSIONS	Short name E F G H	Long name HOST1 HOST2 HOST3 HOST4	Screen 24x80 24x80 24x80 24x80	EAB Yes Yes Yes Yes	PS
PF1=Help	PgDn=Next	PgUp=Prev	Home=Home	End=Last	Esc=Quit

Figure 72. Workstation Program - Customization Panel 2, Host Options

4. Figure 72: The "Host Options" panel is very important. It is the options set here that we shall concentrate on the most.

Following this discussion of the parameters, four scenarios are presented. The object of these is to assist you in determining the workstation parameters required (not to help code VTAM and NCP parameters).

The options required are as follows:

Terminal Type Select T/R (Token-Ring Network)

PU ID This identifies the workstation to the host. This can be up to five hex characters. See your host programmers for details as it must match the 'IDNUM=' in the VTAM switched major node when you are attaching through a 37XX gateway or a 9370 directly. For a 3174 or OS/2 EE V 1.2 as a host gateway, set it to 0.

Send Buffer Size This is the size of the data blocks given to the adapter. This should be at least 1K. If you are using the PC LAN program as well, then you should code the 'DS=' parameter in the DXMTOMOD.SYS statement in the CONFIG.SYS See Figure 70 on page 139.

Receive Buffer Size	Unless you have XMA (Extended Memory Addressing) set this to be 256K. If XMA is present, then you should choose as large a value as possible here (for example, 2048.).
Adapter Number	Are you using the primary (0) or alternate (1) adapter?
Remote SAP ID	This is the SAP ID of the host gateway. This can be 04, 08, or 12. Use 04 for a 3174 or 37XX. Use the number supplied by the host programmers for other devices.
Destination Address	This is the Token-Ring Network adapter address of the host gateway which will be "4000xxxxxxx." You need to specify here the "xxxxxxx," the last eight digits that must be decimal.
Host Sessions	Define the number and characteristics of host sessions.

20.4 Where To Go For More Information

- *3270 Workstation Program Version 1.10 Setup and Customization.*

Chapter 21. Personal Communications/3270

21.1 Overview

For the purposes of simplicity, "Personal Communications/3270" will be shortened to "PC/3270". This program is the follow-on product to PC 3270 Emulation Program Version 3.

PC/3270 provides emulation and gateway capabilities to the host using several different configurations. These are:

Workstation A workstation with PC/3270 provides emulation of 3270 devices to one or more IBM/370 hosts through concurrent connections. Up to a maximum of eight concurrent host sessions (display and/or host print sessions) are supported on a single workstation. Supported protocols are SDLC, DFT, IEEE 802.2, NETBIOS through 3270 Emulation Program Version 3 gateway, or asynchronously to an IBM Information Network Series/1 gateway or through PC/3270 as a gateway.

Gateway PC/3270 provides gateway services for workstations using the IEEE 802.2 protocol provided by the LAN Support Program Version 1.1. Support is provided for workstations which use the 3270 emulation functions of PC/3270, OS/2 Extended Edition Version 1.1, OS/2 Extended Edition Version 1.2, 3270 Emulation Program Version 3 or 3270 Workstation Program Version 1.1. Communication to the System/370 host is supported by using the IEEE 802.2, SDLC or DFT protocols. Connected via Token-Ring or SDLC, up to 253 host sessions (display and/or print) are supported. Only five sessions are supported if the gateway is attached via SNA DFT.

This guide will only consider the configurations for the LAN attachment. The following figure shows these different configurations attached to the LAN.

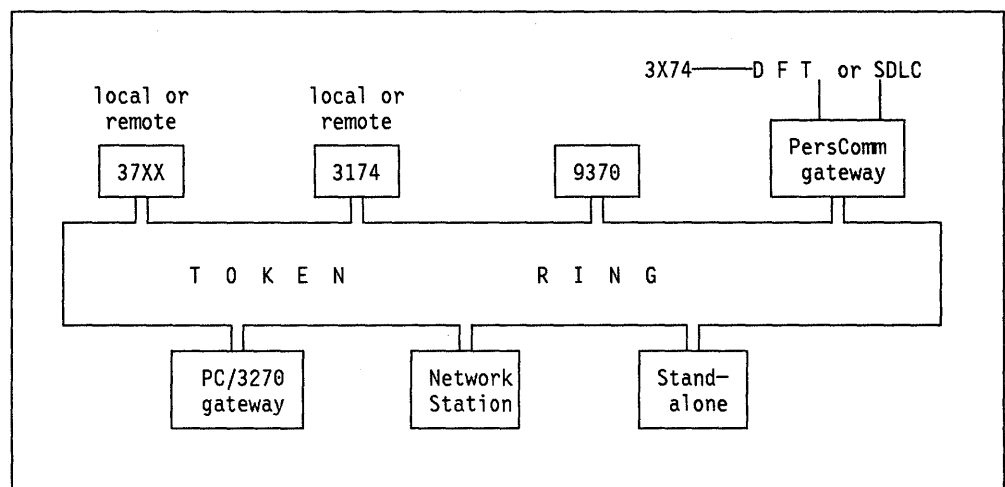


Figure 73. Personal Communications/3270 Configurations

21.2 Planning Checklist

21.2.1 Prerequisites - Hardware

One of the following workstations: PC, PC-XT, PC XT/286, PC-AT, PS/2 Mod 30, 50, 50Z, 55, 55 SX, 60, 70, P70, 80

Depending on the configuration you require, the hardware prerequisites will be different and one or more of the following communication adapters will be needed:

1. For the IBM Personal System/2 Model 50, 50Z, 55 SX, 60, 70, P70 or 80:
 - IBM Personal System/2 Multiprotocol Adapter/A
 - IBM 3270 Connection
 - IBM Token-Ring Network Adapter/A
 - IBM Token-Ring Network 16/4 Adapter/A
 - IBM PC Network Adapter II/A *
 - IBM PC Network Adapter II/A - Frequency 2 *
 - IBM PC Network Adapter II/A - Frequency 3 *
 - IBM PC Network Baseband Adapter/A *
 - IBM Personal System/2 Dual Async Adapter/A
2. For the IBM Personal System/2 Model 30, and 30-286, Personal Computer, Personal Computer XT, Personal Computer XT-286 and Personal Computer AT:
 - IBM SDLC Adapter
 - IBM 3278/79 Emulation Adapter
 - IBM Advanced 3278/79 Emulation Adapter
 - IBM Token-Ring Network PC Adapter
 - IBM Token-Ring Network PC Adapter II
 - IBM Token-Ring Network 16/4 Adapter
 - IBM PC Network Adapter *
 - IBM PC Network Adapter II *
 - IBM PC Network Baseband Adapter *
 - IBM PC Network Adapter II - Frequency 2 *
 - IBM PC Network Adapter II - Frequency 3 *
 - IBM Serial/Parallel Adapter (Asynchronous)

*** Please note the following:**

- *The IBM PC Network Adapters are supported for host connection via the NETBIOS protocol only when Personal Communications/3270 workstations are using the gateway services of IBM PC 3270 Emulation Program Version 3.0.*
- *The NETBIOS interface is provided by the IBM Local Area Network (LAN) Support Program Version 1.1. (For original IBM PC Network Adapters only, NETBIOS is resident on the hardware.)*
- *For all connections using any IBM Token-Ring Adapter, the IEEE 802.2 interface of the IBM Local Area Network (LAN) Support Program, Version 1.1 is required.*
- *When connecting through an IBM PC 3270 Emulation Program Version 3.0 gateway, the IBM Local Area Network Support Program's NETBIOS interface is required for either the IBM Token-Ring Adapter or the IBM PC Network Adapter.*

Memory Requirements:

The following table shows the amount of memory that is needed for a single Model 2 3270 display station. Add 4K for each session when estimating memory requirements for a Model 5 3270 display station. The base program memory requirement must be included in all configurations.

Function	Memory Needed (KB)
Workstation:	
Base Program: Without Host Print	120
With Host Print	123
Host Connection: Display or Host Print Session	
Non-SNA DFT	31
For each additional session add	9
SNA DFT	48
For each additional session add	18
Token-Ring 802.2	78
For each additional session add	14
SDLC	61
For each additional session add	16
NETBIOS	47
For each additional session add	19
ASYNCH	58
For each additional session add	17
LOCAL COPY	17
For each unique printer ID used for local copy add	2
HOST DIRECTED PRINT (Includes Local Copy)	22
For each unique printer ID used for-host directed print and/or local copy add	2
Additional functions:	
EHLAPI (Note #1)	29
LLAPI (Note #2)	13
SRPI (for ECF) (Note #3)	
4K buffer	21
7K buffer	27
32K buffer	64
NOTE #1: The EHLAPI interface is required to be installed when running with Professional Office System (PROFS) Applications Support Feature (PASF) PC Interface.	
NOTE #2: The LLAPI is required to be installed only when running the IBM GDDM-PCLK program for GDDM host graphics or running with the IBM PS/PC Support program.	
NOTE #3: The SRPI interface is required only when running with IBM Enhanced Connectivity Facilities.	
Gateway:	
Token-Ring IEEE 802.2	225
SNA DFT	275
SDLC	262

Figure 74. Table for Calculating Memory Requirements

Examples for calculating memory requirements

- When emulating a Model 2 3270 display (single session) and connected via Token-Ring Network 802.2, PC/3270 would require 198 Kb of memory: 120 Kb for base program, 78 Kb for Token-Ring Network 802.2 host connection.
In addition, 9 Kb for the IBM LAN Support Program would be required. To this 207 Kb, add the DOS Version 3.3 or 4.0 requirements, appropriate system extensions installed, additional device drivers, and any other resident memory programs such as the IBM LAN Support Program.
- When emulating a Model 2 3270 display and a 3287 workstation printer (a total of two host sessions) and connected to the host coaxially via non-SNA, Personal Communications/3270 would require 185 Kb of memory; 123 Kb for base program with host print, 31 Kb for first non-SNA connection, 9 Kb for an additional non-SNA connection and 22 Kb for host-directed print. To this 185 Kb, add the DOS Version 3.3 or 4.0 requirements, appropriate system extensions installed, additional device drivers, and any other resident memory program. This total is subtracted from 640 Kb to determine application space available for your application.

21.2.2 Prerequisites - Software

- DOS 3.3 or
- DOS 4.0 with PTF UR24270 or a later release
- For use with the Token-Ring- or PC Network adapters the LAN Support Program Version 1.1 is required.

For more information see "LAN Support Program V1.1" on page 87.

21.2.3 Coexistence and Compatibility

21.2.3.1 3270 Connection Card (or 3278/79 Emulation Card)

The 3270 connection card and Token-Ring Network adapter require different interrupt levels. For more information on changing the interrupt levels of a Token-Ring Network adapter card refer to "PC Token-Ring Network Adapter Installation" on page 9; and for a Token-Ring Network Adapter/A card refer to "PS/2 Token-Ring Adapter/A Installation" on page 17.

21.2.3.2 SDLC Card

If you have an SDLC gateway and are using the SDLC card, make sure that the Token-Ring Network adapter card does not use interrupt level 3. For more information see "PC Token-Ring Network Adapter Installation" on page 9.

21.2.3.3 PCLP 1.3

The PC/3270 will work in all configurations with a PCLP 1.3 extended services workstation configuration.

21.2.4 Configuration Parameters

This guide will not cover the basics of PC/3270 customization. To understand how to configure your workstation for general 3270 emulation tasks, see the *Personal Communications/3270 Customization and Installation Guide* and also the *Personal Communications/3270 User's Guide*, which comes with the program.

The use of PC/3270 as a gateway or stand-alone configuration across the Token-Ring Network to a gateway controller (of any type) depends upon the configuration of the controller or processor it attaches to. Therefore total customization must be a joint effort between the controller customizer, the planning coordinator and the PC/3270 customizer.

Customization of PC/3270 program is easy and you are completely guided via menu screens including help screens for each item that appears on a screen.

For attachment of the PC/3270 in gateway or Stand-alone configuration across a LAN to a host or host gateway, you will need to know the following (also, ensure that your host programmers have coded these parameters).

21.2.4.1 Host Parameters

The general VTAM/NCP parameters that need coding for the Token-Ring Network are covered in complete detail in "VTAM and NCP Definitions" on page 381.

If you are using a 37XX gateway or a 9370, then the PC/3270 gateway or Stand-alone node is supported by VTAM as a station on a switched line and is defined in a switched major node.

PU Parameters	Recommended Value	Notes
IDBLK=	017	For 37XX and 9370 connection Must match Block Id in the PC/3270 program Must match the physical unit ID in the PC/3270 program Required by PC/3270 program
IDNUM=	xxxxx	
PUTYPE=	2	

LU Parameters	Recommended Value	Notes
LOCADDR=	2 to 253	Corresponds to the number of sessions through the gateway.

Figure 75. VTAM/NCP Parameters for PC/3270 - Gateway or Stand-alone Configuration

If you are using a remote 3174 gateway, then these definitions are in the NCP under a half-duplex leased multipoint line definition.

21.2.4.2 3174 Parameters

When you customize the 3174 you will need the following parameters:

- The locally administered address of the 3174 gateway
- The Token-Ring Network adapter address or locally administered address of the PC gateway or Stand-alone stations (the Downstream PUs - DSPUs).
- The default DLC SAP address of the PC/3270 which is **04**.

21.2.4.3 PC/3270 Gateway or Stand-alone Parameters

When you customize the PC/3270 you will need to know the following parameters:

- The locally administered address of the gateway controller (3174, 37XX or 9370) or host gateway station (PC/3270 or OS/2 EE 1.2).
- If you are using a 37XX or 9370 gateway, then you will need to know the IDNUM assigned to your station (in the VTAM switched major node).
- The locally administered address of **your** station that will be used by some host gateways such as 3174 and OS/2 EE 1.2. It is also needed for dial-out operation from the host.
- The remote SAP ID for the gateway or host. This is typically "04" for a 3174 or 37XX. If you are connecting to a 9370 check with the host programmer for the value of the SAPADDR = parameter.

21.2.4.4 PC/3270 Network Station Parameters

When customizing a "network station," you need to know the Token-Ring Network address or the locally administered address of the adapter on the PC/3270 station that acts as the gateway for your station, or the Token-Ring Network address of the gateway's adapter.

If you are using a PC/3270 gateway, and the downstream PU was defined as preallocated, the PUID parameter defined in the network station must match the PUID parameter indicated when the preallocated downstream station was defined to the PC/3270 gateway.

21.3 Installation Steps

1. Insert the PC/3270 customization diskette in your A drive and print the **README.DOC** file which contains the latest information about the program package.
2. Check the LAN Support Program parameters in your CONFIG.SYS file.

For a complete discussion of LAN Support Parameters see "LAN Support Program V1.1" on page 87. This section also contains worksheets to help you determine these parameters correctly.

The specific scenarios covered later in this document will show these parameters.

- Stand-alone or network station (via PC/3270 gateway) configuration. The NETBIOS interface is not used by the 3270 program in this mode. However, it may be used by another application in this PC such as the

PC LAN Program, in which case you will need to code extra parameters for the "DXMT0MOD.SYS" such as "ES=1" and "EST=1." When using PC/3270 with PCLP code "C=4" and "S=4" as a minimum.

- Network station (via 3270 Emulation Program Version 3 gateway). The NETBIOS interface is used in this configuration.
- Gateway configuration. There are several LAN Support Program parameters that need to be coded. If you are mixing PC LAN Program with PC/3270 gateway, then you should review "LAN Support Program V1.1" on page 87.

3. Then type:

A: SETUP

After this you will be guided by menu screens for configuring the environment you prefer.

PC/3270 supports a wide variety of hardware configuration and user preferences. The **setup** program leads you through a series of screens that allow you to specify the end user's hardware configuration and host session requirements.

PC/3270 provides several options for customization. Each option uses a different set of screens to specify information. You can select "Base Link Options", "Advanced Link Options" or "Gateway Options". The Advanced Configuration Options can be used with any of above options.

Customization produces a configuration file (**yourfile.bat**) that is used to load PC/3270.

If you customize for a gateway, customization produces in addition a gateway file (**yourfile.cfg**) to be used by the main program.

If you customize for Host-Directed Print then the customization produces in addition a printer file called (**yourfile.prt**) also to be used by the main program.

These files contain configuration parameters that you selected during customization.

4. Completing the configuration you have a choice of filing your setup on fixed disk or generating a work diskette which contains all the necessary program files as requested by your configuration setup.
5. Entering "**yourfile**" will activate the PC/3270 program.
6. Pushing the "CTRL" and the "END" key together will end the program and it will completely be removed from memory.

21.4 Basic Troubleshooting

Appendix D in the *Personal Communications/3270 User's Guide* contain most of the error messages you may see while running Personal Communications/3270.

21.5 Where To Go For More Information

- *Personal Communications/3270 Customization and Installation Guide* (Publication that comes with the product.)
- *Personal Communication/3270 User's Guide* (publication that comes with the product.)
- *GG22-9430 Guidelines for Setting IBM LAN Support Program Parameters for Use with Selected IBM Products.*

Chapter 22. OS/2 EE 1.1 Communications Manager

22.1 Overview

The Communications Manager is the communications component of the OS/2 Extended Edition. It is a standard feature that is included with the Operating System/2 Extended Edition product.

The Communications Manager provides a wide variety of connectivity options to one or more applications that are running concurrently and sharing resources, by taking advantage of OS/2 functions such as multitasking and large real memory handling. In fact, it can be compared to VTAM in the S/370 architecture, because both of them are communications access methods used by the operating systems; the Communications Manager also provides end-user functions.

Generally speaking, the Communications Manager provides the implementation of communication protocols and architectures required to support the end user functions that are presented to the user through different types of terminal emulators, LAN support, common support user control services, file transfer utilities and support of cooperative processing.

The following list summarizes the support provided by the Communications Manager:

- **Emulation Services**

The emulation services provided by the communications manager basically make your PC or PS/2 act as a terminal of a specific type, supported by the system to which the workstation is going to be connected.

3270 Emulation allows your workstation to be connected to a S/370, emulating up to five display and printer sessions with a variety of supported communication links.

The links supported include coaxial cable to a 3270 control unit (DFT), connection through the Token-Ring Network to a host Token-Ring Network gateway (3174, 37XX and 9370 with the appropriate Token-Ring Network features) and remote connection by an SDLC link.

ASCII terminal emulation allows your workstation to be connected to an ASCII host or to a protocol converter like 3708, 7171, Series/1, 3174 (with the asynchronous emulation adapter) or 9370 (with the ASCII subsystem).

The links supported include only remote or direct asynchronous communication link.

- **LAN Support**

It allows the PC or PS/2 to be connected to a LAN by providing the particular protocol driver and programming interfaces required for each type of supported LAN.

The LANs supported are IBM Token-Ring and IBM PC Network.

- **Common Support User Control Services**

The user control services provided by the Communications Manager follow the rules of the OS/2 Presentation Manager. Some of these services are start/stop, display feature status, key lock, message, configuration, problem determination aids, SNA subsystem management, keyboard remap, change default configuration name, and so forth.

- **File Transfer Utilities**

File transfer utilities are provided for transferring files to/from OS/2 systems when they are connected to an S/370 or an ASCII host.

- **Support of Cooperative Processing**

Application programming interfaces are provided as a support for cooperative processing.

The application programming interfaces provided are Server Requester Programming Interface (SRPI), Advanced Program-to-Program Communications (APPC), Asynchronous Communications Device Interface (ACDI), Enhanced High-Level Language Advanced Programming Interface (EHLLAPI), 802.2 Advanced Programming Interface and NETBIOS.

For the purpose of this document, only the Token-Ring-related Communications Manager capabilities are documented. In order to facilitate the understanding of the Communications Manager functions depending on the environment in which it is used, two separate chapters have been created as follows:

1. "OS/2 EE 1.1 Communications Manager - 3270 Terminal Emulation" on page 155
2. "OS/2 EE 1.1 Advanced Program-to-Program Communication" on page 163

The following sections deal only with the Communications Manager aspects that can be generalized regardless of the environment in which it is used.

22.2 Planning Checklist

These prerequisites apply to the Communications Manager in general. For the particular prerequisites that the Communications Manager has, depending on the environment in which it is used, see the chapters mentioned above.

22.2.1 Prerequisites - Hardware

- One of the following PCs or PS/2 with at least 3.0 Mb of memory, 20 Mb fixed disk, a diskette drive unit capable of reading either 3.5-inch (1.44 Mb) or 5.25-inch (1.2 Mb) high-capacity diskettes, and a display.
 - PC-XT Model 286
 - PC-AT Models 068, 099, 239, 319 or 339
 - PS/2 Models 30-286, 50, 50Z, 55, 60, 70 or 80
 - Industrial Computers 7531, 7532 or 7552

22.2.2 Prerequisites - Software

- Operating System/2 Extended Edition Version 1.1
 - Base Operating System

22.2.3 Compatibility

The OS/2 Extended Edition 1.0 configuration files are not compatible with the OS/2 Extended Edition Communications Manager V1.1. If you have a configuration file from V1.0, use the upgrade function to reformat the file.

22.3 Installation

The installation of the Communications Manager requires that the OS/2 base operating system is already installed. The Communications Manager is installed into \CMLIB and \CMLIB\DLL directories, which are automatically created if they do not already exist.

Basically, the complete installation process can be divided into two parts. The first part deals with the installation of the required modules to the fixed disk and the second part deals with the addition of the appropriate device driver statements to the CONFIG.SYS file to support the hardware and communications features you want.

22.3.1 Installation Steps

When installing the Communications Manager you can choose one of two ways: one is called "prompted mode" and the other is called "full-function mode." The "Prompted Mode" is oriented to the first-time user in that it is simple to install. The following is the "prompted mode" of installation.

The steps for installing the Communications Manager are:

1. Get the "Start Programs" window if it is not already displayed.
2. Choose "OS/2 full-screen command prompt" from the "Main Group" list.
3. Type C: to be sure that C is the current drive.
4. Type CMINST if you are installing for the first time; type CMINSTM if you are re-installing the Communications Manager.
5. After the welcome panel is displayed, the "Install Menu" panel appears asking you to select the installation mode.
6. Select "prompted mode" and press enter.
7. Insert the OS/2 diskettes that the installation procedure indicates.
8. The "prompted Mode Selection Menu" is displayed and you can:
 - Select "Copy the user configuration files" if you have previously customized a configuration file. In this case, you must:
 - a. Insert the diskette containing your configuration file(s) and
 - b. Specify the drive and path to your configuration file(s) in the prompt "Source drive and directory" on the "Configuration Files" panel and press Enter.
 - and/or
 - Select "Copy the IBM configuration files" and press Enter.

9. Select "Complete the installation" from the "Prompted Mode Selection Menu" and press Enter. At this time, the configuration file(s) and the features configured are installed. The "Installation complete" panel will appear.
10. Remove any OS/2 diskette remaining in the diskette drive and press F3 to exit the installation program and return to OS/2 command prompt.

22.3.2 Updating CONFIG.SYS File

To update the CONFIG.SYS file you can use the OS/2 System Editor or any other editor program. The device driver statements that you must add to the CONFIG.SYS file depend on the kind of connections you plan to use as well as on the type of personal computer you are using.

Figure 76 helps in selecting the device drivers statements that must be added to the CONFIG.SYS file.

Connection Type	Computer	Device Driver Statement (type as one line)
ASCII Terminal Emulation or ACDI	PS/2	DEVICE=C:\CMLIB\ASYNCDDB.SYS portid portid portid
ASCII Terminal Emulation or ACDI	PC-AT, PC-XT mod. 286	DEVICE=C:\CMLIB\ASYNCDDB.SYS portid portid
3270 Terminal Emulation for DFT	all	DEVICE=C:\CMLIB\DFTDD.SYS
SDLC for 3270 Terminal Emul. or APPC	PS/2	DEVICE=C:\CMLIB\SDLCDD.SYS N/S 0/1/B
SDLC for 3270 Terminal Emul. or APPC	PC-AT, PC-XT mod. 286	DEVICE=C:\CMLIB\SDLCDD.SYS N 0
Required for all LANs	all	DEVICE=C:\CMLIB\LANDD.SYS
IBM Token-Ring	all	DEVICE=C:\CMLIB\TRNETDD.SYS CFG=C:\CMLIB\filename.CFG
IBM PC Network	all	DEVICE=C:\CMLIB\PCNETDD.SYS CFG=C:\CMLIB\filename.CFG
IBM NETBIOS	all	DEVICE=C:\CMLIB\NETBDD.SYS CFG=C:\CMLIB\filename.CFG

Connection Type	PC Type	LAN System Process Statement (type as one line)
IBM Token-Ring	all	RUN=C:\CMLIB\ACSTRSYS.EXE
IBM PC Network	all	RUN=C:\CMLIB\ACSPCSYS.EXE

Figure 76. Device Drivers Statements Table

22.4 Where To Go For More Information

- *IBM OS/2 Extended Edition Version 1.1 - Getting Started*
- *IBM OS/2 Extended Edition Version 1.1 - User's Guide*

Chapter 23. OS/2 EE 1.1 Communications Manager - 3270 Terminal Emulation

23.1 Overview

The Communications Manager is the OS/2 communications component that integrates many different communications support functions. Between those functions, 3270 terminal emulation is provided to connect the PC or PS/2 to a S/370 host.

The 3270 Terminal Emulation (OS/2 3270 emulation will be used throughout the chapter) will make your PC or PS/2 workstation act as a 3270 family type terminal. Different types of connection are supported but for the scope of this document, **only** the Token-Ring related connections will be presented.

Basically, the OS/2 3270 emulation can be configured as a workstation connected to the host through a Token-Ring Network.

Workstation A workstation configuration on the OS/2 3270 emulation looks to the host like a PU T2.0 with up to five display sessions. Note that all five sessions belong to the same PC or PS/2 (display sessions are handled by the windowing facility of OS/2). The workstation communicates directly to the host either through modems (SDLC), through coaxial cable (DFT) or across a Token-Ring Local Area Network (via a host Token-Ring gateway). This guide will only consider LAN attachment of the workstation configuration.

The following figure shows how the workstation can be connected to the host through the Token-Ring Network.

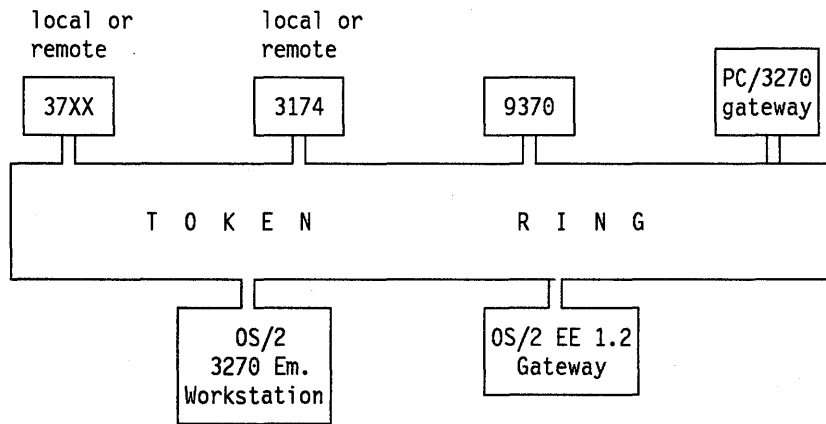


Figure 77. 3270 Terminal Emulation Connections

23.2 Planning Checklist

23.2.1 Prerequisites - Hardware

These prerequisites apply to workstation as well as for gateway configurations.

- One of the following PCs or PS/2s with at least 3.0 Mb of memory, 20 Mb fixed disk, a diskette drive unit capable of reading either 3.5-inch (1.44 Mb) or 5.25-inch (1.2 Mb) high-capacity diskettes, and a display.
 - PC-XT Model 286
 - PC-AT Models 068, 099, 239, 319 or 339
 - PS/2 Models 30-286, 50, 50Z, 55, 60, 70 or 80
 - Industrial Computers 7531, 7532 or 7552
- An appropriate Token-Ring Network Adapter card (one of the following):
 - PC I/O architecture
 - Token-Ring Network Adapter
 - Token-Ring Network Adapter II
 - Token-Ring Network 16/4 Adapter
 - Micro Channel Architecture
 - Token-Ring Network Adapter /A
 - Token-Ring Network 16/4 Adapter/A

23.2.2 Prerequisites - Software

- Operating System/2 Extended Edition Version 1.1
 - Base Operating System
 - Communications Manager

23.2.3 Coexistence and Compatibility

There can be some hardware interrupt conflicts, if care is not taken when assigning interrupt levels to the communications device drivers (as well as to some other like the mouse device driver), particularly when many of them are installed and used simultaneously.

An interrupt level can be shared if the device driver was designed for interrupt sharing. In the case of needing to share an interrupt, both device drivers must share it. Interrupt sharing is only supported on PS/2.

For more information on interrupt levels see "PC Token-Ring Network Adapter Installation" on page 9. The process to alter the interrupt levels is documented in that section, and for the PS/2 card is covered in "PS/2 Token-Ring Adapter/A Installation" on page 17.

23.2.4 Configuration Parameters

The configuration of the OS/2 3270 emulation as a workstation, depends on the gateway used to access the host, as well as how that host gateway is customized. Therefore total customization must be a joint effort between the controller customizer, the planning coordinator and the OS/2 3270 emulation customizer.

There are some parameters whose value in the host definitions must match the value specified in the OS/2 3270 emulation configuration. Ensure that everyone participating in the total customization knows and agree on the value for the following parameters.

23.2.4.1 Host Parameters

The general VTAM/NCP parameters that need coding for the Token-Ring Network are covered in complete detail in "VTAM and NCP Definitions" on page 381.

If you are using a 37XX gateway or a 9370, then the OS/2 3270 emulation workstation node is supported by VTAM as a station on a switched line and is defined in a switched major node.

VTAM Start Parameters List	Recommended Value	Notes
NETID=	xxxxxxx	Must match the "network name" used in the "SNA base profile" of "SNA features profile" for OS/2 CM.

PU Parameters	Recommended Value	Notes
IDBLK=	05D	For 37XX and 9370 Connection. Hard coded in the "OS/2 EE V1.1 CM - 3270 terminal emulation". Must match the "Node ID" used in the "SNA base profile" of "SNA features profile" for OS/2 CM. Required by OS/2 3270 emulation.
IDNUM=	xxxxx	
PUTYPE=	2	

LU Parameters	Recommended Value	Notes
LOCADDR=	2 to 254	The workstation configuration can handle up to five sessions.

Figure 78. VTAM/NCP Parameters for OS/2 3270 Emulation Workstation Configuration

If you are using a remote 3174 gateway, then these definitions are in the NCP under a half-duplex leased multipoint line definition.

23.2.4.2 3174 Parameters

When you customize the 3174 you will need the following parameters:

- The locally administered address of the 3174 gateway
- The Token-Ring Network adapter address of the PC or PS/2 workstations (the downstream PUs - DSPUs).
- The DLC SAP address of the OS/2 3270 emulation, which is "04."

23.2.4.3 OS/2 3270 Emulation Workstation

When you configure the OS/2 3270 emulation workstation you will need to know the following parameters:

- The locally administered address of the host gateway (3174, 37XX or 9370).
- If using a 37XX, a 9370, or Personal Communications/3270 as gateway, then you will need to know the IDNUM assigned to your station (in the VTAM switched major node) as well as the NETID that is used in the VTAM start parameters (ATCSTRxx).
- The Token-Ring Network adapter address that the host gateway is using for **your** node (if applicable).
- The remote SAP ID for the host gateway or host. This is typically "04" for a 3174, 37XX. If you are connecting to a 9370 check with the host programmers for the value of the SAPADDR= parameter.

23.3 OS/2 3270 Emulation Configuration

In order to facilitate the understanding of the OS/2 3270 emulation configuration, this section will be organized as follows:

1. Configuration procedure
2. Workstation configuration

23.3.1 Configuration procedure

Every OS/2 3270 emulation configuration is accomplished by executing the following steps:

1. Start execution of the Communications Manager.

If Communications Manager has not already been started, select Communications Manager from the Start Programs window. If this is the first time you have started the Communications Manager, you will be prompted for a configuration file name. If Communications Manager is already running, press Alt and Esc keys until the Communications Manager Main Menu appears.

2. From the Communications Manager Main Menu use the selection bar at the top of the screen to get the advanced functions and choose the configuration option displayed on the pop-up panel.
3. Specify the name of the configuration file when a prompt asks you to do so.

The Communication Configuration menu is displayed so you can select the type of profile that you want to configure. The profile types are the following:

- a. Workstation profile (and auto-start options)
 - b. Asynchronous feature profiles
 - c. 3270 feature profiles
 - d. SNA feature profiles
 - e. Server-Requester Programming Interface profile (SRPI)
 - f. LAN feature profiles
4. Select and configure each of the profiles (one by one) that your configuration needs.

The Communication Configuration menu is displayed again every time you finish configuring a profile.

5. Verify the configuration you defined.

To verify your configuration go to the communication configuration action bar and select verify.

6. Exit the Communication Configuration menu.

To exit, go to the communication configuration action bar and exit.

If you did not verify your configuration file, you are warned of it and given the opportunity to resume communication configuration so you can verify your defined configuration file.

The Communications Manager Main Menu is displayed.

7. Specify your configuration file name as the new configuration file name default (a Communications Manager Main Menu option).
8. Exit and start again the Communications Manager.

This is a required step because your configuration file may have included feature profiles that the previously used configuration file does not have, and they are processed at the Communications Manager initiation.

You have to select and configure different feature profiles depending on what type of OS/2 3270 emulation configuration you want (workstation or gateway) as well as how it is going to be connected to the host.

23.3.2 Workstation Configuration

When configuring an OS/2 3270 emulation workstation, the following profiles and options are required. Some options are not presented since they are not mandatory for an initial configuration.

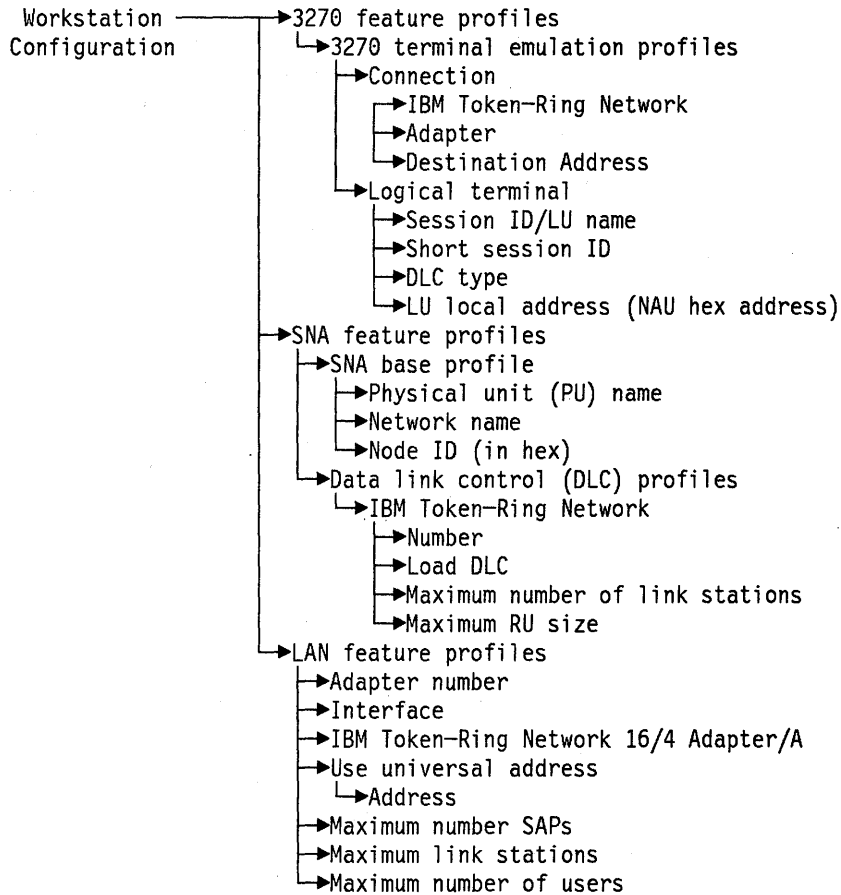


Figure 79. OS/2 3270 Emulation Workstation Configuration

The profiles involved in configuring a OS/2 3270 emulation workstation shown in Figure 79 are described below. You must follow the arrows shown when selecting the profiles and options. Some intermediate popup panels (not shown in this example), will be displayed intermixed with the profile panel described. These will request indications whether the profile is being created, changed or deleted. For the first time definition, the create option must be selected; for later definitions, the selected option depends on the user's request.

- **3270 Feature Profiles**

These feature profiles allow you to define what link is going to be used to connect your workstation to the host as well as to identify the session(s) that you will be working with in your workstation.

Choose **connection**, and a pop-up panel asks you to specify how the workstation will be connected to the host.

IBM Token-Ring Network must be chosen because this is the link we are dealing with now. There are some other possibilities (SDLC, or X.25) included in the scope of this document.

Adapter allows you to specify "0" or "1," which means that you will be using the primary or alternate LAN adapter to connect to the host gateway.

Destination Address must contain the MAC address of the Token-Ring adapter at the host gateway.

Choose **logical terminal** and a new panel asks you to define session ID/LU name, short session ID and LU local address (NAU hex address).

Session ID/LU name you can specify up to 8 characters. The first four characters must be unique because they will be displayed on your 3270 emulation panels and can help to identify the 3270 emulation session you are working with when your workstation has more than one session.

Short Session ID this must be the next available letter of the alphabet starting with "A". It also identifies your 3270 emulation session and is referenced when doing file transfer from the command line.

DLC type. This parameter specifies the DLC used to connect the workstation to the host.

LU local address (NAU hex address) This must be unique from 01 to FF. This is a locally assigned NAU address for the LU and it is mapped to the LU local address coming from the host.

- **SNA Feature Profiles**

These feature profiles allow you to define how your workstation will be identified to the host in SNA terms. It also allows you to define the characteristics of the link to the host.

Choose **SNA base profiles** and a panel will be displayed asking you for a physical unit (PU) name, network name and node ID (in hex).

Physical unit (PU) name. This is a locally assigned name for the PU and may be any name up to eight characters. It is not checked against any host definition parameter. For documentation purposes, it is suggested that you use the same name as the label for the PU macro defined in VTAM (when the workstation is connected to a host gateway). Or use the same name as the one specified for **PU name at workstation** parameter in the gateway configuration when the workstation is connected to a OS/2 3270 emulation gateway.

Network name. This parameter must match the NETID parameter specified in the VTAM start parameters (ATCSTRxx) when the workstation is connected to the host via a host gateway. This parameter is irrelevant when the workstation is connected to the host via an OS/2 EE 1.2 3270 emulation gateway.

Node ID (in hex). This parameter must match the IDNUM parameter specified in the VTAM switched major node definition when the workstation is connected to the host via a host gateway. This parameter is irrelevant when the workstation is connected to the host via an OS/2 3270 emulation gateway.

Choose **data link control (DLC) profiles** and then:

IBM Token-Ring Network must be selected since the workstation will be connected to the host through Token-Ring.

Number. This parameter is used to specify, with "0" or "1," if the primary or alternate Token-Ring adapter will be used to connect to the host.

Load DLC. This parameter specifies if the DLC will be loaded at initialization time. Specify "yes."

Maximum Number of link stations. The value specified may be up to 64 depending on the number needed.

Maximum RU size. This parameter is related to the MAXDATA parameter specified in VTAM (choose 1 or 2 Kb). It is also related to the transmit buffer size specified for 802.2 support.

- **LAN Feature Profiles**

These feature profiles allow you to define the characteristics that your LAN adapter (Token-Ring Adapter in this case) will have.

Adapter number. type "0" or "1" to indicate which adapter characteristics you are defining: the primary or the alternate adapter.

Interface. This parameter indicates what programming interface will be used. The OS/2 3270 emulation uses 802.2.

Select the appropriate Token-Ring adapter, for example **Token-Ring Adapter/A**.

Use universal address. Select "yes" or "no." If your answer is "no" then you must provide an adapter MAC address in the displayed pop-up panel.

Maximum number of SAPs. This is to specify the number of service access points that the workstation as well as other applications will require. Default works with the OS/2 3270 emulation.

Maximum link stations. The value specified depends on the required number. There is a limit imposed by the Token-Ring adapter and it can be 64 or 255.

Maximum number of users. The value specified depends on the number of users that are going to access this station through the Token-Ring network.

It is required that you configure the SNA feature profiles before configuring 3270 profiles. A suggested order for the configuration is:

1. 3270 feature profiles.
2. SNA feature profiles
3. LAN feature profiles

23.4 Basic Troubleshooting

The most common problems are usually related to the understanding of what parameters must be used either in the host and the OS/2 3270 emulation configuration. The scenarios presented in this document will pinpoint these required specifications.

23.5 Where To Go For More Information

- *IBM OS/2 Extended Edition Version 1.1 User's Guide*
- *IBM OS/2 Extended Edition Version 1.1 Keyboard Layouts.*

Chapter 24. OS/2 EE 1.1 Advanced Program-to-Program Communication

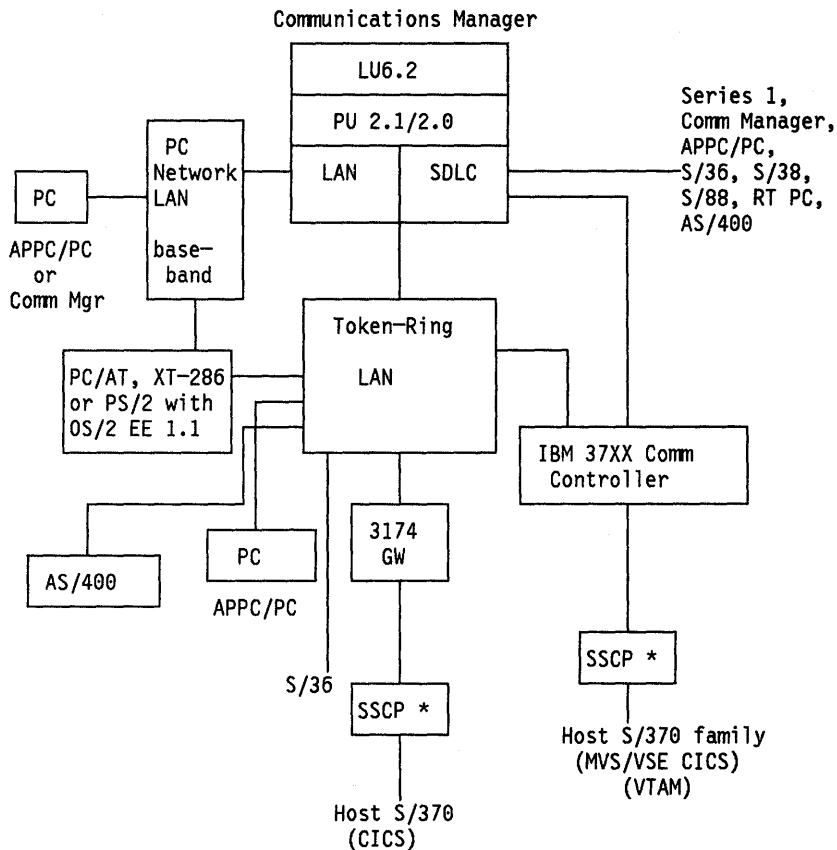
24.1 Overview

This chapter deals with using the IBM Operating System/2 Extended Edition Version 1.1 Advanced Program-to-Program Communication (APPC) interface. For the remainder of this chapter, **APPC** is used to represent IBM Operating System/2 Extended Edition Version 1.1 Advanced Program-to-Program Communication and the APPC architecture. Advanced Program-to-Program Communication is a function of the IBM Operating System/2 Extended Edition Version 1.1 program's Communications Manager, which enables transaction programs on an IBM workstation such as an IBM Personal System/2, Personal Computer AT, Personal Computer XT Model 286 to communicate with other systems that support the APPC architecture.

APPC provides a distributed transaction processing capability in which two or more programs, usually on different systems, cooperate to carry out some processing function. This involves communication between the two programs so they can share each other's local resources, such as processor cycles, databases, work queues and physical interfaces such as keyboards and displays.

The IBM Operating System/2 Extended Edition Version 1.1 program implementation of APPC permits communication between distributed processing programs at SNA LU 6.2 nodes that support APPC architecture. The SNA nodes used by APPC are on remote systems connected by an IBM Token-Ring Network, an IBM PC Network, or an Synchronous Data Link Control (SDLC) link. The nodes must be configured for the APPC interface.

The following figure shows some examples of the IBM OS/2 Extended Edition Version 1.1 Communications Manager SNA LU 6.2 connectivities.



* Only 1 SSCP can be connected with Communications Manager at a time

Figure 80. Communications Manager Supported SNA LU6.2 Connectivities

For the purpose of this document, only the IBM Token-Ring related APPC capabilities are documented.

The following list summarizes some basic APPC concepts:

- **Transaction Program**

A *transaction program* is an application program or portion of a program that uses APPC communications functions. Using these functions, an application program can communicate with application programs on other systems that support APPC.

To request APPC to take some action for your program, your program issues a *verb*. A verb is a formatted request that is executed by APPC. Transaction programs use APPC verb sequences to communicate with programs at other locations.

There is not a one-to-one relationship between an application program and a transaction program. That is, an application can define itself to APPC as more than one transaction program. Verbs can be issued in any programming language that supports the OS/2 program.

- **LU, Local LU, and Partner LU**

Every transaction program gains access to an SNA network through a *logical unit (LU)*. A logical unit manages the exchange of data between

transaction programs, acting as an intermediary between the transaction program and the network. There is not a one-to-one relationship between transaction programs and LUs. Your transaction program issues APPC verbs to its *local LU*. These verbs cause commands and data to flow across the network to your *partner LU*.

SNA defines different kinds of logical units, called LU types. LU types identify the particular set of SNA functions that a product provides to support user communications. The architecture defines many LU types. IBM developed LU type 6.2 for SNA program-to-program communication. APPC is an implementation of the LU type 6.2 architecture. Your local and partner LUs need to be defined only once for each machine, using the Communications Manager configuration menus.

- **Session**

Before transaction programs can communicate with one another, their respective LUs must be connected in a mutual relationship called a *session*. Because the session connects two LUs, it is called an LU-to-LU session. Multiple, concurrent sessions between the same two logical units are called parallel LU-to-LU sessions. Sessions are maintained by their respective LUs; you do not deal with session characteristics in your transaction programs except when you reconfigure.

- **Conversation**

Transaction programs use a *conversation* to communicate. Conversations use LU-to-LU sessions between two logical units. Once a conversation is allocated to a session, a send-receive relationship is established between transaction programs that are connected to the conversation. One transaction program issues verbs to send data, and the other program issues verbs to receive data.

A conversation can be either a basic conversation or a mapped conversation. Basic conversation verbs provide additional flexibility. Mapped conversations are for transaction programs that are the final users of the data exchanged.

The following diagram illustrates the basic terminology that we have just discussed.

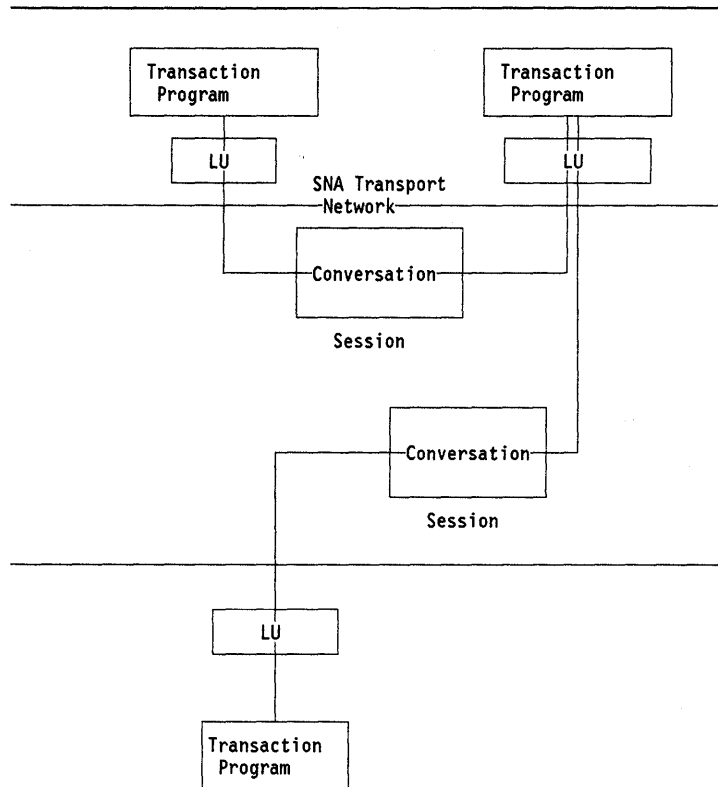


Figure 81. Three Nodes Connected Through an SNA Network

For the purpose of this document, only the Token-Ring related Communications Manager capabilities are documented, and in order to facilitate the understanding of the Communications Manager functions depending on the environment in which it is used, two separate chapters have been created as follows:

1. "OS/2 EE 1.1 Communications Manager - 3270 Terminal Emulation" on page 155
2. "OS/2 EE 1.1 Advanced Program-to-Program Communication" on page 163

The following sections deal only with the Communications Manager aspects that can be generalized regardless of the environment in which it is used.

24.2 Planning Checklist

These prerequisites apply to the Communications Manager in general. For the particular prerequisites that the Communications Manager has, depending on the environment in which it is used, see the chapters mentioned above. The use of APPC imposes no additional hardware or software prerequisites.

24.2.1 Prerequisites - Hardware

- One of the following Personal Computers with at least 3.0 Mb of mMemory, 20 Mb fixed disk, a diskette drive unit capable of reading either 3.5-inch (1.44 Mb) or 5.25-inch (1.2 Mb) high-capacity diskettes, and a display.
 - PC-XT Model 286
 - PC-AT Models 068, 099, 239, 319 or 339

- PS/2 Models 30-286, 50, 50Z, 55, 60, 70 or 80
- Industrial Computers 7531, 7532 or 7552
- For use of the APPC function of the Communications Manager add:
 - One or more modems and/or communications adapters supported by the Communications Manager in the IBM Token-Ring Network, the IBM PC Network, or the SDLC environment.

24.2.2 Prerequisites - Software

- Operating System/2 Extended Edition Version 1.1
 - Base Operating System

24.2.3 Compatibility

The OS/2 Extended Edition 1.0 configuration files are not compatible with the OS/2 Extended Edition Communications Manager V1.1. If you have a configuration file from V1.0, use the upgrade function to reformat the file.

24.3 Installation

APPC is a feature included with the Communications Manager function of OS/2 Extended Edition Version 1.1. You therefore must install the Communications Manager function. The installation of the Communications Manager requires that the OS/2 base operating system is already installed. The Communications Manager is installed into \CMLIB and \CMLIB\DLL directories, which are automatically created if they do not already exist.

Basically, the complete installation process can be divided in two parts. The first part deals with the installation of the required modules to the fixed disk and the second part deals with the addition of the appropriate device driver statements to the CONFIG.SYS file to support the hardware and communications features you want.

24.3.1 Installation Steps

When installing the Communications Manager you can choose one of two ways: one is called "Prompted Mode" and the other is called "Full-Function Mode." The "Prompted Mode" is oriented to the first-time user which means that it is a simple and straight way to install. The "Prompted Mode" will be described here.

The steps for installing the Communications Manager are:

1. Get the "Start Programs" window if it is not already displayed.
2. Choose "OS/2 full-screen command prompt" from the "Main Group" list.
3. Type C: to be sure that C is the current drive.
4. Type CMINST if you are installing for the first time; type CMINSTM if you are re-installing the Communications Manager.
5. After the welcome panel is displayed, the "Install Menu" panel appears asking to select the installation mode.
6. Select "Prompted mode" and press Enter.

7. Insert the OS/2 diskettes that the installation procedure indicates.
8. The "Prompted Mode Selection Menu" is displayed and you can:
 - Select "Copy the user configuration files" if you have previously customized a configuration file. In this case, you must
 - a. Insert the diskette containing your configuration file(s) and
 - b. Specify the drive and path to your configuration file(s) in the prompt "Source drive and directory" on the "Configuration Files" panel and press Enter.
 - Select "Copy the IBM configuration files" and press Enter.
9. Select "Complete the installation" from the "Prompted Mode Selection Menu" and press enter. At this time, the configuration file(s) and the features configured are installed. The "Installation complete" panel will appear.
10. Remove any OS/2 diskette remaining in the diskette drive and press F3 to exit the installation program and return to OS/2 command prompt.

24.3.2 Updating CONFIG.SYS File

To update the CONFIG.SYS file you can use the OS/2 System Editor or any other editor program. The device driver statements that you must add to the CONFIG.SYS file depend on the kind of connections you plan to use as well as on the type of personal computer you are using.

Figure 82 on page 169 helps in selecting the device drivers statements that must be added to the CONFIG.SYS file.

Connection Type	Computer	Device Driver Statement (type as one line)
ASCII Terminal Emulation or ACDI	PS/2	DEVICE=C:\CMLIB\ASYNCCDB.SYS portid portid portid
ASCII Terminal Emulation or ACDI	PC-AT, PC-XT mod. 286	DEVICE=C:\CMLIB\ASYNCCDA.SYS portid portid
3270 Terminal Emulation for DFT	all	DEVICE=C:\CMLIB\DFTDD.SYS
SDLC for 3270 Terminal Emul. or APPC	PS/2	DEVICE=C:\CMLIB\SDLCDD.SYS N/S 0/1/B
SDLC for 3270 Terminal Emul. or APPC	PC-AT, PC-XT mod. 286	DEVICE=C:\CMLIB\SDLCDD.SYS N 0
Required for all LANs	all	DEVICE=C:\CMLIB\LANDD.SYS
IBM Token-Ring	all	DEVICE=C:\CMLIB\TRNETDD.SYS CFG=C:\CMLIB\filename.
IBM PC Network	all	DEVICE=C:\CMLIB\PCNETDD.SYS CFG=C:\CMLIB\filename.
IBM NETBIOS	all	DEVICE=C:\CMLIB\NETBDD.SYS CFG=C:\CMLIB\filename.C

Connection Type	PC Type	LAN System Process Statement (type as one line)
IBM Token-Ring	all	RUN=C:\CMLIB\ACSTRSYS.EXE
IBM PC Network	all	RUN=C:\CMLIB\ACSPCSYS.EXE

Figure 82. Device Drivers Statements Table

24.4 Configuring Communications Manager for APPC

The SNA feature profiles contain the information needed to configure SNA communications to a host or another workstation. The SNA base profile and the Data Link Control (DLC) profiles are used by both 3270 terminal emulation and APPC. The remaining SNA feature profiles are used by APPC only.

We will illustrate the configuration of the Communications Manager for APPC by using the APPC sample programs. The sample programs are designed to work with the Communications Manager while in protected mode of the OS/2 Extended Edition program. This section assumes that the programs have been installed, compiled, linked, and bound. Refer to the information from the PRINT.ME file on the **IBM Operating System/2 Extended Edition Communications Manager API Sample Programs Support** diskette or the **APPC Programming Ref-**

erence for instructions on how to install, compile, link and bind the sample programs. The APPC sample programs are located on the IBM Operating System/2 Extended Edition Communications Manager API Sample Program Support diskette, which is shipped with the *System Administrator's Guide for Communications*.

The following diagram illustrates the use of these two sample APPC programs on an IBM Token-Ring Network.

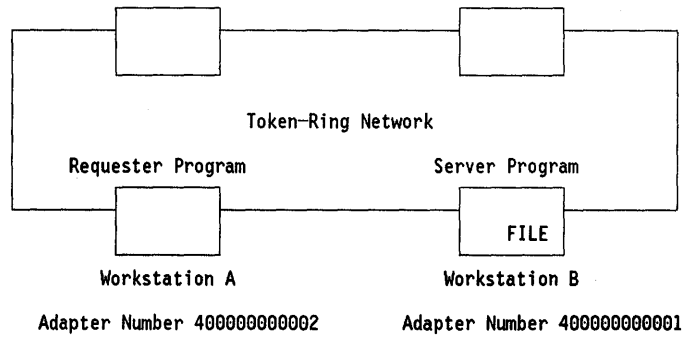


Figure 83. Example of APPC Sample Programs on a Token-Ring Network

24.5 Preparing to Configure Communications Manager for APPC

For the APPC sample programs, two configuration files must be created, one for each workstation. For your own convenience you can build both configuration files on your own workstation. For the purpose of this example, assume that the requester program resides on your workstation, Workstation A. Later you can copy the appropriate configuration file to Workstation B.

IBM supplies configuration files which contain default values for most fields. ACSCFGUS.CFG is the IBM-supplied configuration file that you will want to use to create an APPC configuration file. To do this, use the OS/2 COPY command to copy the file ACSCFGUS.CFG to a new file name.

1. At the OS/2 command prompt, type:
`COPY C:\CMLIB\ACSCFGUS.CFG C:\CMLIB\RECEIVER.CFG`

This is the configuration file that you will use on Workstation A.

2. At the OS/2 command prompt, type:
`COPY C:\CMLIB\ACSCFGUS.CFG C:\CMLIB\SERVER.CFG`

This is the configuration file that you will use on Workstation B.

3. Start Communications Manager

If Communications Manager has not already been started, select Communications Manager from the Start Programs window. If this is the first time you have started Communications Manager, you will be prompted for a configuration file name. Type RECEIVER. This is the name of the configuration file for Workstation A (your workstation). If Communications Manager is already running, press the Alt and Esc keys until the Communications Manager screen group is displayed. If necessary, press the Escape (Esc) key to return to the Communications Manager Main Menu.

24.5.1 Relationship Between Configuration File Parameters

You will be creating two separate configuration files. The following illustrates critical relationships between configuration files for Workstation A and B. Use this illustration as you proceed through the steps for configuring both workstations.

Workstation A - Server Program		Workstation A - Requester Program
<u>SNA Base Profile</u>		<u>SNA Base Profile</u>
Network Name	(1)	Network Name
<u>Partner LU Profile (FILEREQ)</u>		<u>Partner LU Profile (FILESVR)</u>
PLU Alias (FILEREQ)		PLU Alias (FILESVR)
Fully Qualified Name ().(FILEREQ)	(1)	Fully Qualified Name ().(FILESRV)
Token-Ring Adapter Number 0	(2)	Token-Ring Adapter Number 0
LU Alias (FILESVR)	(3)	LU Alias (FILEREQ)
Destination Address (400000000002)	(6)	Destination Address (400000000001)
Mode Name (MODE1)	(4)	Mode Name (MODE1)
Initial Session Limit (ISL)	(5)	Initial Session Limit (ISL)
<u>Local LU Profile</u>		<u>Local LU Profile</u>
Local LU Alias (FILESVR)	(3)	Local LU Alias (FILEREQ)
LU Name (FILESVR)	(1)	LU Name (FILEREQ)
<u>Transmission Service Mode Profile (MODE1)</u>	(4)	<u>Transmission Service Mode Profile (MODE1)</u>
<u>Initial Session Limit Profile (ISL)</u>	(5)	<u>Initial Session Limit Profile (ISL)</u>
<u>DLC Profile</u>		<u>DLC Profile</u>
Token-Ring Adapter Number 0	(2)	Token-Ring Adapter Number 0
<u>LAN Profile</u>		<u>LAN Profile</u>
Token-Ring Adapter Number 0	(2)	Token-Ring Adapter Number 0
Universal Address (No)		Universal Address (No)
Adapter Address (400000000001)	(6)	Adapter Address (400000000002)

Figure 84. Communications Manager Configuration Parameters Relationship

Notes:

1. Network Name, under SNA Base Profile, will be used to form the Fully Qualified Name in the Partner LU (PLU) Profile of the partner workstation. In this example you will not be specifying a network name, since the two workstations reside in the same SNA subarea. The second field should contain the LU Name of the partner workstation (the LU Name you will specify in the configuration file on Workstation B).
2. Token-Ring Adapter Number is specified in three places within the configuration of the workstation. Under the DLC profile, which is under the SNA feature profile, select the DLC type of IBM Token-Ring Network. You will select the adapter number that matches what is installed on the workstation. The adapter number specified here must match the number specified in the LAN profile (IEEE 802.2) and the number you will specify in the Partner LU profile for the workstation.
3. On the SNA Feature Configuration menu, select Logical Unit (LU) Profiles. Select Create in the Profile Operations panel. Accept the default value for Model Profile Name. Specify the Profile name as FILEREQ for Workstation A and FILESVR for Workstation B. This new profile name is the LU Alias name. This name is used by the transaction program. You will use this name in the LU alias field in the partner LU Profile for your workstation. The LU alias name is known only at the workstation, and is not used in the network.
4. On the SNA Feature Configuration menu, select Transmission Service Mode Profiles. On the Profile Operations panel select Create. Accept the default value for Model Profile Name. Specify the profile name as MODE1. The mode name is used in the transaction program. You will specify this name in the Partner LU profile for your workstation, under Mode Name.
5. On the SNA Feature Configuration menu, select Initial Session Limit Profiles. On the Profile Operations panel select Create. Specify the profile name as ISL. The name of this profile is your choice. The name of this profile will be specified in the partner LU profile for your workstation, under Initial Session Limit.
6. On the Specify adapter address panel, type the locally administered adapter address (400000000002 when configuring Workstation A, and 400000000001 when configuring Workstation B) of your workstation. All workstations that communicate to your adapter must use this address as the destination address. In this example, this number is the destination address you will specify in the partner LU profile when you create the configuration file for the partner workstation.

24.6 Where To Go For More Information

- *IBM OS/2 Extended Edition Version 1.1 - Getting Started*
- *IBM OS/2 Extended Edition Version 1.1 - User's Guide*
- *IBM OS/2 Extended Edition Version 1.1 - APPC Programming Reference.*
- *IBM OS/2 Extended Edition Version 1.1 - System Administrator's Guide for Communications.*

Chapter 25. OS/2 EE 1.2 Communications Manager

25.1 Overview

The Communications Manager is the communications component of the OS/2 Extended Edition. It is a standard feature that is included with the Operating System/2 product.

The Communications Manager provides a wide variety of connectivity options to one or more applications that are running concurrently and sharing resources, by taking advantage of OS/2 functions such as multitasking and large real memory handling. In fact, it can be compared to VTAM in the S/370 architecture, because both of them are communications access methods used by the operating systems; the Communications Manager also provides end-user functions.

Generally speaking, the Communications Manager provides the implementation of communication protocols and architectures required to support the end user functions that are presented to the user through different types of terminal emulators, LAN support, common support user control services, file transfer utilities and support of cooperative processing.

The following list summarizes the support provided by the Communications Manager:

- **Emulation Services**

The emulation services provided by the communications manager basically make your PC or PS/2 act as a terminal of a specific type, supported by the system to which the workstation is going to be connected.

3270 emulation allows your workstation to be connected to a S/370, emulating up to five display and printer sessions with a variety of supported communication links.

The links supported include coaxial cable to a 3270 control unit (DFT), connection through the Token-Ring Network to a host Token-Ring Network gateway (3174, 37XX and 9370 with the appropriate Token-Ring Network features) and remote connection by an SDLC or X.25 link.

The gateway function is provided for a group of workstations in a LAN network. In this case, only the gateway station is directly connected to the host (via a Token-Ring Network host gateway, an SDLC link or an X.25 link; DFT is not supported) and the workstations use it to get their own 3270 emulation sessions.

5250 Workstation Feature allows your workstation to be connected to a S/36 or AS/400, emulating up to five display and printer sessions, with a variety of supported communication links.

The link support includes: connection via twinaxial cable to a Workstation controller/adaptor or 5394 control unit, connection via the Token-Ring Network to a Token-Ring Network gateway (S/36 and AS/400 with the appropriate Token-Ring Network features) and remote connection via an SDLC or X.25 link.

ASCII terminal emulation allows your workstation to be connected to an ASCII host or to a protocol converter like 3708, 7171, Series/1, 3174 (with the asynchronous emulation adapter) or 9370 (with the ASCII subsystem).

The links supported include only remote or direct asynchronous communication link.

- **LAN Support**

It allows the PC or PS/2 to be connected to a LAN providing the particular protocol driver and programming interfaces required for each type of supported LAN.

The LANs supported are IBM Token-Ring Network, IBM PC Network, Ethernet DIX Version 2.0 and IEEE 802.3.

- **Common Support User Control Services**

The user control services provided by the Communications Manager follow the rules of the OS/2 Presentation Manager. Some of these services are start/stop, display feature status, key lock, message, configuration, problem determination aids, SNA subsystem management, keyboard remap, change default configuration name, and so forth.

- **File Transfer Utilities**

File transfer utilities are provided for transferring files to/from OS/2 systems when they are connected to a S/370 or an ASCII host.

- **Support of Cooperative Processing**

Application programming interfaces are provided as a support for cooperative processing.

The application programming interfaces provided are Server Requester Programming Interface (SRPI), Advanced Program-to-Program Communications (APPC), Asynchronous Communications Device Interface (ACDI), Enhanced High-Level Language Advanced Programming Interface (EHLLAPI), 802.2 Advanced Programming Interface, NETBIOS and X.25 Application Programming Interface.

For the purpose of this document, only the Token-Ring-related Communications Manager capabilities are documented. In order to facilitate the understanding of the Communications Manager functions depending on the environment in which it is used, three separate chapters have been created as follows:

1. "OS/2 EE 1.2 Communications Manager - 3270 Terminal Emulation" on page 181
2. "OS/2 EE 1.2 Advanced Program-to-Program Communication" on page 197
3. "OS/2 EE 1.2 Communications Manager - 5250 Workstation Feature" on page 207

The following sections deal only with the Communications Manager aspects that can be generalized regardless of the environment in which it is used.

25.2 Planning Checklist

These prerequisites apply to the Communications Manager in general. For the particular prerequisites that the Communications Manager has, depending on the environment in which it is used, see the chapters mentioned above.

25.2.1 Prerequisites - Hardware

- One of the following PCs or PS/2s with at least 3.5 Mb of memory, 30 Mb fixed disk, a diskette drive unit capable of reading either 3.5-inch (1.44 Mb) or 5.25-inch (1.2 Mb) high-capacity diskettes, and a display.
 - PC-AT Models 239, 319 or 339
 - PS/2 Models 30-286, 50Z, 55, 60, 70 or 80
 - Industrial Computers 7531, 7532 or 7552

25.2.2 Prerequisites - Software

- Operating System/2 Extended Edition Version 1.2
 - Base Operating System

25.2.3 Compatibility

The OS/2 Extended Edition 1.0 or 1.1 Communications Manager configuration files are **not** compatible with the OS/2 Extended Edition Communications Manager V1.2. During Communications Manager installation, 1.0 and 1.1 configuration files can be upgraded to a compatible 1.2 level. Any configuration files not upgraded during the installation process can be upgraded via the "Advanced" function option only after the Communications Manager has been started with a valid 1.2 level configuration file.

25.3 Installation Steps

The installation of the Communications Manager is now an extension of the OS/2 base operating system installation procedure. The CONFIG.SYS file is updated automatically at the end of the installation.

The Communications Manager is installed into \CMLIB and \CMLIB\DLL directories, which are automatically created if they do not exist.

Only the modules that support the Communications Manager features defined in the existing configuration files will be copied into the \CMLIB and \CMLIB\DLL directories (for example, if none of the defined configuration file contains X.25 configuration information, no X.25 support will be copied).

If you follow the required steps for the OS/2 installation, you get to the point when the "Select Basic Configuration Services" panel is displayed. You may choose to install the Communications Manager using this method; otherwise skip it and the "Extended Edition Install/Remove" panel is displayed, which gives you a different method for the installation of the Communications Manager.

"Basic Configuration Services" allows you to install the Communications Manager based on a configuration file that is easily defined at the installation

time. "Extended Edition Install/Remove" allows you to install the Communications Manager based on a default configuration file supplied by IBM.

Then, you can install the Communications Manager by using:

1. "Basic Configuration Services"
2. "Extended Edition Install/Remove."

25.3.1 Basic Configuration Services Installation Procedure

The basic configuration services function is designed to aid the user in doing a quick, simple installation by providing easy-to-use configuration services at installation time. It will create a configuration file as a result. You can use this function to configure and install the following features:

- 3270 Terminal Emulation
- ASCII Terminal Emulation
- 5250 Workstation Feature
- Database Manager with Remote Data Services on a LAN
- LAN Requester

Note that the following features **are not** installed when the basic configuration services are used:

- APPC
- SNA gateway
- SRPI
- X.25
- Remote Data Services with Multiple Server/Requester pairs
- Remote Data Services over SDLC
- Configuration file with multiple adapter types

The installation steps when using "Basic Configuration Services" are:

1. When the "Select Basic Configuration Services" panel is displayed, select "yes."
2. Then type a name for your configuration file at the "Create Basic Configuration File" panel. The Communications Manager will be started using this file.
3. You are allowed to provide your own description for your configuration file at the "Change Basic Configuration File Comments" pop-up panel.
4. The "Basic Configuration Services Menu" will appear. Select, one at a time, the components you need (3270 terminal emulation, ASCII terminal emulation, etc.) to be included in your configuration file. For each component you select, you will be guided through a series of particular menus, and finally you return to this menu.
5. Exit the "Basic Configuration Services Menu" by pressing F3. Your configuration file will be created and the "Basic Configuration Services Complete" panel will be displayed.

6. Press Enter and the "Target Drive Specification" menu is displayed asking for the drive ID in which the Communications Manager is going to be installed.
7. The "Communications Manager Install Menu" is displayed. Select an option if you want to install user/default configuration file(s) or additional features. Otherwise, press F3 to exit the menu. When F3 is pressed, the installation of your configuration file and related features is performed. Insert diskettes as required.
8. If you installed more than one configuration file, the "Select Configuration File to Update CONFIG.SYS File" menu is displayed. By selecting the configuration file(s) you wish to activate, the CONFIG.SYS is automatically updated with DEVICE= and RUN= statements.
9. Press F3 to exit the "OS/2 EE Install/Remove " menu.
10. The components you select are already installed and the panel "Installation Complete" appears.
11. Reboot the system.
12. Apply the necessary patches (if received from IBM).
13. Reboot the system again.
14. The Communications Manager and your configuration file(s) are installed and ready to use.

The "Basic Configuration Services" function is part of the OS/2 EE system installation. If you need to rerun only this part of the installation, you have to invoke it from the OS/2 command line: insert the OS/2 EE diskette number 6 in drive A: and enter EECFG at the OS/2 command prompt.

25.3.2 Extended Edition Install/Remove Installation Procedure

If you skipped the "Basic Configuration Services" you can install the Communications Manager using "Extended Edition Install/Remove." This procedure can be used when the "Basic Configuration Services" procedure does not provide all the communications features that you need. The Communications Manager will be installed based on a default configuration file supplied by IBM so that you can later customize a user configuration file and reinstall the Communications Manager to include the required communications features.

The installation steps when using "Extended Edition Install/Remove" are:

1. Choose "no" at the "Select Basic Configuration Services" panel to skip those services.
2. The "OS/2 EE Install/Remove Menu" is displayed.
3. Select the "Install Communications Manager" option.
4. The "Target Drive Specification" panel appears asking you to specify in which drive ID the Communications Manager will be installed.
5. The "Communications Manager Install Menu" is displayed. Select "Additional Features."
6. The "Select Configuration Files" panel is displayed. Select one or more of the default configuration files supplied by IBM.

7. Press F3 to exit the "Install Communications Manager Menu." When F3 is pressed, the installation of your configuration file(s) and related features is performed. Insert diskettes as required.
8. If you installed more than one configuration file, the "Select Configuration File to Update CONFIG.SYS File" menu is displayed. By selecting the configuration file(s) you wish to activate, the CONFIG.SYS is automatically updated with DEVICE= and RUN= statements.
9. Press F3 to exit the "OS/2 EE Install/Remove " menu.
10. The components you select are already installed and the panel "Installation Complete" appears.
11. Reboot the system.
12. Apply the necessary patches (if received from IBM).
13. Reboot the system again.
14. The Communications Manager and your configuration file(s) are installed and ready to use.

25.3.3 Additional Features to a User Configuration

If you need to include features like APPC, SNA gateway, X.25, etc., *NOT* considered in "Basic Configuration Services" or in the default configuration files supplied by IBM, you must install Communications Manager (if it is not already installed), start the Communications Manager, use its configuration services to create a user configuration file that includes definitions for the required features, and re-install the Communications Manager (the required support to handle OS/2 EE features is included only if there is a configuration file defining that support and it is included at installation time).

The steps for creating an activating a user configuration file are:

1. Install the Communications Manager using the "Basic Configuration Services Installation Procedure" on page 176 or the "Extended Edition Install/Remove Installation Procedure" on page 177.
2. Start the Communications Manager from the "Main Group Menu" using the configuration file name that you just installed.
3. Go to the "Advanced" functions using the action bar.
4. Select "Configuration" from the pop-up panel to configure your desired feature profiles.
5. When your configuration file(s) are built and verified, exit the Communications Manager. Insert diskette number 6 and type **REINST** at the OS/2 command prompt to re-install your configuration file(s) and the related feature profiles.
6. When the "Communications Manager Install Menu" appears, select "Install Communications Manager."
7. When the "Target Drive Specification" panel appears, specify the drive ID in which the Communications Manager will be re-installed (it will usually be the same used for the original installation).

The "Communications Manager Install Menu" appears. Select "User Configuration Files and Features."

8. The "Source Location" menu is displayed; specify the drive and path to your user configuration file.
9. The "Select Configuration Files" panel asks you to choose the configuration files you desire to install.
10. Press F3 to exit the "Install Communications Manager Menu." When F3 is pressed, the installation of your configuration file(s) and related features is performed. Insert diskettes as required.
11. If you installed more than one configuration file, the "Select Configuration File to Update CONFIG.SYS File" menu is displayed. By selecting the configuration file(s) you wish to activate, the CONFIG.SYS is automatically updated with DEVICE = and RUN = statements.
12. Press F3 to exit the "OS/2 EE Install/Remove " menu.
13. The components you select are already installed and the panel "Installation Complete" appears.
14. Reboot the system.
15. Re-apply the necessary patches because you may have lost them due to the re-installation of the Communications Manager (if they were received from IBM).
16. Reboot the system again.
17. The Communications Manager and your configuration file(s) are installed and ready to use.

25.4 Basic Troubleshooting

Remember that some of the Communications Manager features like SNA gateway, X.25, APPC, etc., are not installed with either of the two installation methods. If you need any of those features you must install the Communications Manager with "any" configuration file (default or produced by the basic configuration services), start the Communications Manager, create a configuration file including the new services you need (and not normally installed), verify your configuration file and re-install the Communications Manager.

25.5 Where To Go For More Information

- *IBM OS/2 Extended Edition Version 1.2 - Getting Started*
- *IBM OS/2 Extended Edition Version 1.2 - User's Guide*
- *IBM OS/2 Extended Edition Version 1.2 - System Administrator's Guide for Communications.*

Chapter 26. OS/2 EE 1.2 Communications Manager - 3270 Terminal Emulation

26.1 Overview

The Communications Manager is the OS/2 communications component that integrates many different communications support functions. Between those functions, 3270 terminal emulation is provided to connect the PC or PS/2 to a S/370 host.

The 3270 terminal emulation (OS/2 3270 emulation will be used throughout the chapter) will make your PC or PS/2 workstation act as a 3270 family-type terminal. Different types of connection are supported but in this document, **only** the Token-Ring Network related connections will be presented.

Basically, most of the non-Distributed Function Terminal (non-DFT) connections are related to Token-Ring Network, including workstation configuration as well as gateway for other workstations configuration.

Workstation A workstation configuration on the OS/2 3270 emulation looks to the host like a PU T2.0 with up to five sessions which can be display- or printer-session types. Note that all five sessions belong to the same PC or PS/2 (display sessions are handled by the windowing facility of OS/2). The workstation communicates directly with the host either through modems (SDLC or X.25) or across a Token-Ring Network (via a host Token-Ring Network gateway or an OS/2 3270 emulation gateway). This guide will only consider LAN attachment of the workstation configuration.

Gateway A gateway configuration on the OS/2 3270 emulation looks to the host like a single PU T2.0 supporting up to 254 display or printer sessions. Up to five sessions can be assigned to each workstation controlled by the gateway. It communicates to the workstations on one side (providing a PU T4 subset function) and to the host on the other side (like a PU T2.0). This host connection can be either via a SDLC line, X.25 link or across the LAN to another host gateway such as a 3174, 9370 or a 37XX. The gateway can also use the workstation function to have up to five display/printer sessions for its own use.

The Figure 85 on page 182 summarizes the Token-Ring-related connections for the OS/2 3270 emulation.

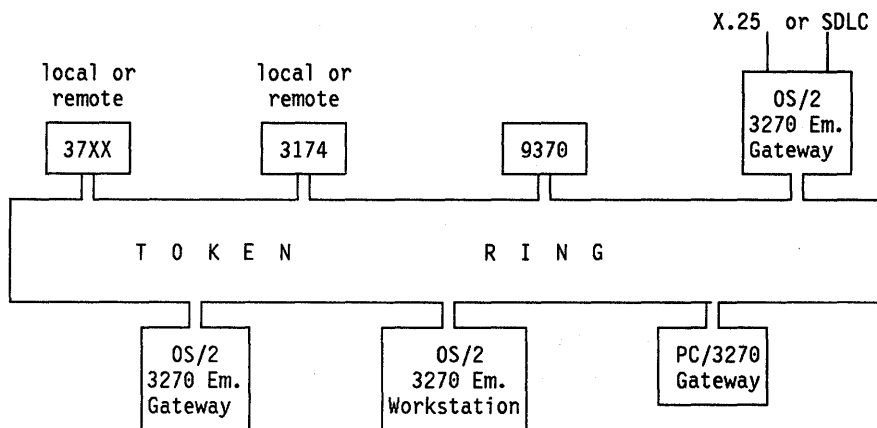


Figure 85. 3270 Terminal Emulation Configurations

26.2 Planning Checklist

26.2.1 Prerequisites - Hardware

These prerequisites apply to workstation as well as gateway configurations.

- One of the following PCs with at least 3.5 Mb of memory, 30 Mb fixed disk, a diskette drive unit capable of reading either 3.5-inch (1.44 Mb) or 5.25-inch (1.2 Mb) high-capacity diskettes, and a display.
 - PC-AT Models 239, 319 or 339
 - PS/2 Models 30-286, 50Z, 55, 60, 70 or 80
 - Industrial Computers 7531, 7532 or 7552
- An appropriate Token-Ring Network adapter card from the following:
 - PC I/O architecture
 - Token-Ring Network Adapter
 - Token-Ring Network Adapter II
 - Token-Ring Network 16/4 Adapter
 - Micro Channel Architecture
 - Token-Ring Network Adapter /A
 - Token-Ring Network 16/4 Adapter/A
- One of the following communications adapter cards *only* if the configuration is a gateway, attached to the host using an SDLC or X.25 link.
 - SDLC
 - SDLC Adapter, for PC I/O architecture
 - Multiprotocol Adapter/A, for Micro Channel architecture
 - X.25

- X.25 Interface Co-Processor/2, for Micro Channel architecture but it is only supported for PS/2 Models 50Z, 60, 70 or 80.

26.2.2 Prerequisites - Software

- Operating System/2 Extended Edition Version 1.2
 - Base Operating System
 - Communications Manager.

26.2.3 Coexistence and Compatibility

There may be some hardware interrupt conflicts if care is not taken when assigning interrupt levels to the communications device drivers (as well as to some other like the mouse device driver), particularly when many of them are installed and used simultaneously.

An interrupt level can be shared if the device driver was designed for interrupt sharing. If interrupt sharing is needed, both device drivers must share it. Interrupt sharing is only supported on PS/2.

For more information altering the interrupt levels of the Token-Ring Network Adapter refer to "PC Token-Ring Network Adapter Installation" on page 9; and for the Token-Ring Network Adapter/A refer to "PS/2 Token-Ring Adapter/A Installation" on page 17.

26.2.4 Configuration Parameters

The configuration of the OS/2 3270 emulation as a gateway or as a workstation depends on the gateway used to access the host, as well as how that host gateway is customized. Therefore total customization must be a joint effort between the controller customizer, the planning coordinator and the OS/2 3270 emulation customizer.

There are some parameters whose value in the host definitions must match the value specified in the OS/2 3270 emulation configuration. Ensure that everyone participating in the total customization knows and agree on the value for the following parameters.

26.2.4.1 Host Parameters

The general VTAM/NCP parameters that need coding for the Token-Ring Network are covered in complete detail in "VTAM and NCP Definitions" on page 381.

If you are using a 37XX gateway or a 9370, then the OS/2 3270 emulation gateway or workstation node is supported by VTAM as a station on a switched line and is defined in a switched major node.

VTAM Start Parameters List	Recommended Value	Notes
NETID=	xxxxxxx	Must match the "network name" used in the "SNA base profile" of "SNA features profile" for OS/2 CM.

PU Parameters	Recommended Value	Notes
IDBLK=	05D	For 37XX and 9370 Connection Hard coded in the "OS/2 EE V1.2 CM - OS/2 3270 Terminal Emulation" Must match the "Node ID" used in the "SNA Base profile" of "SNA features profile" for OS/2 CM. Required by OS/2 3270 emulation.
IDNUM=	xxxxx	
PUTYPE=	2	

LU Parameters	Recommended Value	Notes
LOCADDR=	2 to 254	Corresponds to the number of sessions through the gateway.

Figure 86. VTAM/NCP Parameters for OS/2 3270 Emulation - Gateway or Workstation configuration

If you are using a remote 3174 gateway, then these definitions are in the NCP under a half-duplex leased multipoint line definition.

26.2.4.2 3174 Parameters

When you customize the 3174 you will need the following parameters:

- The locally administered address of the 3174 gateway
- The Token-Ring Network adapter address of the PC gateway or workstations (the downstream PUs - DSPUs).
- The DLC SAP address of the OS/2 3270 emulation, which is "04."

26.2.4.3 OS/2 3270 Emulation Workstation

When you configure the OS/2 3270 emulation workstation you will need to know the following parameters:

- The locally administered address of the host gateway (3174, 37XX or 9370) if the workstation is directly connected it.
- The locally administered address of the Token-Ring Network adapter on the OS/2 3270 emulation gateway if the workstation is connected to the host via the OS/2 3270 emulation gateway.
- If using a 37XX, a 9370, or a Personal Communications/3270 station as Token-Ring Network gateway, then you will need to know the IDNUM assigned to your station (in the VTAM switched major node) as well as the NETID that is used in the VTAM start parameters (ATCSTRxx).

- The Token-Ring Network adapter address that the host gateway or OS/2 3270 emulation gateway is using for **your** node.
- The remote SAP ID for the host gateway, OS/2 3270 emulation gateway or host. This must be "04" for a 3174, 37XX or OS/2 3270 emulation gateway. If you are connecting to a 9370 check with the host programmers for the value of the SAPADDR= parameter.

26.2.4.4 OS/2 3270 Emulation Gateway

When you customize the OS/2 3270 emulation gateway you will need to know the following parameters:

- The locally administered address of the host Token-Ring gateway (3174, 37XX or 9370).
- If using a 37XX, a 9370 or a Personal Communications/3270 station as Token-Ring Network gateway, then you will need to know the IDNUM assigned to your station (in the VTAM switched major node) as well as the NETID that is used in the VTAM start parameters (ATCSTRxx).
- The Token-Ring Network adapter address that the host gateway is using for *your* node (if it is used a 3174 or a OS/2 EE 1.2 Token-Ring Network gateway).
- The remote SAP ID for the gateway or host. This must be "04" for a 3174, 37XX. If you are connecting to a 9370, check with the host programmers for the value of the SAPADDR= parameter.
- The Token Ring Adapter addresses that the OS/2 3270 emulation gateway will use for the OS/2 3270 emulation workstations that it is going to control.

The OS/2 3270 emulation gateway can also be used to provide the gateway function to other programs such as PC 3270 Emulation Program V3, Workstation Program 1.1.1 or Personal Communications, customized as "stand-alone" stations (and, with the exception of the WSP 1.1.1, they can even be customized as "gateway" stations controlling "network" stations).

26.3 OS/2 3270 Emulation Configuration

There are several considerations when configuring the OS/2 3270 emulation depending on the functions that the PC or PS/2 workstation will perform. In order to facilitate the understanding of these functions, this configuration section will be organized as follows:

1. Configuration procedure
2. Workstation configuration
3. General gateway considerations
4. Token-Ring Network gateway configuration
5. SDLC gateway configuration

26.3.1 Configuration Procedure

Every OS/2 3270 emulation configuration is accomplished by executing the following steps:

1. Start execution of the Communications Manager.

If the Communications Manager has not already been started, select Communications Manager from the Start Programs window. If this is the first time you have started Communications Manager, you will be prompted for a configuration file name.

If Communications Manager is already running, press Alt and Esc keys until a Communication Manager panel displays and using the Esc key go to the Main Menu.

2. From the Communications Manager Main Menu use the selection bar at the top of the screen to get the advanced functions and choose the configuration option displayed on the pop-up panel.
3. Specify the name of the configuration file when a prompt asks you to do so.

The Communication Configuration Menu is displayed so you can select the type of profile that you want to configure. The profile types are the following:

- a. Workstation profile (and auto-start options)
- b. Asynchronous feature profiles
- c. 3270 feature profiles
- d. SNA feature profiles
- e. Server-Requester Programming Interface (SRPI) profiles
- f. LAN feature profiles
- g. 5250 feature profiles
- h. X.25 feature profiles

4. Select and configure each of the profiles (one by one) that your configuration needs.

The Communication Configuration menu is displayed again every time you finish configuring a profile.

5. Verify the configuration you defined.

To verify your configuration go to the communication configuration action bar and select verify.

6. Exit the Communication Configuration Menu.

To exit, go to the communication configuration action bar and exit.

If you did not verify your configuration file, you are warned of it and given the opportunity to resume communication configuration so you can verify your defined configuration file.

The Communications Manager Main Menu is displayed.

7. Specify your configuration file name as the new configuration file name default (a Communications Manager Main Menu option).
8. Exit and start again the Communications Manager.

This is a required step because your configuration file may have included feature profiles that the previously used configuration file does not have, and they are processed at the Communications Manager initiation.

You have to select and configure different feature profiles depending on what type of OS/2 3270 emulation configuration you want (workstation or gateway), as well as how it is going to be connected to the host.

26.3.2 Workstation Configuration

When configuring an OS/2 3270 emulation workstation, the following profiles and options are required. Some options are not presented since they are not mandatory for an initial configuration.

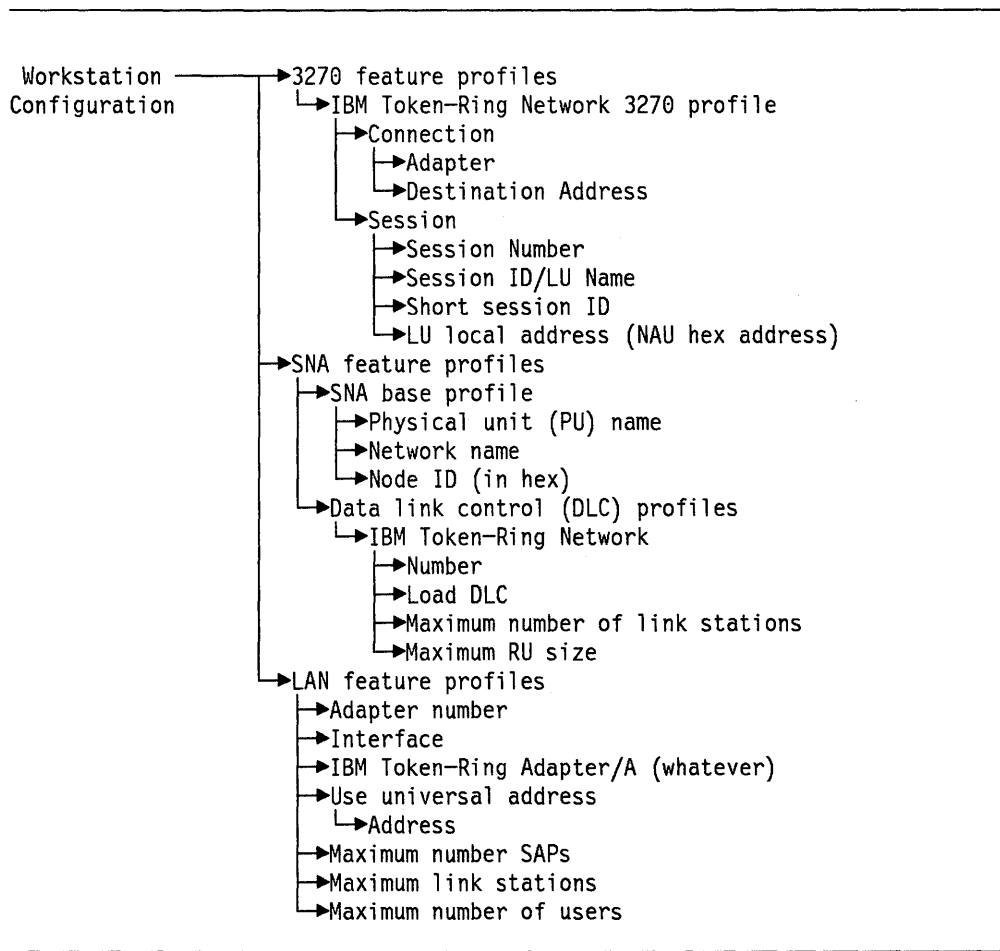


Figure 87. OS/2 3270 Emulation Workstation Configuration

The profiles involved in configuring an OS/2 3270 emulation workstation shown in Figure 87 are described below. You must follow the arrows shown when selecting the profiles and options. Some intermediate popup panels (not shown in the figure), will be displayed intermixed with the profile panel described. These will request indications whether the profile is being created, changed or deleted. For the first time definition, the create option must be selected; for later definitions, the selected option depends on the user's request.

- **3270 Feature Profiles**

These feature profiles allow you to define what link is going to be used to connect your workstation to the host as well as to identify the session(s) that you will be working with in your workstation.

IBM Token-Ring Network 3270 profile must be chosen because this is the link we are dealing with now. There are some other possibilities (SDLC, X.25 or IBM PC Network) not included in the scope of this document.

Choose **connection**, and a pop-up panel asks you to assign the adapter and the destination address.

Adapter allows you to specify "0" or "1" which means that you will be using the primary or alternate LAN adapter to connect to the host gateway or to the OS/2 3270 emulation gateway.

Destination Address must contain the MAC address of the Token-Ring Network adapter at the host gateway or at the OS/2 3270 emulation gateway.

Choose **session** and a new panel asks you to define session number, session ID/LU name, short session ID and LU local address (NAU hex address).

Session number is a number from 1 to 5 that identifies a 3270 session.

Session ID/LU name you can specify up to eight characters. The first four characters must be unique because they will be displayed on your 3270 emulation panels and can help to identify the 3270 emulation session you are working with when your workstation has more than one session.

Short session ID this must be the next available letter of the alphabet starting with "A." It also identifies your 3270 emulation session and is referenced when doing file transfer from the command line.

LU local address (NAU hex address) This must be unique from 01 to FF. This is a locally assigned NAU address for the LU and it is mapped to the LU local address coming from the host. When the workstation is connected to the host via a non-OS/2 EE 1.2 host gateway, the workstation always receives consecutive NAU numbers starting from 02. When the workstation is connected to the host via a OS/2 3270 emulation gateway, the workstation receives the NAU numbers assigned when configuring the OS/2 3270 emulation gateway.

- **SNA Feature Profiles**

These feature profiles allow you to define how your workstation will be identified to the host in SNA terms. It also allows you to define the characteristics of the link to the host.

Choose **SNA base profiles** and a panel will be displayed asking you for a physical unit (PU) name, network name and node ID (in hex).

Physical unit (PU) name. This is a locally assigned name for the PU and may be any name up to eight characters. It is not checked against any host definition parameter. For documentation purposes, it is suggested that you use the same name as the label for the PU macro defined in VTAM (when the workstation is connected to a host gateway). Or use the same name as the one specified for **PU name at workstation** parameter in the gateway configuration when the workstation is connected to a OS/2 3270 emulation gateway.

Network name. This parameter must match the NETID parameter specified in the VTAM start parameters (ATCSTRxx) when the workstation is connected to the host via a host gateway. This parameter is irrelevant when the workstation is connected to the host via an OS/2 3270 emulation gateway.

Node ID (in hex). This parameter must match the IDNUM parameter specified in the VTAM switched major node definition when the workstation is connected to the host via a host gateway. This parameter is irrelevant when the workstation is connected to the host via an OS/2 3270 emulation gateway.

Choose **data link control (DLC) profiles** and then:

IBM Token-Ring Network must be selected since the workstation will be connected to the host through Token-Ring Network.

Number. This parameter is used to specify, with "0" or "1," if the primary or alternate Token-Ring Network adapter will be used to connect to the host.

Load DLC. This parameter specifies if the DLC will be loaded at initialization time. Specify "yes."

Maximum Number of link stations. The value specified may be up to 64 depending on the number needed.

Maximum RU size. This parameter is related to the MAXDATA parameter specified in VTAM (choose 1 or 2 Kb). It is also related to the transmit buffer size specified for 802.2 support.

- **LAN Feature Profiles**

These feature profiles allow you to define the characteristics that your LAN adapter (Token-Ring Adapter in this case) will have.

Adapter number. type "0" or "1" to indicate which adapter characteristics you are defining: the primary or the alternate adapter.

Interface. This parameter indicates what programming interface will be used. The OS/2 3270 emulation uses 802.2.

Select the appropriate Token-Ring Network adapter, for example **Token-Ring Network Adapter/A**.

Use universal address. Select "yes" or "no". If your answer is "no" then you must provide an adapter MAC address in the displayed pop-up panel.

Maximum number of SAPs. This is to specify the number of service access points that the workstation as well as other applications will require. Default works with the OS/2 3270 emulation.

Maximum link stations. The value specified depends on the number of link stations required. It has a limit established by the Token-Ring Network adapter used which can be 64 or 255.

Maximum number of users. The value specified is the number of applications (using different SAP values) that are going to access the Token-Ring Network adapter in this PC or PS/2.

It is required that you configure the SNA feature profiles before configuring 3270 profiles. A suggested order for the configuration is:

1. 3270 feature profiles.

2. SNA feature profiles
3. LAN feature profiles

26.3.3 General Gateway Considerations

The OS/2 3270 emulation gateway appears to the host as a SNA PU.T2 control unit, supporting up to 254 total LUs. The processor speed, memory size and link to the host on the gateway machine can limit the practical number of LUs.

The OS/2 3270 emulation gateway appears to the downstream PUs as an SNA PU.T4 Communications Controller. The DSPUs are configured as directly accessing a host gateway regardless of the presence of other gateway in between.

In reality, the OS/2 3270 emulation gateway is a very particular PU.T2. It implements the LU functions for dependent workstations as a real PU.T2 would, but only as long as the corresponding workstation is offline. As soon as a workstation is online, the gateway leaves to it the responsibility of implementing the LU functions. All LU-LU and LU-SSCP traffic exchanged with the host is simply passed through the gateway transparently as if the host and workstation communicated directly. In support of that illusion, the gateway remains a PU.T2 on the host side, but effectively behaves as a PU.T4 on the workstations' side, forwarding such host messages as ACTPU, ACTLU and BINDs.

The OS/2 3270 emulation gateway operates on a PC or PS/2 connected on one side to the host via SDLC, X.25 or Token-Ring Network data link control, and on the other side to a set of workstations connected to it via SDLC, X.25, Token-Ring or PC Network data link control.

The possibilities of the OS/2 3270 emulation gateway are summarized in Figure 88.

DSPU link	Host link		
	Token-Ring	SDLC	X.25
Token-Ring	YES	YES	YES
SDLC	YES	YES	YES
X.25	YES	YES	YES
PC Network	YES	YES	YES

Figure 88. OS/2 3270 Emulation Gateway Capabilities Matrix

This matrix must be used with caution, since there are some restrictions depending on the DLC used in the workstation side.

- If the DSPU uses Token-Ring Network DLC, there is no restriction at all. The workstation could be a PC or PS/2 working with OS/2 EE CM V1.2, OS/2 EE CM V1.1, 3270 Emulation Program V3, Personal Communications or Workstation Program V1.1.1.

- If the DSPU uses an SDLC DLC, the Workstation Program V1.1.1 can not be used. The workstation Program does not provide the PU type 2.0 support on an SDLC discipline.
- If the DSPU uses an X.25 DLC, **only** OS/2 EE CM V1.2 can be used; it is the only emulation program that supports this DLC.
- If the DSPU uses a PC Network DLC, OS/2 EE CM V1.1 and 3270 Emulation Program V3 can not be used (they are not supported). The Workstation Program V1.1.1 does not support this DLC at all.

For the scope of this document, only Token-Ring-related combinations are considered. The combinations covered are:

- Token-Ring Network DLC to the DSPU (between the OS/2 3270 emulation gateway and the workstations) and Token-Ring Network DLC to the host (between the OS/2 3270 emulation gateway and the host gateway).
- Token-Ring Network DLC to the DSPU (between the OS/2 3270 emulation gateway and the workstations) and SDLC DLC to the host (between the OS/2 3270 emulation gateway and the host gateway).

26.3.4 Token-Ring Network Gateway Configuration

The configuration of an OS/2 3270 emulation Token-Ring Network gateway follows the same pattern as the configuration of the OS/2 3270 emulation workstation, plus additional profiles definitions. The required profiles when configuring an OS/2 3270 emulation gateway are indicated in Figure 89 on page 192.

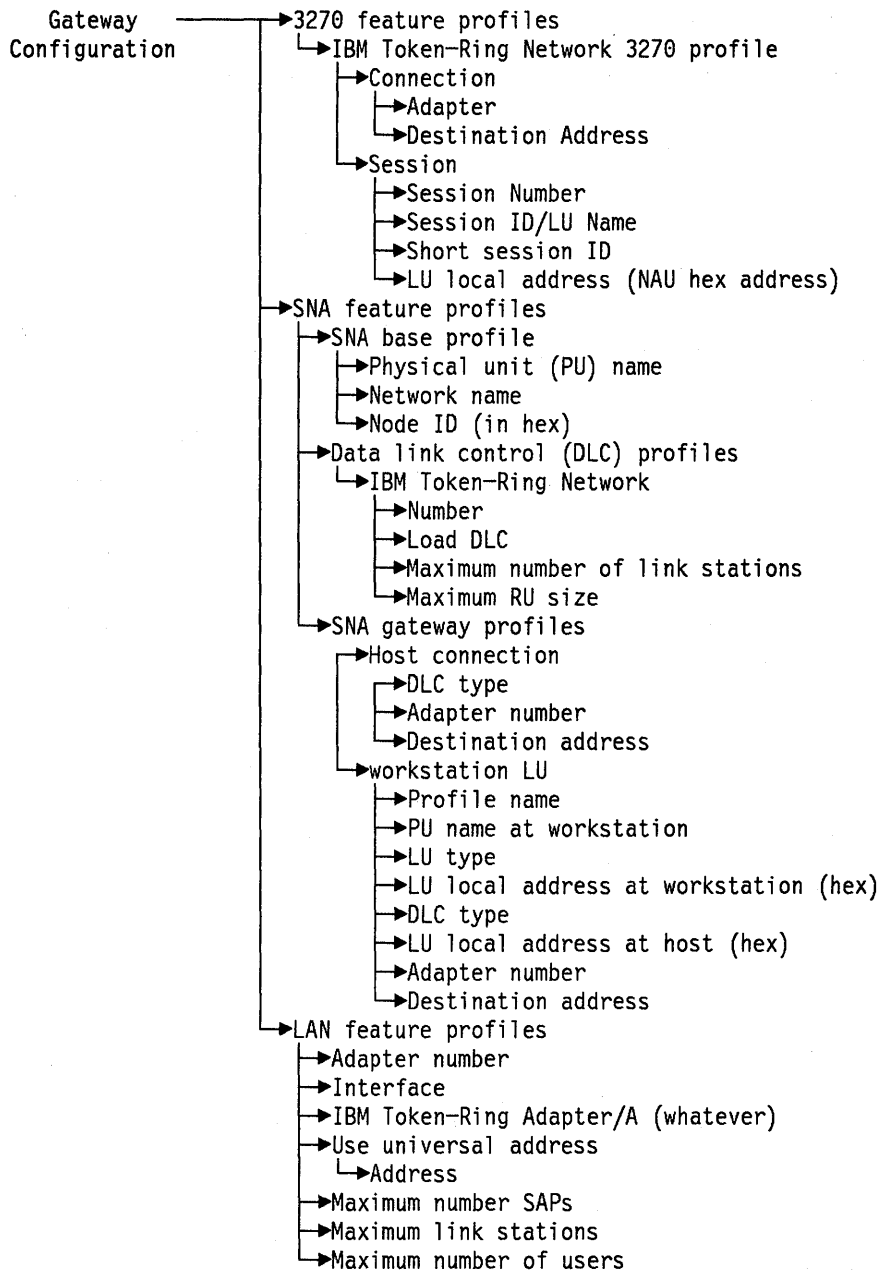


Figure 89. OS/2 3270 Emulation Token-Ring Network Gateway Configuration

The OS/2 3270 emulation Token-Ring Network gateway itself can also have the workstation function. **SNA gateway profiles**, are additional profiles that have to be defined for this configuration. Some intermediate popup panels (not shown in the figure), will be displayed intermixed with the profile panel described. These will request indications whether the profile is being created, changed or deleted. For the first time definition, the create option must be selected; for later definitions, the selected option depends on the user's request.

The description for these additional profiles is:

- **SNA Gateway Profiles**

These feature profiles allow you to define the gateway function. It defines the connection to the host as well as each of the workstations connected to this OS/2 3270 emulation gateway.

Choose **host connection**, and a pop-up panel asks you to select a DLC type.

DLC type. This parameter specifies the DLC that is used to connect to the host. In this case select IBM Token-Ring Network.

Adapter number allows you to specify "0" or "1" which means that you will be using the primary or alternate LAN adapter to connect to the host Token-Ring Network gateway.

Destination Address must contain the MAC address of the Token-Ring Network adapter at the host gateway.

Choose **workstation LU** and a pop-up panel asks you to give a profile name for every LU at every workstation that the gateway will control.

Profile name this is any unique name for this gateway configuration and it is later referred to as the **LU name of the workstation**.

PU name at workstation specifies any name of up to eight characters. For documentation purposes, it is recommended that you use the same name that you used for the **physical unit (PU) name** in the OS/2 3270 emulation workstation configuration.

LU type. You can specify **dedicated** or **pool**. Dedicated means that you will assign a specific NAU from the host to that LU on the workstation. Pool means that you will define pools of LU to be acquired when needed.

LU local address at workstation (hex) This must be the same as the one you used in **LU local address (NAU hex address)** in the 3270 feature profiles for the OS/2 3270 emulation workstation configuration.

DLC type. This parameter allows you to define what DLC will be used to connect the workstation to the OS/2 3270 emulation gateway that you are configuring. Choose IBM Token-Ring Network.

LU local address at host (hex). This parameter allows you to assign a specific LU local address coming from the host, which is translated or mapped to the **LU local address at workstation (hex)** that you specified for the OS/2 3270 emulation workstation.

Adapter Number. This parameter is used to specify, with "0" or "1", if the primary or alternate Token-Ring Network adapter will be used to connect to the OS/2 3270 emulation workstation.

Destination address. This parameter must be the MAC address of the Token-Ring Network adapter installed at the OS/2 3270 emulation workstation.

26.3.5 SDLC Gateway Configuration

The configuration of an OS/2 3270 emulation SDLC gateway follows the same pattern as the configuration of the OS/2 3270 emulation Token-Ring Network gateway, with some differences in the profiles where the link to the host is defined. The required profiles when configuring an OS/2 3270 emulation SDLC gateway are indicated in Figure 90 on page 194.

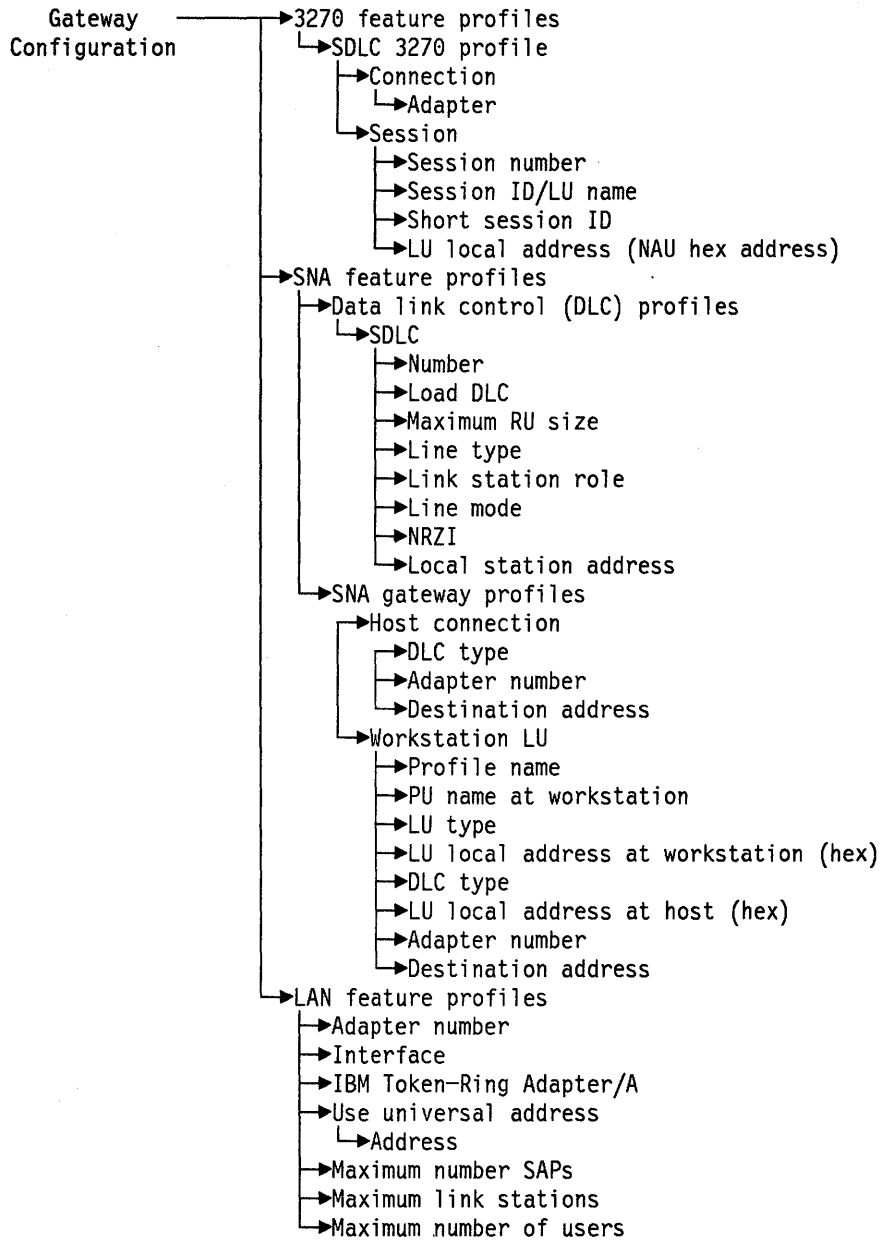


Figure 90. OS/2 3270 Emulation SDLC Gateway Configuration

The OS/2 3270 emulation SDLC gateway itself can also have the workstation function.

The profiles that have differences due to the SDLC link to the host instead of the Token-Ring Network link to the host, are following described. Some intermediate popup panels (not shown in this example), will be displayed intermixed with the profile panel described. These will request indications whether the profile is being created, changed or deleted. For the first time definition, the create option must be selected; for later definitions, the selected option depends on the user's request.

1. 3270 feature profiles

SDLC 3270 profile must be selected instead of **IBM Token-Ring Network 3270 profile**. The **session** option remains the same as previously described, and the **connection** option changes are described below.

The **SDLC 3270 profile** must be chosen because the OS/2 3270 emulation gateway is going to be connected to the host using an SDLC link.

Choose **connection**, and a pop-up panel asks you to assign the adapter number.

Adapter allows you to specify "0" or "1" which means that you will be using the primary or alternate SDLC adapter to connect to the host via an SNA communications link.

2. SNA Feature Profiles

SNA base profiles remains the same as previously described. **Data link control (DLC) profiles** changes are described below.

Choose **data link control (DLC) profiles** and then:

SDLC must be selected since the gateway will be connected to the host through an SNA communications link.

Number. This parameter is used to specify, with "0" or "1", if the primary or alternate SDLC adapter will be used to connect to the host.

Load DLC. This parameter specifies if the DLC will be loaded at initialization time. Specify "yes."

Maximum RU size. This parameter is related to the MAXDATA parameter specified in VTAM (256 is usually used).

Line type. This parameter allows you to specify what type of connection will be used: switched or non-switched.

Link station role. This parameter allows you to specify what role in the session establishment this station will assume. For 3270 emulation, it must be secondary.

Line mode. This parameter allows you to specify "constant request to send" for full-duplex communication or "line turn around" for half-duplex communication.

NRZI. This parameter must match the corresponding parameter in the NCP LINE definition.

Local station address. This parameter must match the ADDR parameter in the NCP PU definition.

26.4 Basic Troubleshooting

The most common problems are usually related to the understanding of what parameters must be used between the host and the OS/2 3270 emulation gateway configuration, as well as between the 3270 TE gateway and the OS/2 3270 emulation workstations (or any other, such as 3270 EP V3, WSP V1.1.1 or Personal Communications workstations). The scenarios presented in this document will pinpoint these required specifications.

26.5 Where To Go For More Information

- *IBM OS/2 Extended Edition Version 1.2 - Getting Started*
- *IBM OS/2 Extended Edition Version 1.2 - User's Guide*
- *IBM OS/2 Extended Edition Version 1.2 - System Administrator's Guide for Communications.*

Chapter 27. OS/2 EE 1.2 Advanced Program-to-Program Communication

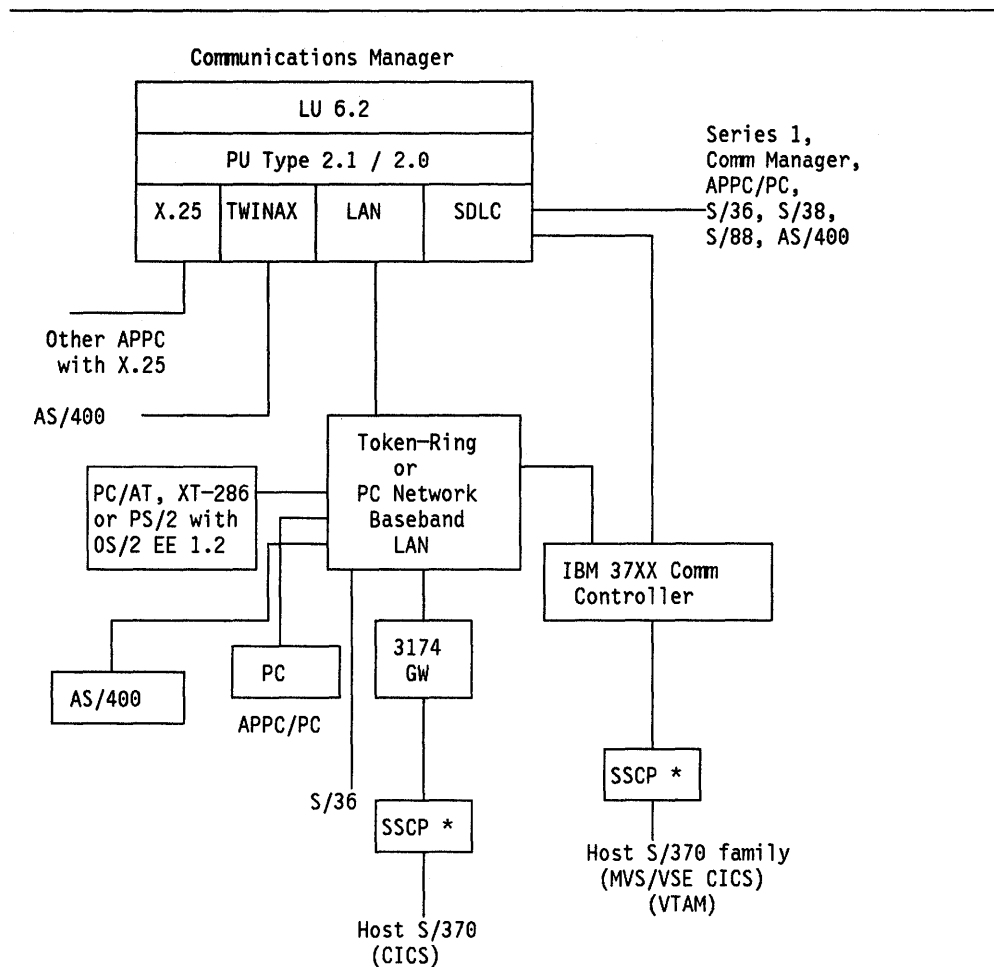
27.1 Overview

This chapter deals with using the IBM Operating System/2 Extended Edition Version 1.2 Advanced Program-to-Program Communication (APPC) interface. For the remainder of this chapter, **APPC** is used to represent IBM Operating System/2 Extended Edition Version 1.2 Advanced Program-to-Program Communication and the APPC architecture. Advanced Program-to-Program Communication is a function of the IBM Operating System/2 Extended Edition Version 1.2 program's Communications Manager, which enables transaction programs on an IBM workstation such as an IBM Personal System/2, or Personal Computer AT to communicate with other systems that support the APPC architecture.

APPC provides a distributed transaction processing capability in which two or more programs, usually on different systems, cooperate to carry out some processing function. This involves communication between the two programs so they can share each other's local resources, such as processor cycles, databases, work queues and physical interfaces such as keyboards and displays.

The IBM Operating System/2 Extended Edition Version 1.2 program implementation of APPC permits communication between distributed processing programs at SNA LU 6.2 nodes that support APPC architecture. The SNA nodes used by APPC are on remote systems connected by an IBM Token-Ring Network, an IBM PC Network, an Synchronous Data Link Control (SDLC), a Twinax, or an X.25 link. The nodes must be configured for the APPC interface.

The following figure shows some examples of the IBM OS/2 Extended Edition Version 1.2 Communications Manager SNA LU 6.2 connectivities.



* Only 1 SSCP can be connected with Communications Manager at a time

Figure 91. Communications Manager supported SNA LU6.2 connectivities

For the purpose of this document, only the IBM Token-Ring related APPC capabilities are documented.

The following list summarizes some basic APPC concepts:

- **Transaction Program**

A transaction program is an application program or portion of a program that uses APPC communications functions. Using these functions, an application program can communicate with application programs on other systems that support APPC.

To request APPC to take some action for your program, your program issues a verb. A verb is a formatted request that is executed by APPC. Transaction programs use APPC verb sequences to communicate with programs at other locations.

There is not a one-to-one relationship between an application program and a transaction program. That is, an application can define itself to APPC as more than one transaction program. Verbs can be issued in any programming language that supports the OS/2 program.

- **LU, Local LU, and Partner LU**

Every transaction program gains access to an SNA network through a logical unit (LU). A logical unit manages the exchange of data between transaction programs, acting as an intermediary between the transaction program and the network. There is not a one-to-one relationship between transaction programs and LUs. Your transaction program issues APPC verbs to its local LU. These verbs cause commands and data to flow across the network to your partner LU.

SNA defines different kinds of logical units, called LU types. LU types identify the particular set of SNA functions that a product provides to support user communications. The architecture defines many LU types. IBM developed LU type 6.2 for SNA program-to-program communication. APPC is an implementation of the LU type 6.2 architecture. Your local and partner LUs need to be defined only once for each machine, using the Communications Manager configuration menus.

- **Session**

Before transaction programs can communicate with one another, their respective LUs must be connected in a mutual relationship called a session. Because the session connects two LUs, it is called an LU-to-LU session. Multiple, concurrent sessions between the same two logical units are called parallel LU-to-LU sessions. Sessions are maintained by their respective LUs; you do not deal with session characteristics in your transaction programs except when you reconfigure.

- **Conversation**

Transaction programs use a conversation to communicate. Conversations use LU-to-LU sessions between two logical units. Once a conversation is allocated to a session, a send-receive relationship is established between transaction programs that are connected to the conversation. One transaction program issues verbs to send data, and the other program issues verbs to receive data.

A conversation can be either a basic conversation or a mapped conversation. Basic conversation verbs provide additional flexibility. Mapped conversations are for transaction programs that are the final users of the data exchanged.

The following diagram illustrates the basic terminology that we have just discussed.

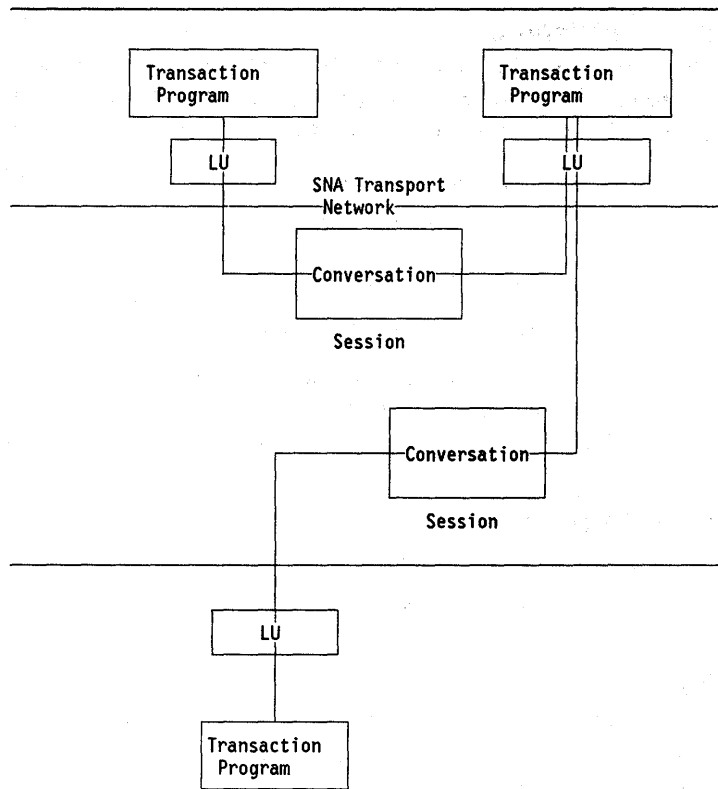


Figure 92. Three Nodes Connected Through an SNA Network

For the purpose of this document, only the Token-Ring related Communications Manager capabilities are documented, and in order to facilitate the understanding of the Communications Manager functions depending on the environment in which it is used, three separate chapters have been created as follows:

1. "OS/2 EE 1.2 Communications Manager - 3270 Terminal Emulation" on page 181
2. "OS/2 EE 1.2 Advanced Program-to-Program Communication" on page 197.
3. "OS/2 EE 1.2 Communications Manager - 5250 Workstation Feature" on page 207

The following sections deal only with the Communications Manager aspects that can be generalized regardless of the environment in which it is used.

27.2 Planning Checklist

These prerequisites apply to the Communications Manager in general. For the particular prerequisites that the Communications Manager has, depending on the environment in which it is used, see the chapters mentioned above.

27.2.1 Prerequisites - Hardware

- One of the following PCs or PS/2s with at least 3.5 Mb of memory, 30 Mb fixed disk, a diskette drive unit capable of reading either 3.5-inch (1.44 Mb) or 5.25-inch (1.2 Mb) high-capacity diskettes, and a display.
 - PC-AT Models 239, 319 or 339
 - PS/2 Models 30-286, 50Z, 55, 60, 70 or 80
 - Industrial Computers 7531, 7532 or 7552.
- For use of the APPC function of the Communications Manager add:
 - One or more modems and/or communications adapters supported by the Communications Manager in the IBM Token-Ring Network, the IBM PC Network, the SDLC, the Twinax, or X.25 environment.

27.2.2 Prerequisites - Software

- Operating System/2 Extended Edition Version 1.2.
 - Base Operating System

27.2.3 Compatibility

The OS/2 Extended Edition 1.0 or 1.1 Communications Manager configuration files are *not* compatible with the OS/2 Extended Edition Communications Manager V1.2. During Communications Manager installation, 1.0 and 1.1 configuration files can be *upgraded* to a compatible 1.2 level. Any configuration files not upgraded during the installation process can be upgraded via the "Advanced" function option only after the Communications Manager has been started with a valid 1.2 level configuration file.

27.3 Installation Steps

APPC is a feature that is installed when you install and configure the Communications Manager portion of OS/2 Extended Edition Version 1.2. The installation of the Communications Manager is now an extension of the OS/2 base operating system installation procedure. The CONFIG.SYS file is updated automatically at the end of the installation.

The Communications Manager is installed into \CMLIB and \CMLIB\DLL directories, which are created if they do not exist.

Only the modules that support the Communications Manager features defined in the existing configuration files, will be copied into the \CMLIB and \CMLIB\DLL directories (eg. if none of the defined configuration file contains APPC configuration information, no APPC support will be copied).

If you follow the required steps for the OS/2 installation, you get to the point when the "Select Basic Configuration Services" panel is displayed, you may choose to install the Communications Manager using this method, otherwise you skip it and the "Extended Edition Install/Remove" panel is displayed which gives you a different method for the installation of the Communications Manager.

"Basic Configuration Services" allows you to install the Communications Manager based on a configuration file that is easily defined at installation time.

“Extended Edition Install/Remove” allows to install the Communications Manager based on a default configuration file supplied by IBM.

Therefore, you can install the Communications Manager by using:

1. “Basic Configuration Services”
2. “Extended Edition Install/Remove.”

27.3.1 Basic Configuration Services Installation Procedure

The basic configuration services function is designed to aid the user in doing a quick, simple installation by providing easy-to-use configuration services at installation time. It will create as a result, a configuration file. You can use this function to configure and install the following features:

- 3270 Terminal Emulation
- ASCII Terminal Emulation
- 5250 Workstation Feature
- Database Manager with Remote Data Services on a LAN
- LAN Requester

Note that the following features **are not** installed when the basic configuration services are used:

- APPC
- SNA gateway
- SRPI
- X.25
- Remote Data Services with Multiple Server/Requester pairs
- Remote Data Services over SDLC
- Configuration file with multiple adapter types.

Since APPC is not one of the features that can be installed using Basic Configuration Services, you should bypass Basic Configuration Services and use Extended Edition Install/Remove when installing the APPC feature of Communications Manager under OS/2 Extended Edition Version 1.2.

27.3.2 Extended Edition Install/Remove Installation Procedure

In order to install the APPC feature you should use the “Extended Edition Install/Remove” procedure. This procedure can be used when the “Basic Configuration Services” procedure does not provide all the communications features that you need. The Communications Manager will be installed based on a default configuration file supplied by IBM so that you can later customize it and create a user configuration file and reinstall the Communications Manager to include the required communications features.

The installation steps when using “Extended Edition Install/Remove” are:

1. Choose “no” on the “Select Basic Configuration Services” panel to skip those services.
2. The “OS/2 EE Install/Remove Menu” is displayed.

3. Select the "Install Communications Manager" option.
4. The "Target Drive Specification" panel appears asking you to specify in which drive the Communications Manager will be installed.
5. The "Communications Manager Install Menu" is displayed. Select "Additional Features."
6. The "Select Configuration Files" panel is displayed. Select one or more of the default configuration files supplied by IBM. Both of the IBM-supplied default configuration files (ACSCFG and ACSCFGUS) contain specifications for the APPC feature.
7. Press F3 to exit the "Install Communications Manager Menu." When F3 is pressed, the installation of your configuration file(s) and related features is performed. Insert diskettes as required.
8. If you installed more than one configuration file, the "Select Configuration File to Update CONFIG.SYS File" menu is displayed. By selecting the configuration file(s) you wish to activate, the CONFIG.SYS is automatically updated with DEVICE= and RUN= statements.
9. Press F3 to exit the "OS/2 EE Install/Remove " menu.
10. The components you select are already installed and the "Installation Complete" panel appears.
11. Reboot the system.
12. Apply the necessary patches.
13. Reboot the system again.
14. The Communications Manager and your configuration file(s) are installed and ready to use.

27.4 Basic Troubleshooting

Remember that some of the Communications Manager features like SNA gateway, X.25, APPC, etc., are not installed when using the Basic Configuration Services. If you need any of those features you must install the Communications Manager with "any" configuration file (default or produced by the basic configuration services), start the Communications Manager, create a configuration file referring the features you need (and not normally installed), verify your configuration file and re-install the Communications Manager.

27.5 Configuring Communications Manager for APPC

The SNA feature profiles contain the information needed to configure SNA communications to a host or another workstation. The SNA base profile and the Data Link Control (DLC) profiles are used by both 3270 terminal emulation and APPC. The remaining SNA feature profiles are used by APPC only.

We will illustrate the configuration of the Communications Manager for APPC by using the APPC sample programs. The sample programs are designed to work with the Communications Manager while in protected mode of the OS/2 Extended Edition program. This section assumes that the programs have been installed, compiled, linked, and bound. Refer to the information from the PRINT.ME file on the **IBM Operating System/2 Extended Edition Communications**

Manager API Sample Programs Support diskette or the **APPC Programming Reference** for instructions on how to install, compile, link and bind the sample programs. The APPC sample programs are located on the IBM Operating System/2 Extended Edition Communications Manager API Sample Program Support diskette, which is shipped with the *System Administrator's Guide for Communications*.

The following diagram illustrates the use of these two sample APPC programs on an IBM Token-Ring Network.

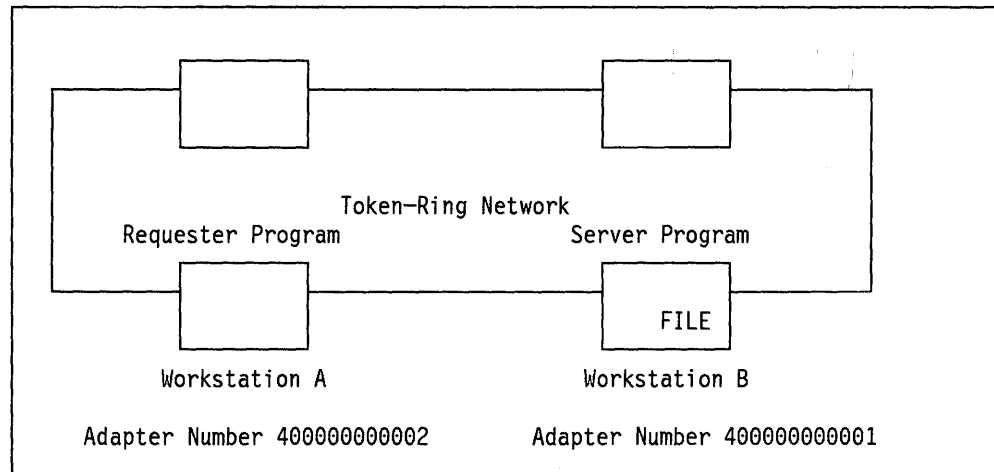


Figure 93. Example of APPC Sample Programs on a Token-Ring Network

27.6 Preparing to Configure Communications Manager for APPC

For the APPC sample programs, two configuration files must be created, one for each workstation. For your own convenience you can build both configuration files on your own workstation. For the purpose of this example, assume that the requester program resides on your workstation, Workstation A. Later you can copy the appropriate configuration file to Workstation B.

IBM supplies configuration files which contain default values for most fields. ACSCFGUS.CFG is the IBM-supplied configuration file that you will want to use to create an APPC configuration file. To do this, use the OS/2 COPY command to copy the file ACSCFGUS.CFG to a new file name.

1. At the OS/2 command prompt, type:
`COPY C:\CMLIB\ACSCFGUS.CFG C:\CMLIB\RECEIVER.CFG`
 This is the configuration file that you will use on Workstation A.
2. At the OS/2 command prompt, type:
`COPY C:\CMLIB\ACSCFGUS.CFG C:\CMLIB\SERVER.CFG`
 This is the configuration file that you will use on Workstation B.
3. Start Communications Manager.

If Communications Manager has not already been started, select Communications Manager from the Start Programs window. If this is the first time you have started Communications Manager, you will be prompted for a con-

figuration file name. Type RECEIVER. This is the name of the configuration file for Workstation A (your workstation).

If Communications Manager is already running, press the Alt and Esc keys until the Communications Manager screen group displays. If necessary, press the Escape (Esc) key to return to the Communications Manager Main Menu.

27.6.1 Relationship Between Configuration File Parameters

You will be creating two separate configuration files. The following illustrates critical relationships between configuration files for Workstation A and B. Use this illustration as you proceed through the steps for configuring both workstations.

Workstation A - Server Program		Workstation A - Requester Program
<u>SNA Base Profile</u>		
Network Name	(1)	Network Name
<u>Partner LU Profile (FILEREQ)</u>		
PLU Alias (FILEREQ)		PLU Alias (FILESVR)
Fully Qualified Name ().(FILEREQ)	(1)	Fully Qualified Name ().(FILESVR)
Token-Ring Adapter Number 0	(2)	Token-Ring Adapter Number 0
LU Alias (FILESVR)	(3)	LU Alias (FILEREQ)
Destination Address (400000000002)	(6)	Destination Address (400000000001)
Mode Name (MODE1)	(4)	Mode Name (MODE1)
Initial Session Limit (ISL)	(5)	Initial Session Limit (ISL)
<u>Local LU Profile</u>		
Local LU Alias (FILESVR)	(3)	Local LU Alias (FILEREQ)
LU Name (FILESVR)	(1)	LU Name (FILEREQ)
<u>Transmission Service Mode Profile (MODE1)</u>		
Initial Session Limit Profile (ISL)	(5)	Initial Session Limit Profile (ISL)
<u>DLC Profile</u>		
Token-Ring Adapter Number 0	(2)	Token-Ring Adapter Number 0
<u>LAN Profile</u>		
Token-Ring Adapter Number 0	(2)	Token-Ring Adapter Number 0
Universal Address (No)		Universal Address (No)
Adapter Address (400000000001)	(6)	Adapter Address (400000000002)

Figure 94. Communications Manager Configuration Parameters Relationship

Notes:

1. Network Name, under SNA Base Profile, will be used to form the Fully Qualified Name in the Partner LU (PLU) Profile of the partner workstation. In this example, you will not be specifying a network name, since the two workstations reside in the same SNA subarea. The second field should contain the LU Name of the partner workstation (the LU Name you will specify in the configuration file on Workstation B).
2. Token-Ring Adapter Number is specified in three places within the configuration of the workstation. Under the DLC profile, which is under the SNA feature profile, select the DLC Type of IBM Token-Ring Network. You will select the adapter number that matches what is installed on the workstation. The adapter number specified here must match the number specified in the LAN profile (IEEE 802.2) and the number you will specify in the partner LU profile for the workstation.
3. On the SNA Feature Configuration menu, select Logical Unit (LU) Profiles. Select Create in the Profile Operations panel. Accept the default value for Model Profile Name. Specify the profile name as FILEREQ for Workstation A and FILESVR for Workstation B. This new profile name is the LU Alias name. This name is used by the transaction program. You will use this name in the LU alias field in the partner LU profile for your workstation. The LU alias name is known only at the workstation, and is not used in the network.
4. On the SNA Feature Configuration menu, select Transmission Service Mode Profiles. On the Profile Operations panel select Create. Accept the default value for Model Profile Name. Specify the profile name as MODE1. The mode name is used in the transaction program. You will specify this name in the partner LU profile for your workstation, under Mode Name.
5. On the SNA Feature Configuration menu, select Initial Session Limit Profiles. On the Profile Operations panel select Create. Specify the profile name as ISL. The name of this profile is your choice. The name of this profile will be specified in the partner LU profile for your workstation, under Initial Session Limit.
6. On the Specify adapter address panel, type the locally administered adapter address (400000000002 when configuring Workstation A, and 400000000001 when configuring Workstation B) of your workstation. All workstations that communicate to your adapter must use this address as the destination address. In this example, this number is the Destination Address you will specify in the partner LU profile when you create the configuration file for the partner workstation.

27.7 Where To Go For More Information

- *IBM OS/2 Extended Edition Version 1.2 - Getting Started*
- *IBM OS/2 Extended Edition Version 1.2 - User's Guide*
- *IBM OS/2 Extended Edition Version 1.2 - APPC Programming Reference.*
- *IBM OS/2 Extended Edition Version 1.2 - System Administrator's Guide for Communications.*

Chapter 28. OS/2 EE 1.2 Communications Manager - 5250 Workstation Feature

28.1 Overview

The Communications Manager is the OS/2 communications component that integrates many different communications support functions. Between those functions, the 5250 Workstation Feature emulates a 5250 terminal and printers. 5250 WSF can emulate this terminal and printer via the Communications Manager providing the following connectivities:

- Twinaxial²⁹, X.25, SDLC and Token-Ring Network to Application System/400 (AS/400)
- X.25, SDLC and Token-Ring Network to System/36.

5250 WSF provides support for up to five host-attached display or printer sessions.

It consists of two sets of programs. One set of programs run on the host under control of the host operating system. These programs provide the host pass-through capabilities. The host pass-through programs are packaged as part of the host operating system.

The other set of programs, which is the Workstation Feature, require the Communication Manager of OS/2 V1.2 to provide the PC router functions for the APPC datastream. This datastream can be routed via the above-mentioned connections.

In this chapter we will only discuss the connection via the Token-Ring Network.

The following figure summarizes the Token-Ring-related connections for the OS/2 5250 Workstation Feature:

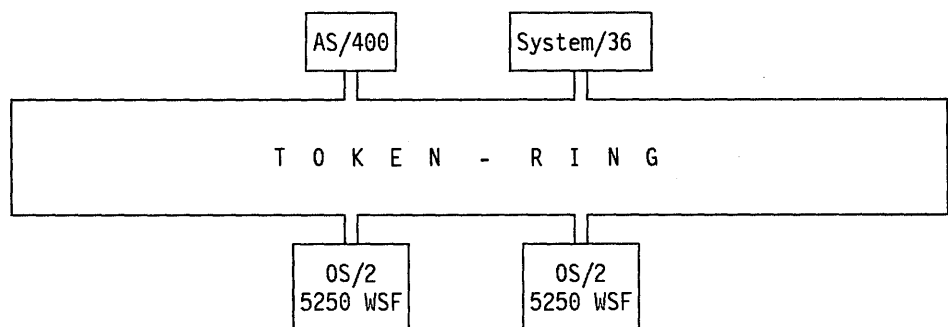


Figure 95. OS/2 Workstation Feature Configuration

²⁹ Twinaxial connection is through the twinaxial adapter

28.2 Planning Checklist

28.2.1 Prerequisites - Hardware

These prerequisites apply to workstation as well as gateway configurations.

- One of the following PCs or PS/2s with at least 3.5 Mb of memory, 30 Mb fixed disk, a diskette drive unit capable of reading either 3.5-inch (1.44 Mb) or 5.25-inch (1.2 Mb) high-capacity diskettes, and a display.
 - PC-AT Models 239, 319 or 339
 - PS/2 Models 30-286, 50Z, 55, 60, 70 or 80
 - Industrial Computers 7531, 7532 or 7552
- An appropriate Token-Ring Adapter card from the following:
 - PC I/O architecture
 - Token-Ring Network Adapter
 - Token-Ring Network Adapter II
 - Token-Ring Network 16/4 Adapter
 - Micro Channel Architecture
 - Token-Ring Network Adapter /A
 - Token-Ring Network 16/4 Adapter/A
- One of the following communications adapter cards *only* if the configuration is attached to an AS/400 or System/36 using an SDLC, X.25 or twinaxial link.

SDLC

- SDLC Adapter, for PC I/O architecture
- Multiprotocol Adapter/A, for Micro Channel architecture

X.25

- X.25 Interface Co-Processor/2, for Micro Channel architecture (PS/2 Models 50Z, 55, 60, 70 or 80 only).

TWINAX

- 5250 Display Station Emulation Adapter.

28.2.2 Prerequisites - Software

- Operating System/2 Extended Edition Version 1.2
 - Base Operating System
 - Communications Manager

28.2.3 Coexistence and Compatibility

There can be some hardware interrupt conflicts, if care is not taken when assigning interrupt levels to the communications device drivers (as well as to some others such as the mouse device driver), particularly when many of them are installed and used simultaneously.

An interrupt level can be shared if the device driver was designed for interrupt sharing. When interrupt sharing is needed, both device drivers must share it. Interrupt sharing is supported only on PS/2.

For more information on modifying the interrupt levels for the Token-Ring Network Adapter card refer to "PC Token-Ring Network Adapter Installation" on page 9; and for the Token-Ring Network Adapter/A card refer to "PS/2 Token-Ring Adapter/A Installation" on page 17.

28.2.4 Configuration Parameters

There are some parameters whose value in the AS/400 or System/36 definitions must match the value specified in the OS/2 5250 WSF configuration. Ensure that everyone participating in the total customization knows and agrees on the value for the following parameters.

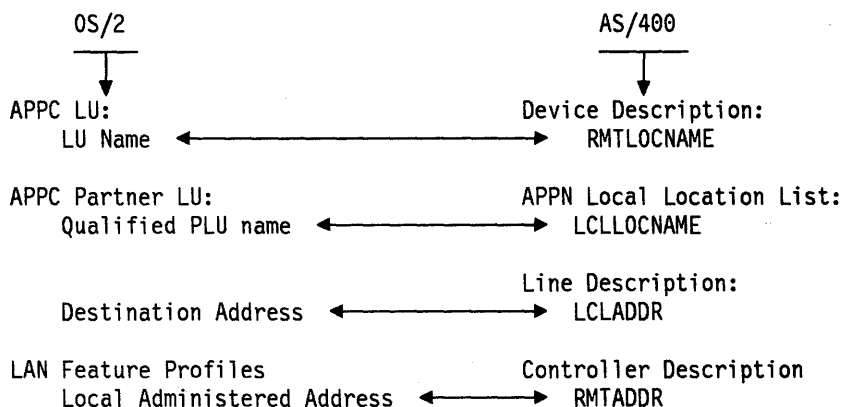


Figure 96. Matching Parameters Between OS/2 and AS/400

28.3 OS/2 5250 WSF Configuration

28.3.1 Configuration Procedure

Every OS/2 5250 WSF configuration is accomplished by these steps:

1. Start the Communications Manager.

If Communications Manager has not already been started, select Communications Manager from the Start Programs window. If this is the first time you have started Communications Manager, you will be prompted for a configuration file name. If Communications Manager is already running, press the Alt and Esc keys until a Communications Manager's panel is displayed. By pressing the Esc key the Communications Manager Main Menu will eventually be displayed.

2. From the Communications Manager Main Menu use the selection bar at the top of the screen to get the advanced functions and choose the configuration option displayed on the pop-up panel.
3. Specify the name of the configuration file when a prompt asks you to do so.

The Communication Configuration Menu is displayed so you can select the type of profile that you want to configure. The profile types are the following:

- Workstation profile (and autostart options)
- Asynchronous feature profiles

- 3270 feature profiles
- SNA feature profiles
- Server-Requester Programming Interface (SRPI) profiles
- LAN feature profiles
- 5250 feature profiles
- X.25 feature profiles

4. Select and configure each of the profiles (one by one) that your configuration needs.

The Communication Configuration Menu is displayed again every time you finish configuring a profile.

5. Verify the configuration you defined.

To verify your configuration go to the communication configuration action bar and select verify.

6. Exit the Communication Configuration Menu.

To exit, go to the communication configuration action bar and exit.

If you did not verify your configuration file, you are warned of it and given the opportunity to resume communication configuration so you can verify your defined configuration file.

The Communications Manager Main Menu is displayed.

7. Specify your configuration file name as the new configuration file name default (a Communications Manager Main Menu option).

8. Exit and start again the Communications Manager.

This is a required step because your configuration file may have included feature profiles that the previously used configuration file does not have, and they are processed at the Communications Manager initiation.

28.3.2 5250 Workstation Configuration

Modify the profiles indicated by an arrow on the Figure 97.

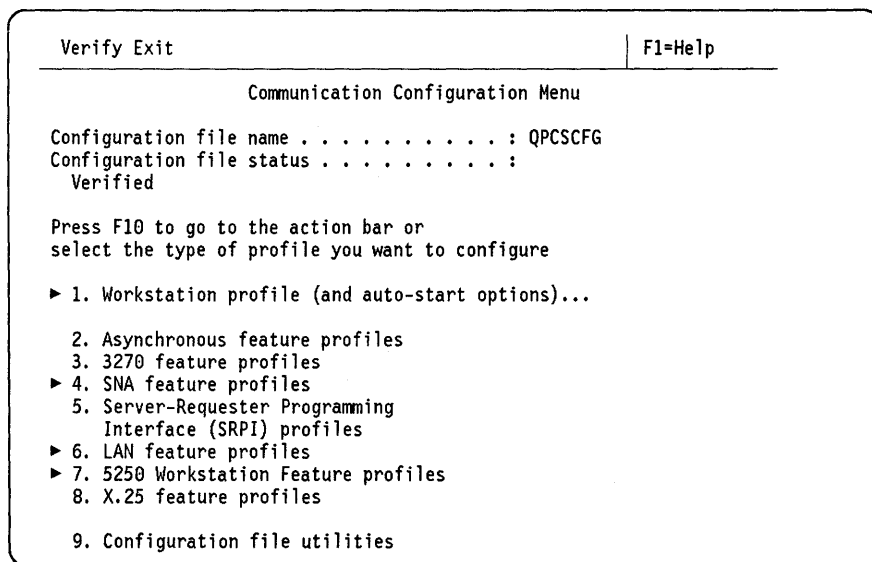


Figure 97. OS/2 Communication Configuration Menu Screen

28.4 Configuration Flow

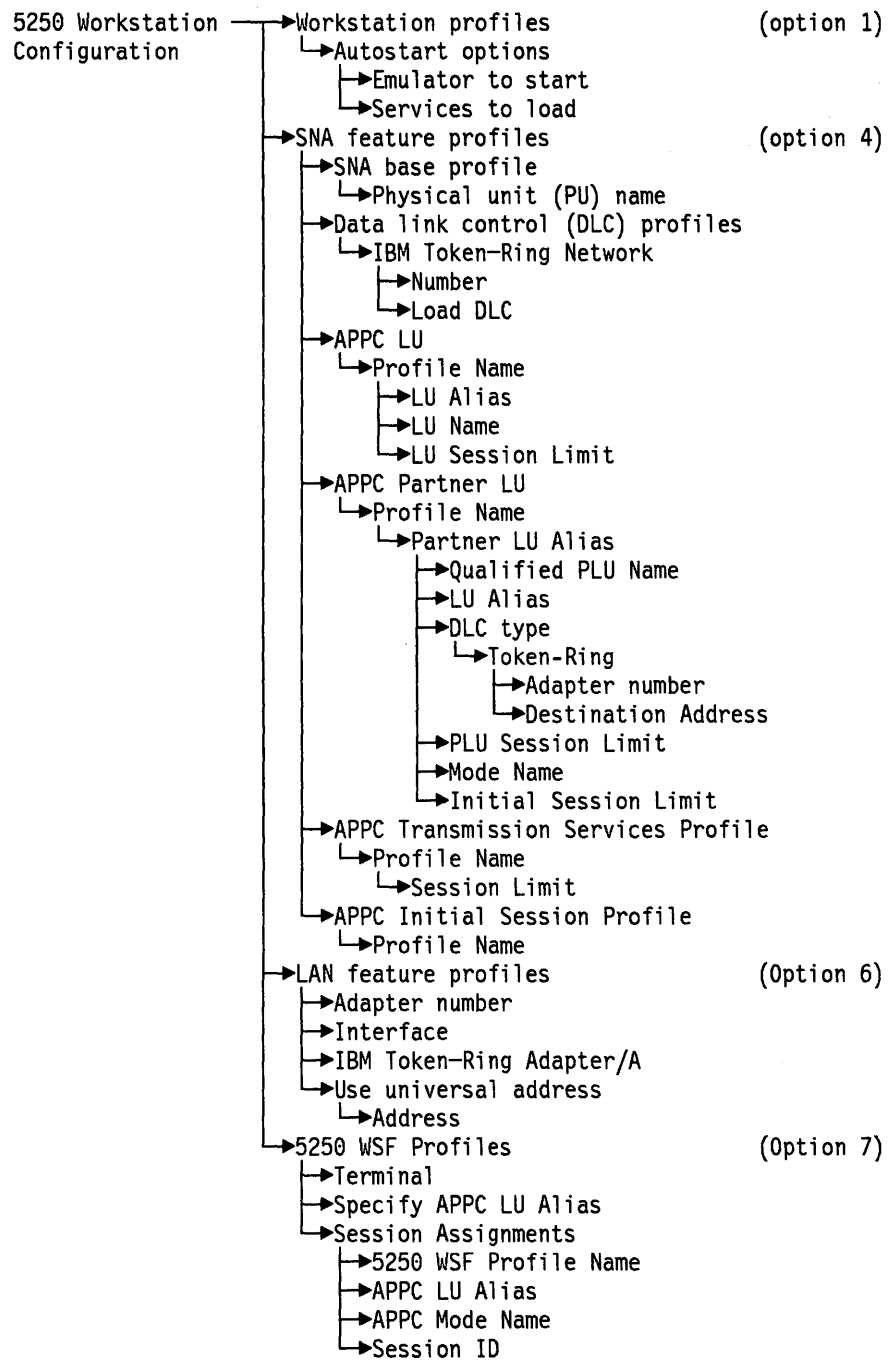


Figure 98. OS/2 5250 WSF Workstation Configuration

28.5 Configuration Sample

WORKSTATION PROFILE		(Option 1)	
Autostart options:			
Emulator to start: 5250 WSF			
Services to load: SNA/APPC			
SNA FEATURE PROFILES		(Option 4)	
SNA Base Profile:	PU Name	PS2M70	(1)
	Network Name		
DLC IBM TOKEN-RING:	C\SM LAN Id	ITSCRAL	(2)
	LOADDLC	YES	
APPC LU:	Profile Name	QPCS	(3)
	LU Alias	QPCS	
	LU Name	RAOTNNB1	
	LU Session Limit	128	
APPC Partner LU:	Profile Name	AS400A	(4)
	Partner LU Alias	AS400A	
	Qualified PLU Name	USIBMRA.RAOTNNB0	
	LU Alias	QPCS	
	Destination Addr	400010020001	
	PLU Session Limit	64	
	Mode Name	QPCSUPP	
	Init. Sess.Limit	QPCSUPP	
APPC Trsm. Services:	Profile Name	QPCSUPP	(5)
	Session Limit	64	
APPC Init. Session:	Profile Name	QPCSUPP	(6)
LAN FEATURE PROFILES		(Option 6)	
Use Locally Administered Address		400000001111	
5250 WSF PROFILES		(Option 7)	
Terminal:		WSFTERM1	(1)
Specify APPC LU Alias:		QPCS	(3)
Session Assignments:	5250WSF Prf.Name	WSFTERM1	(4)
	APPC LU Alias	AS400A	
	APPC Mode Name	QPCSUPP	
	Session ID	A	

Figure 99. OS/2 Communications Manager Configuration Sample

When the Communications Manager is started, the 5250 WSF emulator is also started, and the SNA/APPC services are loaded.

We need SNA/APPC services since the 5250 Workstation application uses an APPC session between an AS/400 and a PS/2 running OS/2 EE 1.2. There are several parameters not discussed here that can be used with the default value.

Configuration items from Figure 99 are described in the following chapters.

28.5.1 Modify Workstation Profiles (Option 1)

- **Emulators to autostart.** Choose the 5250 Workstation Feature.
- **Services to load;** SNA/APPC services is needed since the 5250 Workstation application uses an APPC session between an AS/400 or System/36 and a PS/2 running OS/2 EE 1.2.

28.5.2 Modify SNA Feature Profiles (Option 4)

Refer to Figure 98 on page 211, and configure the following profiles:

1. SNA Base Profile

The PU name is used in error logs and network management alerts to identify the PS/2. This name should be unique within the network.

2. DLC Profiles

IBM Token-Ring Network must be selected since the workstation will be connected to the AS/400 through Token-Ring.

Number. This parameter is used to specify, with "0" or "1", if the primary or alternate Token-Ring adapter will be used to connect to the host.

Load DLC. This parameter specifies if the DLC will be loaded at initialization time. Specify "yes."

C&SM LAN ID parameter identifies the particular LAN that this adapter is attached to.

3. APPC Logical Unit (LU) Profiles

Profile name is the local APPC LU profile name and identifies the PS/2 to different networks. Each profile matches a specific configuration.

LU alias is the same name as the APPC LU profile name and is used to specify the local partner in an APPC session. If this workstation has a host connection then this **LU name** must match the LU name in VTAM/NCP.

LU session limit specifies the maximum number of sessions between the local LU and all partner LUs. This value must be greater than or equal to the sum of all the partner LU session limits that are configured with this LU.

4. APPC Partner Logical Unit (LU) Profiles

These APPC partner LU profiles identify different session partners for the PS/2. Each AS/400 or System/36 the PS/2 will be connected to must be defined in a profile.

Qualified PLU name is the network name of the partner LU and must match the local location name of the partner.

LU alias is the LU profile name in the configuration to be used that corresponds with this partner.

Destination address must match the Token-Ring local adapter address of the partner.

Mode name is the name of the partner LU that will be processed. The name you enter must also be specified as the name of a Transmission Service Mode Profile.

PLU session limit defines the maximum number of concurrently active logical connections between the local LU and this partner. The sum of all the mode session limit values for the partner LU must be no greater than the partner LU session limit.

5. APPC Transmission Services Profile must be created for each different mode specified by a transaction program you plan to run. The mode name must be the same for both the local LU and the partner LU.

Session limit must be equal or less than the partner LU session limit in the partner LU profile. Take the default values for the other parameters.

6. **APPC Initial Session Limit Profile** defines the initial session limit setup. You can configure the number of sessions to be started automatically, and the number of contention winners for each LU.

28.5.3 Modify LAN Feature Profiles (Option 6)

These feature profiles allow you to define the characteristics that your LAN adapter (Token-Ring adapter in this case) will have.

Adapter number. type "0" or "1" to indicate which adapter characteristics you are defining: the primary or the alternate adapter.

Interface. This parameter indicates what programming interface will be used. The OS/2 5250 WSF uses 802.2. Select the appropriate Token-Ring adapter (for example **Token-Ring Adapter/A**).

Use universal address. Select "yes" or "no". If your answer is "no" then you must provide an adapter MAC address in the displayed pop-up panel.

Maximum number of SAPs. This is to specify the number of service access points that the workstation as well as other applications will require. The default value works with the OS/2 5250 WSF.

Maximum link stations. The value specified may be up to 64 or 255 depending on the type of adapter that is used and the amount of shared RAM that has been defined.

Maximum number of users. The value specified depends on the number of users that are going to access this station through the Token-Ring Network.

28.5.4 Modify 5250 Workstation Feature Profiles (Option 7)

1. **Terminal Profiles.** Determine the terminal attributes for keyboard, screen color and common terminal options.
2. **Printer Profiles.** Determine the printer type.
3. **APPC LU alias.** Specifies the APPC LU alias profile name used by the 5250 Workstation Feature for APPC communication to the host. It can be a terminal or a printer profile.
4. **Session Assignments.** Assign up to five session profiles.
 - **5250 WSF profile name** specifies the name of the profile you want to use for the chosen session.
 - **APPC partner LU alias** specifies the name of the APPC profile for the partner in your configuration.
 - **APPC mode name** specifies the name for an APPC transmission service mode profile in your workstation that tells the Communications Manager how to communicate with the host system. The mode name must be configured for the specified partner LU alias.

28.6 Where To Go For More Information

- *AS/400, S/38/ and PS/2 as T2.1 Nodes in a Subarea Network*, GG24-3420
- *AS/400 Communication Definitions Examples*, GG24-3449
- *AS/400 PC Support Under OS/2 Extended Edition Version 1.2*, GG24-3446

Chapter 29. OS/2 LAN Server V1.0 and OS/2 EE V1.1 LAN Requester

29.1 Overview

The OS/2 LAN Server V1.0 and the OS/2 Extended Edition V1.1 LAN requester provide together the required support to share resources among several workstations interconnected by Local Area Network hardware. These two products also provide the workstations access to the network services.

“OS/2 LAN Server” and “OS/2 LAN Requester” will be used to refer to these products throughout the chapter.

The OS/2 LAN Requester allows a workstation to use the resources that belong to other workstations. The OS/2 LAN Server allows a workstation to share its own resources with other workstations.

The OS/2 LAN Requester is an integrated component of the OS/2 Extended Edition V1.1 but the OS/2 LAN Server comes as an independent product. As both programs complement each other you need to buy the OS/2 LAN Server in addition to the OS/2 Extended Edition if you need resource sharing in the LAN.

The OS/2 LAN products allow users to transparently access resources (files, applications, printers, serial devices, etc.) regardless of the system unit they are on, their physical location in the network, etc., while being totally hidden from the underlying communications and administration.

Users of the LAN resources have user IDs and optionally passwords. They can log onto the LAN using any workstation acting as a requester. Their logon is processed by the domain controller which controls access to LAN resources. If the logon is successful, the user's profile is retrieved from a server which holds this user's profiles and other personal data. The user is then presented with a general services full-screen interface which allows him to perform whatever function he has access to (like resource assignment, access network services, define private applications, customize logon details, modify the access control profiles of the resources to which he has been authorized, utilities, etc.).

The establishment of sessions between the user and the resource, the authorization of access to applications and the definitions for all the user IDs and passwords, etc, are done as a centralized function on a domain controller.

The domain controller controls access to **all** system resources defined to it. Thus a user requesting a private or public application from his OS/2 Program Starter window, has the request checked by the domain controller which then allows the establishment of a session between requester and server. The user then has access to the application unaware of the underlying process of the LAN. Note that this process is performed for a user ID, not for a specific machine.

Apart from the users of the LAN, there needs to be a person who sets up the authorization of access on the domain controller. This is the system adminis-

trator's function. The administrator's task is to manage the access and authority that LAN users have to LAN resources.

A system administrator can provide users with formal structured access to specific resources and can free users from the network commands, allowing them to simply use the applications they require.

When a system administrator logs onto a domain controller workstation, his user ID and his password are verified before he can gain access to the system. Then he is presented with the general services full-screen interface which allows him to perform all the functions that a user on a requester workstation can perform, but additionally he will have access to functions that allow him to define users, network resources and in general, facilities to control and manage the network.

There are some specific services provided by the OS/2 LAN products which run as separate OS/2 processes in the server machine. The following is a short description of them:

- **Messenger.** This optional service for the requester and the server workstations supports the message handling between users in the network.
- **Netpopup.** This optional service for the requester and the server workstations allows received messages to be displayed as pop-up panels on the user's screen. Messages may then be viewed or held, without disrupting the work currently being performed.
- **Alerter.** This optional service for the server workstations, sends alert notifications to designated users. These alerts can also be processed by Communications Network Management products.
- **Netrun.** This optional service allows a user to request execution of his programs at a server workstation. The requested program executes on the server but the output is directed to the user's workstation.
- **PCDOSRPL.** This optional service runs in a server workstation and supports the RPL of PC DOS workstations. The RPLed workstation must have a Token-Ring Network adapter with the RPL feature installed on it.
- **PCLP13.** This optional service runs in a server workstation and allows a DOS workstation having the PC LAN Program V1.3, to access that server.

The following is a definition of some of the concepts of the OS/2 LAN products.

Before planning, migrating or installing your LAN, you will need to understand the following concepts with which you will be working.

- **Domain**

A domain is a self-contained group of servers, applications and users on a LAN.

An organization with different departments could divide the LAN into logical work groups by defining one domain for each group.

- **Domain Controller**

There is only **one** domain controller per domain. It is the primary server in the domain, holding definition information on all the users, applications, and other resources within its domain. It also coordinates its users and

resources as one single set, regardless of where they are located. The machine ID of the domain controller is also the name of the domain in which it resides.

A domain controller is a server but with extra responsibilities. It can function as a regular server on its domain if necessary.

An administrator can log on any workstation to manage the domain controller information. In order for the resources on its servers to be made available, this machine must be the first to be started on the domain.

- **Servers**

In each domain there may be one or more additional servers. These may be sharing disk resources, applications, printer and/or serial resources. Also, they provide some other services like DOS RPL support and DOS Requester access support.

Each server is defined in the domain controller that totally controls the access to all the server resources.

Although a user's applications and directories may be physically located on multiple servers, he is unaware of this. The connection between server resources and users is always made by the domain controller.

A server can only be defined in one domain controller, that is, it cannot belong to more than one domain.

A server workstation also has the capability of working as a requester workstation.

- **Requesters**

While every user of the LAN is defined to a domain, the requester workstations themselves are not. When you log on from a requester, you have to specify your user ID, your password (optional) and the domain you require. Your domain controller looks up your user ID and your password (if defined) for validation. It has no interest in the machine you are working on.

Only DOS Requester workstations that are going to be remotely IPLed from a server need to be defined at the domain controller.

The services provided by a requester workstation (like messenger and message pop-up) are provided or not depending on what you selected at the OS/2 LAN Requester installation time, independently of the user ID you use to log on from that machine.

- **DOS Remote Program Load**

A remote-program-loaded DOS workstation means that its initial "start-up" files are sent to it from a remote machine without it reading from, or needing to have its own disk media. The RPLed workstation must have a Token-Ring Network adapter with the IBM RPL feature on it.

Medialess workstations can be started up on the LAN by just being switched on. Each RPL workstation requests its start up image file from its defined RPL server.

- **DOS Requester Access Support**

A DOS requester workstation can still access an OS/2 LAN Server workstation, which means that the DOS requester can work with DOS and PC LAN Program to access an OS/2 server machine.

- **System Administrator**

Each domain requires a system administrator. With his special administrator status, this person defines which users can log onto the domain, how network resources are to be shared, and with what level of access. This person can manage the LAN in this way in addition to carrying out his own user tasks.

The administrator can log onto the domain controller from any workstation or server in the domain. You should have at least one administrator per domain. The system does not stop you from creating more than this, but will only allow one administrator to use the administration services at any one time.

- **User and User ID**

The OS/2 LAN products allow a "user" to log onto the LAN in order to use its resources. All the applications reside on servers on the LAN, on a shared or private directory, so that the user can work from **any** workstation acting as a requester.

At the logon screen, the user is prompted for a user ID and the domain to which he wants to logon. He may then be required to give a password. If the domain specified recognizes the user ID and password, the user is logged on. Otherwise the logon attempt fails. A user can log onto any domain in which he is defined from any requester workstation. A user can be defined to more than one domain, but can only be logged onto one at a time, since the user ID must be unique in the whole LAN.

A user can use the requester function of a server workstation to log on, but he will be able to access only the domain to which that server belongs.

- **Passwords**

Passwords are required at logon time. When the system administrator defines a new user to a domain, the use of a password is offered as an option. Once the user has been assigned a password, he can change it himself using the requester workstation services.

Security of the domain's resources is controlled through the administrator's assignment of specific resources to individual users. The only time password access to resources might still be used is in the accessing of a resource outside the user's domain where a user is accessing "external" rather than "internal" resources.

- **Shared Network Resources**

Files, applications (a special type of file resource), printers and serial devices are resources that can be shared among workstation users when the network administrator make them available through server machines.

When users access resources, they assign a device to the resource. For a file resource, the device is a drive. For a printer or serial device, the device is a port. This assignment overrides local device assignments. Resources can be given a name on the domain called an alias. By giving an alias to a resource, you allow users to refer to the resource without having to know

the server on which the resource resides. In addition to simplifying access to resources, aliases also simplify managing those resources.

- **Internal Resources**

These are resources which are defined and controlled within the domain. They may be programs, data files, directories, printers or serial devices which physically exist on any of the servers defined in the domain.

To give a user access to these resources, the system administrator defines them in the domain controller, and can then assign the user to each one individually, specifying the type of access for each resource-user relationship.

- **External Resources**

These exist outside the home domain, and belong to a server in another domain. They are controlled and defined from outside the domain, but are also defined on the home domain controller, as an "external" resource.

- **Aliases**

An "alias" is a logical name for a network resource. Aliases are used to make the handling, definition and protection of resources a lot easier for both the administrator and users.

29.2 Planning

29.2.1 Prerequisites - Hardware

There are different requirements for hardware depending upon whether you install OS/2 LAN Requester or OS/2 LAN Server.

29.2.1.1 OS/2 LAN Requester

- Any of the PCs or PS/2s supported by the OS/2 Extended Edition V1.1
- At least 3.2 Mb (including DOS compatibility box)
- A diskette drive
- A fixed disk
- Optionally printers and additional fixed disks
- The LAN adapter and cable required to connect the workstation to a Token-Ring or PC Network.

29.2.1.2 OS/2 LAN Server

- Any of the PCs or PS/2s supported by the OS/2 Extended Edition V1.1
- At least 4.9 Mb (including DOS compatibility box)
- A diskette drive
- A fixed disk
- Optionally printers and additional fixed disks
- The LAN adapter and cable required to connect the workstation to a Token-Ring or PC Network.

At least one station must be a server; the other stations can be either additional servers or requesters.

29.2.1.3 RIPL DOS Workstation

- Any of the PCs or PS/2s supported by DOS V3.3 or V4.0
- At least 512 Kb
- Optionally diskette drives, printers and fixed disks
- The LAN adapter and cable required to connect the workstation to a Token-Ring or PC Network.

The Token-Ring Network adapter **must** have the RPL feature installed.

29.2.2 Prerequisites - Software

29.2.2.1 OS/2 LAN Requester

- OS/2 Extended Edition V1.1

29.2.2.2 OS/2 LAN Server

- OS/2 Extended Edition V1.1
- DOS 3.3 or DOS 4.0, for DOS image creation and LAN Support Program V1.02 (or higher), if you plan to use the DOS RPL support
- PC LAN Program V1.3, if you plan to use the DOS requester support.

29.2.3 Migration from PCLP V1.3

OS/2 Extended Edition V1.1 has the LAN support integrated as LAN Requester. OS/2 LAN Server V1.0 is an optional program product that provides the LAN server function in the OS/2 LAN environment. So, OS/2 Extended Edition and the OS/2 LAN Server program provide together the functions included in PCLP V1.3.

Even when PCLP V1.3 requesters can access OS/2 LAN Server V1.0, there is no real migration from PCLP V1.3 to the OS/2 LAN products.

29.2.3.1 Compatibility

If you are moving from PCLP V1.3 to OS/2 LAN products, you may need to have some stations with PCLP V1.3 and some other stations with OS/2 LAN products. In a such situation, **only** PCLP V1.3 workstations can access the OS/2 LAN Server V1.0 and **no other** combination is officially supported.

29.2.4 Installation Planning

It is very easy to install the OS/2 LAN products on a few machines. However, as the size of your network increases, and the number of objects such as users, applications, servers, aliases and access control profiles increases, the administrator will have an increasingly important role to play in the management and security of the LAN environment.

It is vital that you plan your network. By setting up a few rules now and establishing a structure for naming and accessing, etc, you will make your LAN environment very simple to control as it expands. Here is a checklist of some of the things you as administrator should think about:

- What machines can share applications?
- What machines can share disks/directories?
- What machines can share printers?
- What machines can provide DOS RPL support?
- What machines can provide PCLP V1.3 support for DOS requesters?
- What machines will be DOS requesters?

- What machines must be DOS RPLed?
- What machines belong to each domain?
- What applications can be shared?
- On what machines do the applications reside?
- In which directories are the applications installed?
- Who can use those applications?
- What type of access does each user have to each application?
- Who can use each printer?
- Who else can act as an administrator?
- What resources can be outside a domain?
- What will be the unique ID of each user, machine, file, printer, serial device and alias?

29.3 Installation Steps

This section has been divided into two parts because, when installing the OS/2 LAN products, you may choose to make your workstation work as a requester or as a server (with or without the domain controller function).

29.3.1 OS/2 LAN Requester Installation Steps

In order to install the OS/2 LAN requester, you **must** have previously installed the following products.

1. The Operating System/2 Extended Edition Base
2. The Communications Manager.

For the Operating System/2 installation refer to the *Operating System/2 Extended Edition Version 1.1 Getting Started* manual which comes included with the OS/2 Extended Edition.

For the Communication Manager installation refer to "OS/2 EE 1.1 Communications Manager" on page 151 in this document.

During the installation process, you will need to know:

- Which fixed disk to install on
- Whether to install the Online Reference and Help panels
- Requester name
- Domain name
- Which services to start
- Which network adapter is installed.

The steps for installing the OS/2 LAN Requester are:

1. Get the "Start Programs" window if it is not already displayed.
2. Choose "OS/2 full screen command prompt" from the "Main Group" list.
3. Type REQINST
4. After the welcome panel is displayed, the "Installation Destination" panel appears asking to specify the partition or drive to which the OS/2 LAN requester will be installed.

5. The panel "Selecting Online Reference and Help Panels Option" allows you to choose if this set of panels will be installed. If you will also install the OS/2 LAN Server, respond "Yes" to this option.
6. The next three panels will ask you to insert diskettes 9, 10 and 11 in the "A" drive.
7. Then, the "Specifying Requester and Domain Names" panel is displayed so you can supply those names.

If this workstation will work only with OS/2 LAN Requester, the requester name will be the computer name for this workstation across the LAN and the domain specified will be the default when a user on this workstation tries to log on.

If the OS/2 LAN server will also be installed on this machine, enter any requester name; it will be replaced during the server installation.

8. The "Selecting Requester Services" panel allows you to specify what services you want to include for this requester.

"Messenger" service allows the workstation to perform messaging tasks. "Message Pop-up" enables the workstation to be interrupted when a message arrives for the user.

9. The "Selecting Network Adapter" is displayed so you can specify the type of network adapter that is installed in the workstation. In this case, choose "IBM Token Ring Adapter."
10. The "LAN Requester Installation Completion" panel is displayed indicating that the installation has been completed and also warns you to apply patches if they exist.
11. The "Installation Complete" panel is displayed allowing you to display or print the history file, or to return to the OS/2 command line.
12. The last panel asks you to remove the diskette inserted in the "A" drive (if any) and also, indicates you to IPL the workstation if you will not install the OS/2 LAN server, otherwise it asks you to press Enter and continue with the server installation.

Note that the CONFIG.SYS file is automatically updated including the required LAN driver depending on the LAN adapter previously specified.

29.3.2 OS/2 LAN Server Installation Steps

In order to install the OS/2 LAN Server, you **must** have previously installed the following products in the shown order.

1. The Operating System/2 Extended Edition Base
2. The Communications Manager
3. The OS/2 LAN requester.

For the Operating System/2 installation refer to the *Operating System/2 Extended Edition Version 1.1 Getting Started* manual which comes included with the OS/2 Extended Edition.

For the Communication Manager installation refer to "OS/2 EE 1.1 Communications Manager" on page 151 in this document.

For the OS/2 LAN Requester installation refer to "OS/2 LAN Requester Installation Steps" on page 223 in this chapter.

During the installation process, you will need to know:

- Whether to install the Online Reference and Help panels if not already installed (during requester installation)
- Whether to install the Online Reference and Help panels for PCLP V1.3 support
- Whether to install RPL support
- Whether this server will be a domain controller
- Names for domain controller and administrator
- Which services to start
- Which network adapter is installed.

If you decided to install RPL support, you must have the DOS diskette(s) and the LAN Support Program diskettes.

If you decided to install PCLP V1.3 support, you must have the PCLP V1.3 diskette(s).

The steps for installing the OS/2 LAN Server are:

1. Get the "Start Programs" window if it is not already displayed.
2. Choose "OS/2 full screen command prompt" from the "Main Group" list.
3. Type SRVINST.
4. After the welcome panel is displayed, the "Selecting domain controller Option" panel appears so you can specify if this server will also operate as a domain controller.
5. The panel "Specifying Backup Configuration File Name" warns you that the IBMLAN.INI configuration file (created during the OS/2 LAN requester installation) will be renamed as IBMLAN.BAK because a new IBMLAN.INI configuration file will be created. The panel also allows you to specify another name for the backup file.
6. The "Specifying Domain Controller and Administrator Names" panel is displayed only if you previously specified that this server will also operate as a domain controller. The domain controller name will replace the requester name specified during OS/2 Requester installation. The administrator name will be the user ID for the network administrator to logon to the system .
7. The "Selecting Server Services" panel allows you to specify what services you want to include for this server.

The "Alerter" service sends alert notifications to designated users, the "Netrun" service handles requests for remote execution of programs, the "PCLP 1.3" service enables support of PCLP 1.3 users and the "DOS RPL" service provides server functions to support RPL of DOS workstations.

8. The "Selecting Network Adapter" is displayed so you can specify the type of network adapter that is installed in the workstation. In this case, choose "IBM Token Ring Adapter"

9. The "Selecting PC LAN Program 1.3 Online Information Option" panel is displayed so you can specify if this set of panels must be installed. Respond "Yes" if PCLP V1.3 requesters will be accessing this server (you will be asked later to insert the PCLP V1.3 diskettes).
10. The "LAN Server Installation Completion" panel is displayed indicating that the installation has been completed and also warns you to apply patches if they exist.
11. The "Selecting Type of Installation" panel allows you to select "Install IPL Image Support" if you intend to create images used for RPL of DOS machines or IPL diskettes for diskette DOS machines. Otherwise select "Return."
12. If you selected "Install IPL Image Support," the "Selecting DOS Version and Diskette Size" panel is displayed for you to specify what DOS version and what type of diskette image you want to install. You will be asked to insert the DOS diskettes and the LAN Support Program diskettes. When the copying process finishes, the "RPL Support Installation Complete" panel is displayed.
13. The "Installation Complete" panel is displayed allowing you to display or print the history file, or to return to the OS/2 command line.
14. Now, you must IPL your workstation to start working as a server or as a domain controller (whatever you have defined).

Now please proceed to the "Network Environment Definition" section where you will find a short guide to defining the components of the network.

29.3.2.1 Network Environment Definition

This section is mainly oriented to the system administrator who is responsible for defining resources and users within the domain.

Generally speaking, the network administrator is responsible for:

- Providing service to the network users
- Protecting valuable data by defining an adequate access control
- Administering the network shared resources in such a way that they can be better utilized.

Figure 100 on page 227 represents, in a simplified manner, all the functions that a system administrator can perform.

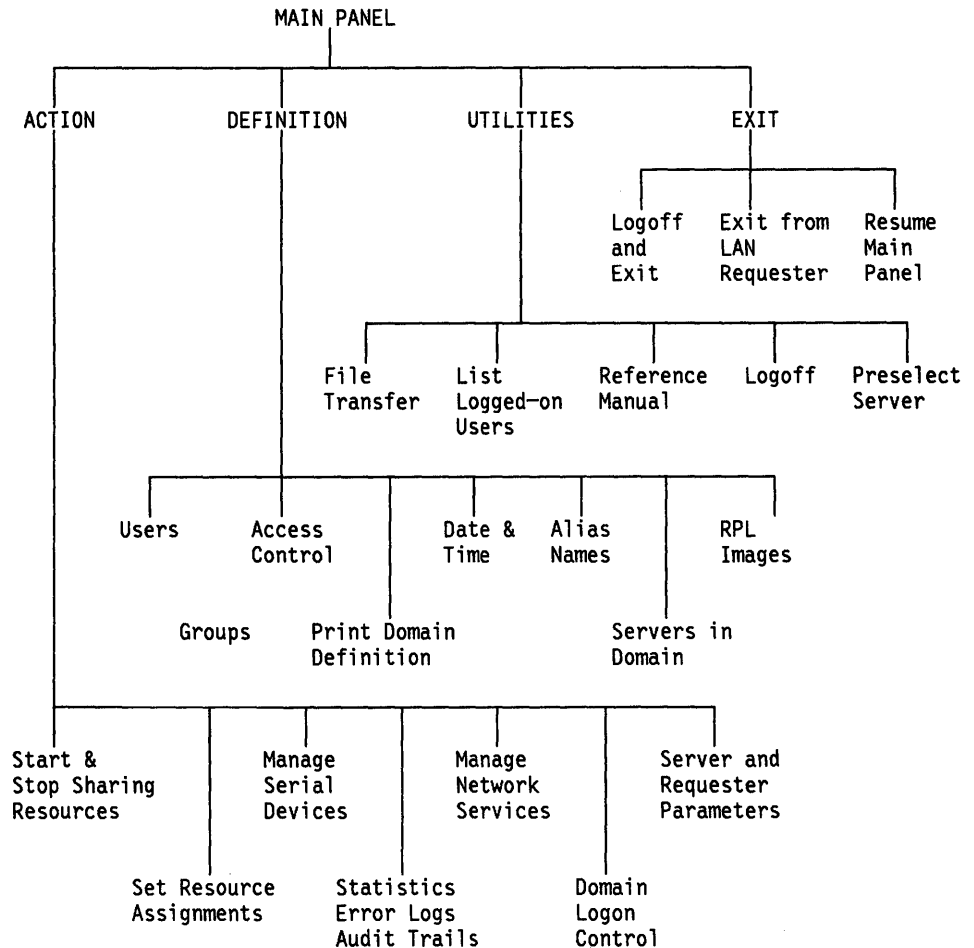


Figure 100. Panel Flow for the LAN Server Administrator Functions

The domain environment definition is the most important administrator activity for achieving a successful setup of a network based on the OS/2 LAN products. With careful planning, the definition process can get through fewer interruptions and later, there will be fewer inconsistencies and problems when operating and administering the network.

The domain environment definition process can also become more or less complicated depending on the sequence of steps used to define the different objects involved.

There is no standard sequence of steps to follow, but rather, based on practical experience as well as on the "logical" inter-dependencies among certain definition steps, the following guide is recommended to facilitate the domain environment definition process in most cases.

1. Careful planning is the key to a smooth domain definition. It is recommended to complete the worksheets for all servers, resources, users, groups of users and access control, which will help you have a structured domain design and will avoid a fragmented definition.
2. Under OS/2, create and assign the shared physical resources (directories, files, applications, printers and serial devices) on every server in the domain.

3. Log onto the system using the administrator user ID defined at OS/2 LAN server installation time.
4. Create your own administrator user ID assigning it a password. Then, disable the logon capability for the user ID defined during the OS/2 LAN server installation.
5. It is suggested that the domain is set into the global state of "Logon Disabled" while you are performing the definitions. This will stop already defined users from using half-finished domain definitions. Remember to reset this state once the domain has been completely defined.
6. Define all the machines in the domain (servers and PC DOS RPL workstations).
7. Define aliases for the physical resources so that they can be referenced by this short name in other definitions. Aliases can be defined for directories, printers, serial devices and external resources.
8. Define all users in this domain, including a backup administrator.
9. Define the groups of users as previously planned.
10. Give groups and individual users access to the aliases and other resources by defining access control profiles, access lists and access permission.
11. Define the previously loaded applications as public applications and set them up to automatically appear on the OS/2 Program Starter of the users that apply for using such applications, when they log onto the domain.
12. Define a LOGON profile for every user. This is the command file that will be executed in the workstation at which the user logs on.
13. Define the RPL images and Netrun applications if required.
14. Reset global logon status to "Enabled."

29.4 Where To Go For More Information

- *IBM Operating System/2 Local Area Network Server - User's Reference*
- *IBM Operating System/2 Local Area Network Server - Network Administrator's Reference*
- *IBM Operating System/2 Local Area Network Server - Getting Started: Planning and Installation*
- *IBM Operating System/2 Extended Edition Version 1.1 - Getting Started*
- *OS/2 LAN Server Version 1.0 - Planning, Installation and Customization - Document Number GG24-3402.*

Chapter 30. OS/2 LAN Server V1.2 and OS/2 EE V1.2 LAN Requester

30.1 Overview

The OS/2 LAN Server V1.2 and the OS/2 Extended Edition V1.2 LAN Requester together provide the required support for sharing resources among several workstations interconnected by Local Area Network hardware. These two products also provide the workstations access to the network services.

“OS/2 LAN Server” and “OS/2 LAN Requester” will be used to refer to these products throughout the chapter.

The OS/2 LAN Requester allows a workstation to use the resources that belong to other workstations. The OS/2 LAN Server allows a workstation to share its own resources with other workstations.

The OS/2 LAN Requester is an integrated component of the OS/2 Extended Edition V1.2 but the OS/2 LAN Server comes as an independent product. As both programs complement each other you need to buy the OS/2 LAN Server in addition to the OS/2 Extended Edition if you need resource sharing in the LAN.

It may happen that the LAN environment requires that some workstations continue to work with DOS and that they need to be integrated into the OS/2 LAN environment.

Considering that potential need, the OS/2 LAN Server V1.2 product was designed to provide the support called “DOS LAN Requester” which, once installed in the DOS machine, allows it to work as a requester workstation. Then, a user on this requester workstation can use the resources that belong to other workstations.

The OS/2 LAN products allow users to transparently access resources (files, applications, printers, serial devices, etc.) regardless of the system unit they are on, their physical location in the network, etc., while being totally hidden from the underlying communications and administration.

Users of the LAN resources have user IDs and optionally passwords. They can log onto the LAN using any workstation acting as a requester. Their logon is processed by the domain controller which controls access to LAN resources. If the logon is successful, the user’s profile is retrieved from a server which holds this user’s profiles and other personal data. The user is then presented with a general services full-screen interface which allows him to perform whatever function he has access to (like resource assignment, accessing network services, defining private applications, customizing logon details, modifying the access control profiles of the resources to which he has been authorized, utilities, etc.).

The establishment of sessions between the user and the resource, the authorization of access to applications and the definitions for all the user IDs and passwords, etc, are done as a centralized function on a domain controller.

The domain controller controls access to **all** system resources defined to it. Thus a user requesting a private or public application from his OS/2 Program Starter window has the request checked by the domain controller, which then allows the establishment of a session between requester and server. The user then has access to the application unaware of the underlying process of the LAN. Note that this process is performed for a user ID, not for a specific machine.

Apart from the users of the LAN, there needs to be a person who sets up the authorization of access on the domain controller. This is the system administrator's function. The administrator's task is to manage the access and authority that LAN users have to LAN resources.

A system administrator can provide users with formal structured access to specific resources and can free users from the network commands allowing them to simply use the applications they require.

When a system administrator logs onto a domain controller workstation, his user ID as well as his password are verified before he can gain access to the system.

The OS/2 Extended Edition V1.2 provides the logon facility for LAN users as a new set of panels called "User Profile Management Services," which can be accessed from the OS/2 "Desktop Manager" window or by typing LOGON at the OS/2 full-screen command window.

An administrator can also define users and groups of users when accessing these "User Profile Management Services." This user definition functions are not part of the general services full-screen interface anymore.

Once logged on, the user must start the LAN Requester application from the "Group-Main" window and he is presented with the general services full-screen interface. If the user is a network administrator, he is allowed to perform all the functions that a normal user on a requester workstation can perform, but additionally he will have access to functions that allow him to define network resources and in general, facilities to control and manage the network.

There are some specific services provided by the OS/2 LAN products which run as separate OS/2 processes in the server machine. The following is a short description of them.

- **Messenger.** This optional service for the requester and the server workstations supports the message handling between users in the network.
- **Netpopup.** This optional service for the requester and the server workstations allow received messages to be displayed as pop-up panels on the user's screen. Messages may then be viewed or held, without disrupting the work currently being performed.
- **Alerter.** This optional service for the server workstations sends alert notifications to designated users. These alerts can also be processed by Communications Network Management products.
- **Netrun.** This optional service allows a user to request execution of his programs at a server workstation. The requested program executes on the server but the output is directed to the user's workstation.

- **PCDOSRPL.** This optional service runs in a server workstation and supports the RPL of PC DOS workstations. The RPLed workstation must have a Token-Ring Network adapter with the RPL feature installed on it.
- **Netlogon.** This optional service runs in a server workstation. It copies the master user and group definitions file from the domain controller to the server. So, the server itself can control the users' access to the resources.
- **DLRINST.** This optional service allows you to migrate automatically the PCLP 1.3 requesters in the domain to the DOS LAN Requester. When a PCLP 1.3 user tries to log onto an OS/2 domain, this service being active, he will receive a menu with an option to migrate automatically to the DOS LAN Requester.
- **Replicator.** This optional service allows the user to have continuously updated copies of files on different workstations, which means that there can be automatic backup of files with no user intervention required. Server workstations can replicate files on other server or requester workstations.

Before planning, migrating or installing your LAN, you will need to understand the following concepts with which you will be working. The following is a definition of some of the concepts of the OS/2 LAN products.

- **Domain**

A domain is a self-contained group of servers, applications and users on a LAN.

An organization with different departments could divide the LAN into logical work groups by defining one domain for each group.

- **Domain Controller**

There is only **one** domain controller per domain. It is the primary server in the domain, holding definition information on all the users, applications, and other resources within its domain. It also coordinates its users and resources as one single set, regardless of where they are located.

A domain controller is a server but with extra responsibilities. It can function as a regular server in its domain if necessary.

An administrator can log on any workstation to manage the domain controller information. In order for the resources on its servers to be made available, this machine must be the first to be started in the domain.

- **Servers**

In each domain there may be one or more additional servers. These may be sharing disk resources, applications, printer and/or serial resources. Also, they provide some other services like DOS RPL support and DOS LAN requester access support.

Each server is defined in the domain controller which totally controls the access to all the server resources.

Although a user's applications and directories may be physically located on multiple servers, he is unaware of this. The connection between server resources and users is always made by the domain controller.

A server can only be defined in one domain controller, that is, it cannot belong to more than one domain.

A server workstation also has the capability of working as a requester workstation.

- **Requesters**

While every user of the LAN is defined to a domain, the requester workstations themselves are not. When you log on from a requester, you have to specify your user ID, your password (optional) and the domain you require. Your domain controller looks up your user ID and your password (if defined) for validation. It has no interest in the machine you are working on.

Only DOS requester workstations that are going to be remotely IPLed from a server need to be defined at the domain controller.

The services provided by a requester workstation (like messenger and message pop-up) are provided or not depending on what you selected at the OS/2 LAN Requester installation time, independently of the user ID you use to log on from that machine.

- **DOS Remote Program Load**

A remote-program-loaded workstation means that its initial "start-up" files are sent to it from a remote machine without it reading from, or needing to have its own disk media. The RPLed workstations must have a Token-Ring Network adapter with the RPL feature on it.

Medialess workstations can be started up on the LAN by just being switched on. Each RPL workstation requests its start up image file from its defined RPL server.

- **DOS LAN Requester**

This function comes included with the OS/2 LAN Server V1.2 product. It allows a DOS machine to operate as a requester to gain access to the network resources shared by a group of servers within a domain.

- **System Administrator**

Each domain requires a system administrator. With his special administrator status, this person defines which users can log onto the domain, how network resources are to be shared, and with what level of access. This person can manage the LAN in this way in addition to carrying out his own user tasks.

The administrator can log onto the domain controller from any workstation or server in the domain. You should have at least one administrator per domain; the system does not stop you from creating more than this, but will only allow one administrator to use the administration services at any one time.

- **User and User ID**

The OS/2 LAN products allow a "user" to log onto the LAN in order to use its resources. All the applications reside on servers on the LAN, in a shared or private directory, so that the user can work from **any** workstation acting as a requester.

At the logon screen, the user is prompted for a userid and the domain to which he wants to log on. He may then be required to give a password. If the domain specified recognizes the user ID and password, the user is logged on. Otherwise the logon attempt fails. A user can log onto any

domain in which he is defined, from any requester workstation. A user can be defined to more than one domain, but can only be logged onto one at a time, since the user ID must be unique in the whole LAN.

A user can use the requester function of a server workstation to log on, but he will be able to access only the domain to which that server belongs.

- **Passwords**

Passwords are required at logon time. When the system administrator defines a new user to a domain, the use of a password is offered as an option. Once the user has been assigned a password, he can change it himself using the "User Profile Management Services."

Security of the domain's resources is controlled through the administrator's assignment of specific resources to individual users by creating access profiles. The only time password access to resources might still be used is in the accessing of a resource outside the user's domain where a user is accessing "external" rather than domain resources.

- **Shared Network Resources**

Files, applications (a special type of file resource), printers and serial devices are resources that can be shared among workstation users when the network administrator make them available through server machines.

When users access resources, they assign a device to the resource. For a file resource, the device is a drive. For a printer or serial device, the device is a port. This assignment overrides local device assignments. Resources can be given a name on the domain called an alias. By giving an alias to a resource, you allow users to refer to the resource without having to know the server on which the resource resides. In addition to simplifying access to resources, aliases also simplify managing those resources.

- **Domain Resources**

These are resources which are defined and controlled within the domain. They may be programs, data files, directories, printers or serial devices which physically exist on any of the servers defined in the domain.

To give a user access to these resources, the system administrator defines them in the domain controller, and can then assign the user to each one individually, specifying the type of access for each resource-user relationship.

- **External Resources**

These exist outside the home domain, and belong to a server in another domain or to a PCLP V1.3 server. They are controlled and defined from outside the domain, and a guest account can be defined in the home domain controller to pass the access requirements to those "external" resources.

- **Guest Account**

A "guest account" can be defined in a domain controller to allow any user to access external resources, with a specific type of access, without defining all those users to the domain.

- **Aliases**

An "alias" is a logical name for a network resource. Aliases are used to make the handling, definition and protection of resources a lot easier for both the administrator and users.

30.2 Planning

30.2.1 Prerequisites - Hardware

There are different requirements for hardware depending upon whether you install DOS LAN Requester, OS/2 LAN Requester or OS/2 LAN Server.

30.2.1.1 DOS LAN Requester

- Any of the PCs or PS/2s supported by the DOS V3.3 or V4.0
- At least 64 Kb free for the redirector function.
- A 720 Kb diskette drive
- A fixed disk
- Optionally printers and additional fixed disks
- The LAN adapter and cable required to connect the workstation to a Token-Ring or PC Network LAN.

30.2.1.2 OS/2 LAN Requester

- Any of the PCs or PS/2s supported by the OS/2 Extended Edition V1.2
- At least 4 Mb
- A diskette drive
- A fixed disk
- Optionally printers and additional fixed disks
- The LAN adapter and cable required to connect the workstation to a Token-Ring or PC Network LAN.

30.2.1.3 OS/2 LAN Server

- Any of the PCs or PS/2s supported by the OS/2 Extended Edition V1.2
- At least 6 Mb
- A diskette drive
- A fixed disk
- Optionally printers and additional fixed disks
- The LAN adapter and cable required to connect the workstation to a Token-Ring or PC Network LAN.

At least one station must be a server; the other stations can be either additional servers or requesters.

30.2.1.4 RIPL Workstation

- Any of the PCs or PS/2s supported by the DOS V3.3 or V4.0
- At least 64 Kb free for the redirector function.
- A diskette drive
- Optionally printers and fixed disks
- The LAN adapter and cable required to connect the workstation to a Token-Ring or PC Network LAN.

The Token-Ring Network adapter **must** have the RPL feature installed.

30.2.2 Prerequisites - Software

30.2.2.1 DOS LAN Requester

- DOS V3.3 or V4.0
- LAN Support Program V1.1 or higher

30.2.2.2 OS/2 LAN Requester

- OS/2 Extended Edition V1.2

30.2.2.3 OS/2 LAN Server

- OS/2 Extended Edition V1.2
- DOS 3.3 or DOS 4.0, and LAN Support Program V1.1 or higher, if you plan to use the DOS RPL support

30.2.2.4 RIPL Workstation

- DOS V3.3 or V4.0 (in the RPL server)
- LAN Support Program V1.1 or higher (in the RPL server)

30.2.3 Migration from OS/2 LAN Server V1.0 to OS/2 LAN Server V1.2

The OS/2 LAN Server V1.2 is implemented with two enhancements which make it incompatible with the OS/2 LAN Server V1.0:

- The "User Profile Management Services" for user logon/logoff and for user/group of users definition.
- Improved access control.

If you want to migrate to the new version, you are provided with a DCDB migration utility which basically converts the old domain control database to a suitable OS/2 LAN Server V1.2 database.

30.2.4 Migration from a PCLP V1.3 Requester to a DOS LAN Requester

The PCLP V1.3 requester is not supported on an OS/2 LAN Server. The DOS LAN Requester, which is part of the OS/2 LAN Server V1.2, must be used instead.

The DOS LAN Requester may be installed in two ways:

- Using the installation program that comes in the DOS LAN Requester diskettes.
- Starting the DLRINST service at the domain controller to which the PCLP V1.3 requester will try to log on. At the log on time, an option is provided to migrate to the DOS LAN Requester. If the user decides to do so, the PCLP V1.3 program will be automatically replaced by the DOS LAN Requester on the disk.

30.2.4.1 Compatibility

Figure 101 on page 236 shows graphically the different access combinations that can happen between the LAN products in a LAN environment.

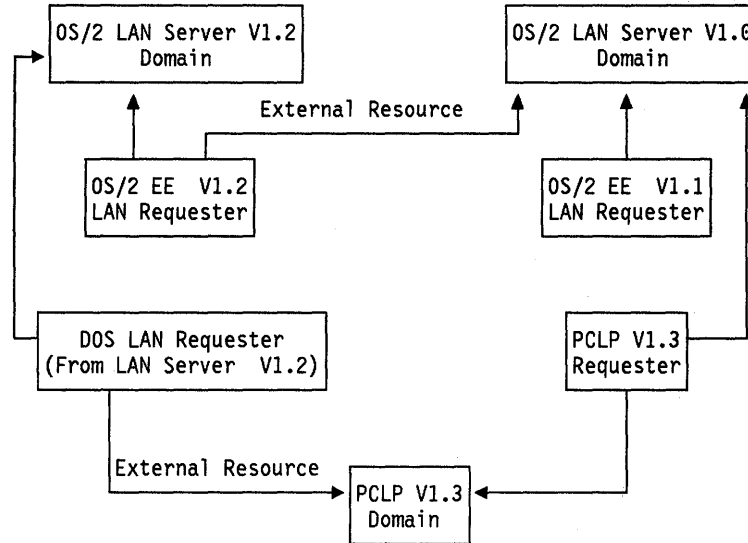


Figure 101. Access Between different LAN Products.

30.2.5 Installation Planning

It is very easy to install the OS/2 LAN products on a few machines. However, as the size of your network increases, and the number of objects such as users, applications, servers, aliases and access control profiles increases, the administrator will have an increasingly important role to play in the management and security of the LAN environment.

It is vital that you plan your network. By setting up a few rules now and establishing a structure for naming and accessing, etc, you will make your LAN environment very simple to control as it expands. Here is a checklist of some of the things you as administrator should think about:

- What machines can share applications?
- What machines can share disks/directories?
- What machines can share printers?
- What machines can provide DOS RPL support?
- What machines can provide PCLP V1.3 support for DOS requesters?
- What machines will be DOS requesters?
- What machines must be DOS RPLed?
- What machines belong to each domain?
- What applications can be shared?
- On what machines do the applications reside?
- In which directories are the applications installed?
- Who can use those applications?
- What type of access does each user have to each application?
- Who can use each printer?
- Who else can act as an administrator?
- What resources can be outside a domain?
- What will be the unique ID of each user, machine, file, printer, serial device and alias?

30.3 Installation Steps

This section has been divided into three parts because, when installing the OS/2 LAN products, you may choose to make your workstation work as a DOS requester, an OS/2 requester or an OS/2 server (with or without the domain controller function).

30.3.1 DOS LAN Requester Installation Steps

In order to install the DOS LAN Requester, you must have previously installed the following products:

1. DOS V3.3 or V4.0
2. LAN Support Program V1.1 or later.

The following parameters in the CONFIG.SYS file should be equal or greater than the values shown below.

- BUFFERS = 20
- FILES = 50

The DOS LAN Requester comes included with the OS/2 LAN Server V1.2. It consists of three diskettes formatted at 720 Kb.

The first diskette contains an install utility that runs under DOS. To execute it:

1. Insert the first (1 of 3) diskette into the A: drive.
2. Type A:INSTALL and press the Enter key.
3. Follow the instructions, which are self explanatory, until the successful installation message appears. You are returned to the DOS prompt.
4. A disk directory is automatically created by the utility. If you do not provide a specific directory name, then DOSLAN directory is created under the root directory of the C: drive. An AUTOEXEC.BAT file is created for an autostart of the DOS LAN requester

For stations currently running PCLP V1.3, an alternative way of installing the DOS LAN Requester consists of an automatic replacement of the PCLP V1.3 by the DOS LAN Requester.

This procedure is performed by starting the DLRINST service at the domain controller to which the PCLP V1.3 requester will log on. At logon time, an option is provided to migrate to the DOS LAN Requester. If the user decides to do so, the PCLP V1.3 program will be automatically replaced by the DOS LAN Requester on the disk.

30.3.2 OS/2 LAN Requester Installation Steps

In order to install the OS/2 LAN Requester, you **must** have previously installed the following products.

1. The Operating System/2 Extended Edition Base
2. The Communications Manager.

For the Operating System/2 installation refer to the *Operating System/2 Extended Edition Version 1.2 Getting Started* manual, which comes included with the OS/2 Extended Edition.

For the Communication Manager installation refer to "OS/2 EE 1.2 Communications Manager" on page 173 in this document.

For the OS/2 LAN Requester installation steps described in this section, it is assumed that you have already installed the OS/2 Extended Edition Base and the Communications Manager, which means that you are not installing the OS/2 LAN Requester as part of the normal OS/2 Extended Edition installation procedure but rather you are doing a reinstallation of the OS/2 Extended Edition components.

A reinstallation is performed by executing an OS/2 program which is commonly called the "Extended Edition Install/Remove." The steps to use it for the OS/2 LAN Requester installation are:

1. Insert diskette number 6 of the OS/2 EE package in the "A" drive.
2. Type **REINST** on the OS/2 full-screen command line.
3. When the Install/Remove Menu appears, select "Install LAN Requester."
4. Follow the instructions displayed on the panels. You will specify a machine name for this requester and the name of the domain that users on this workstation will be frequently accessing. You are also asked to specify the services that the requester will have.
5. When you have completed the sequence of panels that define the OS/2 LAN Requester installation, Press F3.
6. Insert in the "A" drive, the diskettes required by the installation process.
7. Press F3 to exit the "OS/2 EE Install/Remove" menu.
8. The components you select are already installed and the panel "Installation Complete" appears.
9. Reboot the system.
10. Re-apply the necessary patches because you may have lost them due to the re-installation process.
11. Reboot the system again.
12. The OS/2 LAN Requester is installed and ready to use.

30.3.3 OS/2 LAN Server Installation Steps

In order to install the OS/2 LAN Server, you **must** have previously installed the following products.

1. The Operating System/2 Extended Edition Base
2. The Communications Manager
3. The OS/2 LAN Requester.

For the Operating System/2 installation refer to the *Operating System/2 Extended Edition Version 1.2 Getting Started* manual, which comes included with the OS/2 Extended Edition.

For the Communication Manager installation refer to "OS/2 EE 1.2 Communications Manager" on page 173 in this document.

For the OS/2 LAN Requester installation refer to "OS/2 LAN Requester Installation Steps" on page 237 in this chapter.

If you decided to install RPL support, you must have the DOS diskette(s) and the LAN Support Program diskettes.

The steps for installing the OS/2 LAN Server are:

1. Insert OS/2 LAN Server diskette into the "A" drive
2. Type A:SRVINST at the OS/2 full-screen command prompt
3. Select LAN server
4. Select domain controller or additional server
5. Change machine or domain name if desired
6. Select requester services
7. Select server services
8. Press F3 on the "LAN Server Install" menu. Files will be copied from the diskette.
9. Follow panels to completion
10. Reboot your workstation
11. Type the following commands at the OS/2 full-screen command prompt:
MD \IBMLAN\DCDB\LISTS if this workstation is a server only
NET START RDR
NET USER server-name /ADD /PRIV:USER /PASSWORDREQ:NO
NET USER SYSASID /ADD /PRIV:USER /PASSWORDREQ:NO
NET GROUP SERVERS /ADD
NET GROUP SERVERS server-name /ADD
NET ACCOUNTS /ROLE:PRIMARY (for a domain controller) or
NET ACCOUNTS /ROLE:MEMBER (for an additional server)
NET START SERVER

These commands are typed only after completing the OS/2 LAN Server installation, with the exception of the command NET START SERVER, which must be typed every time that the server is required to be active.
12. Go to the "User Profile Management Services" and select LOGON, or go to the OS/2 full-screen command prompt and type LOGON.
13. Default administrator user ID and password are USERID and PASSWORD. You should add other users through the UPMS to allow additional requesters to logon.

Now please proceed to the "Network Environment Definition" section, where you will find a short guide to defining the components of the network.

30.3.3.1 Network Environment Definition

This section is mainly oriented to the system administrator who is responsible for defining resources and users within the domain.

Generally speaking, the network administrator is responsible for:

- Providing service to the network users
- Protecting valuable data by defining an adequate access control
- Administering the network shared resources in such a way that they can be better utilized.

Figure 102 represents, in a simplified manner, all the functions that a system administrator can perform.

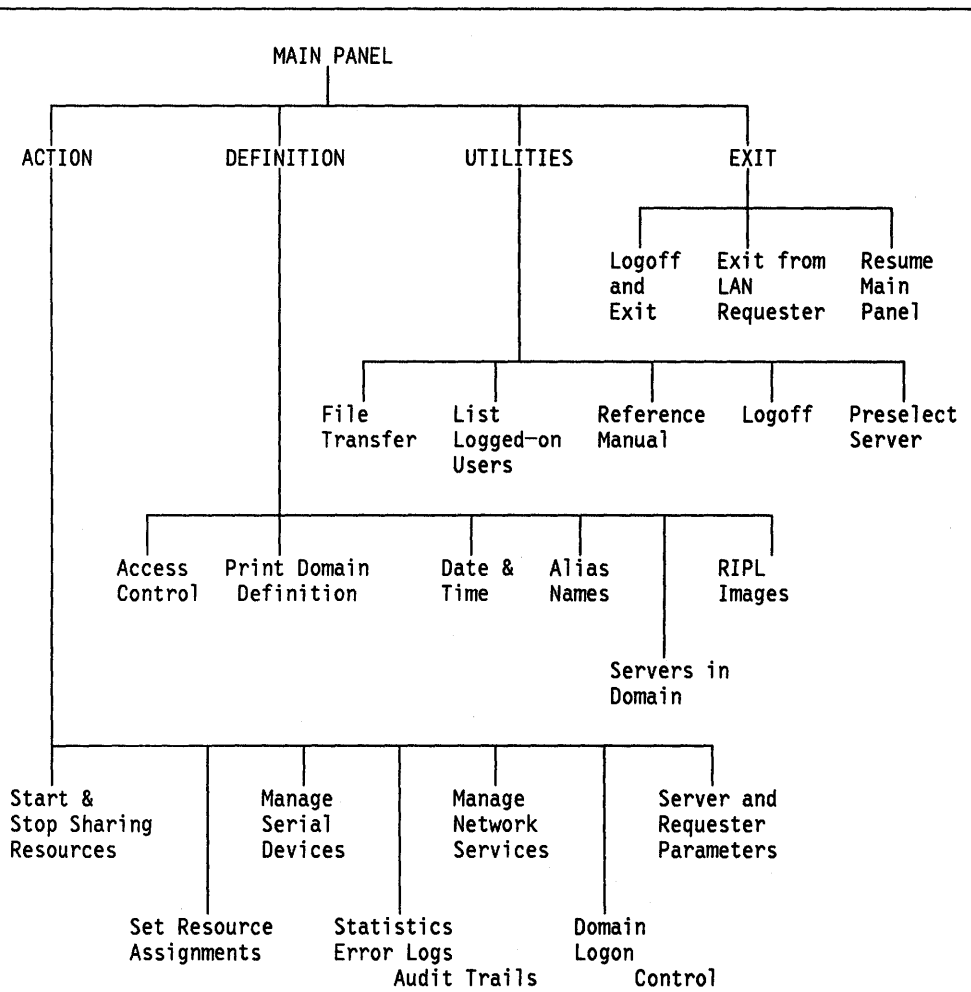


Figure 102. Panel Flow for the LAN Server Administrator Functions

The domain environment definition is the most important administrator activity for achieving a successful setup of a network based on the OS/2 LAN products. With careful planning, the definition process can get through with fewer interruptions and later, there will be fewer inconsistencies and problems when operating and administering the network.

The domain environment definition process can also become more or less complicated, depending on the sequence of steps used to define the different objects involved.

There is no standard sequence of steps to follow, but rather, based on practical experience as well as on the "logical" inter-dependencies among certain definition steps, the following guide is recommended to facilitate the domain environment definition process in most cases.

1. Careful planning is the key to a smooth domain definition. It is recommended to complete the worksheets for all servers, resources, users, groups of users and access control, which will help you have a structured domain design and will avoid a fragmented definition.
2. Under OS/2, create and assign the shared physical resources (directories, files, applications, printers and serial devices) on every server in the domain.
3. Log onto the system using the administrator user ID defined at OS/2 LAN Server installation time.
4. Create your own administrator user ID assigning it a password. Then, disable the logon capability for the user ID defined during the OS/2 LAN Server installation.
5. It is suggested that the domain is set into the global state of "Logon Disabled" while you are performing the definitions. This will stop already defined users from using half-finished domain definitions. Remember to reset this state once the domain has been completely defined.
6. Define all the machines in the domain (servers and PC DOS RPL workstations).
7. Define aliases for the physical resources so that they can be referenced by this short name in other definitions. Aliases can be defined for directories, printers, serial devices and external resources.
8. Define all users in this domain, including a backup administrator.
9. Define the groups of users as previously planned.
10. Give groups and individual users access to the aliases and other resources by defining access control profiles, access lists and access permission.
11. Define the previously loaded applications as public applications and set them up to automatically appear on the OS/2 Program Starter of the users that apply for using such applications, when they log onto the domain.
12. Define a LOGON profile for every user. This is the command file that will be executed in the workstation at which the user logs on.
13. Define the RPL images and "Netrun" applications if required.
14. Reset global logon status to "Enabled."

30.4 Where To Go For More Information

- *IBM Operating System/2 Local Area Network Server - User's Reference*
- *IBM Operating System/2 Local Area Network Server - Administrator's Reference*
- *IBM Operating System/2 Local Area Network Server - User's Quick Reference*
- *IBM Operating System/2 Local Area Network Server - Quick Administrator's Reference*
- *IBM Operating System/2 Local Area Network Server - Getting Started: Planning and Installation*
- *IBM Operating System/2 Extended Edition Version 1.2 - Getting Started*
- *OS/2 LAN Server Version 1.2 - Planning, Installation and Customization - Document Number GG24-XXXX*

Chapter 31. Token-Ring Network Bridge Program V2.0

31.1 Overview

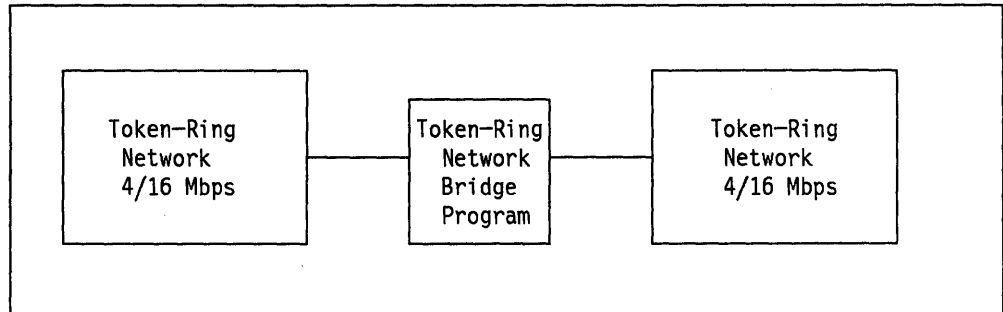


Figure 103. Token-Ring Network Bridge Program Version 2.0

The Token-Ring Network Bridge Program allows you to connect two rings into a single logical network by transferring Token-Ring Network frames between the two interconnected rings. Each of the interconnected rings may be operating at a data transfer rate of 4 or 16 Mbps independently of the data transfer rate in the other ring. The bridge is a dedicated computer.

All the LAN segments that are bridged are part of the same network and applications that are written to the IEEE 802.2 Open Interface, to the NETBIOS interface or to the APPC/PC interface, that implement source routing, can operate across bridges without modification.

You can use the IBM Token-Ring Network Bridge Program to forward a broadcast message through up to seven bridge computers (hops).

Additional functions of the Token-Ring Bridge Program are:

- Displays ring status and fault domain details for error conditions.
- Maintains and displays performance statistics.
- Provides network management capability by sending notifications and reports to IBM LAN Manager V2.0.

31.1.1.1 Performance of the Bridge

In most environments the impact of bridge processing in response time or throughput will not be seen by the end user. System planners for large multi-ring networks may wish to consult their IBM support to evaluate the impact of high traffic levels on bridge placements in the network.

31.2 Planning Checklist

31.2.1 Prerequisites - Hardware

- One of the following with at least 384 Kb of memory:
 - Computers that use PC/IO Channel architecture:
 - PC-AT
 - Industrial Computer 7531 or 7537
 - Personal System/2 Model 30.

These computers must use the Token-Ring Network Adapter II or the Token-Ring Network 16/4 Adapter.
 - Computers that use Micro Channel architecture:
 - Personal System/2 Models 50, 55, 60, 70 or 80.

These computers must use the Token-Ring Network Adapter/A or the Token-Ring Network 16/4 Adapter/A.
- At least one 1.2 Mb diskette drive for 5.25-inch media or at least one 720 Kb diskette drive for 3.5-inch media
- A monochrome or color display
- Blank diskettes (2)
- Printer (optional).

The bridge computer must be connected to both networks, and you will need two sets of adapters and cables for your computer.

31.2.2 Prerequisites - Software

- DOS 3.3 or later
 - Diagnostic diskettes for the Token-Ring Network adapters
- These are packaged with the adapters.

31.2.3 Coexistence And Compatibility

If you are migrating from a previous version (V1.00 or V1.1) to version 2.0 of the Bridge Program, you cannot use the old configuration file, since there are some new installation and configuration parameters in V2.0. The best thing to do is to make a printed copy of this old file so that you can refer to it when configuring your V2.0 bridge.

31.3 Installation Steps

The whole bridge installation process can be divided into three major steps:

- Bridge Planning
- Bridge Installation
- Bridge Definition on the LAN Manager.

31.3.1 Bridge Planning

The bridge planning must be done before you start the bridge installation. To complete this bridge planning you are guided by the Bridge Planning Chart contained and described in the *IBM Token-Ring Network Bridge Program User's Guide* Version 2.0.

The Bridge Planning Chart contains three sections for defining different planning aspects. The first section deals with the physical location of the bridge in your network. The second section contains parameter values that will be used to install the bridge program. The third section contains parameter values to be used to configure the bridge program.

It is strongly recommended to fill out this chart before installing the bridge.

31.3.2 Bridge Installation

31.3.2.1 Bridge Hardware Installation

This section will cover the installation considerations for the Token-Ring Network adapters.

1. Set adapter options

- Specify one as primary and the other as alternate
- Select different ROM addresses for each of them
- Select different RAM addresses for each of them
- Select different interrupt levels for each of them
- If you are installing a dual-speed adapter, select the speed as well as the RAM size

For a Token-Ring Network Adapter II or Token-Ring Network 16/4 Adapter, the configuration of the adapter is done by setting micro switches on the adapter.

For a Token-Ring Network Adapter/A or Token-Ring Network 16/4 Adapter/A, the configuration of the adapter is done by using the PS/2 Reference Diskette.

In case you install one Token-Ring Adapter/A and one Token-Ring 16/4 Adapter/A, each of the different Token-Ring adapter Option diskettes must be copied to the Reference Diskette.

2. Test the adapters

3. Proceed to the bridge software installation and configuration.

31.3.2.2 Bridge Software Installation and Configuration

You do not require the LAN Support Program; the bridge program provides its own interface to the adapter microcode.

1. Decide whether to install the program to diskette or fixed disk:

Type **A:INSTALL C** to install the program on a fixed disk

Type **A:INSTALL B** to install the program on a diskette

Type **A:INSTALLH** to temporarily install the program on fixed disk for further creation of diskette installations for other systems.

NOTE: Do not type "A:INSTALL B" in lowercase; you will get the message "Batch file missing"

For every type of installation, new CONFIG.SYS and AUTOEXEC.BAT files will be created. If those files already existed, they are renamed to CONFIG.SAV and AUTOEXEC.SAV before the new files are created. Update the new files if you are missing anything you require from the old files. Make sure that the AUTOEXEC.BAT file does not include DOS commands that require operator intervention, such as DATE and TIME, since the bridge program will not start/restart until a response to these prompts is made.

If you install to diskette you must have formatted it to be a system diskette (that means, formatted using the /S option).

2. After the IBM copyright panel, you will be presented with an option panel asking you to specify if the installation is for the machine you are working with or if it is for another machine.

If you will be installing for the machine you are working with, the Installation Program will require that the two Token-Ring adapters are already installed.

3. The next panel asks for the installation parameters, which are **Locally Administered Address**, **Shared RAM Address** and **Early Token Release**. They must be specified for both Token-Ring Network adapters. The early token release parameter is ignored if neither of the two adapters is a dual-speed adapter, or operates at 4 Mbps.
4. When the bridge software installation is concluded, the next panel asks if the bridge configuration is wanted.

It may be possible that you are going to use the default values for the bridge. If so, you do not need to configure the bridge program and you can skip the rest of this section. Otherwise, continue with the next step.

5. Customization of the configuration file can be done on any PC or PS/2. This does not require the adapters to be installed. You will be using the information from the Bridge Planning Chart. Tailor these values to your network's requirements.
6. If you are not coming directly from the bridge installation but you need to customize the configuration file, make the bridge program directory (BRIDGE) the current directory and then type:

```
ECCCNFG
```

7. After the copyright panel is displayed, the first of four configuration panels for the bridge program is displayed. The configuration parameters are:
 - **Bridge Number.** This number is used to uniquely identify a bridge to the bridge program when frames are forwarded through the bridge. The bridge numbers specified must be unique for **parallel** bridges³⁰; otherwise, any bridge number can be used.
 - **LAN Segment Number.** This parameter assigns a number to each of the rings that the bridge program is interconnecting. Every ring in the network should have a unique LAN segment number. All bridges con-

³⁰ Parallel bridges are bridges interconnecting the same two LAN segments of a Token-Ring Network.

nected to a specific LAN segment must refer to that LAN segment by the same number.

- **Frame Forwarding Active.** Generally, this should be set to YES. If this is set to NO then frames will not be forwarded through the bridge until the function is activated by a network manager program (An IBM LAN Manager Program, V2.0 only operating in controlling mode can activate this function).
- **Bridge Performance Threshold.** This parameter specifies the maximum allowable number of frames not forwarded through the bridge, per 10,000 frames arriving at the bridge, due to adapter congestion, a beaconing target ring, or invalid frames. Each time the threshold is exceeded, the bridge program counts a "threshold exceeded" occurrence and sends a notification to any linked network manager programs.
- **Restart on Error.** This is used to restart the bridge automatically if the bridge program abends. If you specify YES, then DOS is reloaded and the AUTOEXEC.BAT file (with the entry **ECCMAIN**) is executed.
- **Drive for Memory Dump on Error.** This is used to cause a dump of bridge program memory to disk or diskette in the event of program failure. This will only occur on internal bridge program errors and is used for problem determination.

If the "Restart on Error" option is selected, the drive specified for the dump must be the same or a later sequential character than the system drive for the restart.

- **Drive for Error Log.** This is used to specify the drive onto which errors will be logged in a file called "ECCLLOG.DAT." The errors are anything that causes the bridge program to terminate, (for example, the reason for a restart). Data is appended to the file until it is full, in which case you will need either to erase it or make a copy for problem determination purposes.

8. The second configuration panel is displayed with the following parameters:

- **Hop Count Limit.** The hop count is a means of limiting the number of bridges that a broadcast frame crosses including this bridge. This parameter does not apply to non-broadcast frames or to single-route broadcast frames.
- **Parameter Server.** If this function is enabled then the bridge program will provide the LAN segment number to adapters inserting on that LAN segment.
- **Error Monitor.** If this is enabled then the bridge program will collect error frames from the LAN segment, display statistics on these soft errors, and report such errors to network management programs.
- **Configuration Report Server.** If this is enabled then the bridge program will copy and process configuration report frames coming from the IBM LAN Manager Program. The configuration report server will report network configuration changes to the LAN Manager.

9. The third configuration panel asks about single-route broadcast:

These parameters allow you to specify how the bridge program is going to handle the single-route broadcast frames; that is, the bridge program will or

will not pass this kind of frame from one LAN segment to the other LAN segment.

- **Single-route broadcast selection mode.** If you specify manual mode, you must indicate with "Y" or "N" for both LAN segments if single-route broadcast frames from that segment will or will not be processed by the bridge. All other bridges in the network must be configured also with manual mode.

If you specify automatic mode, the bridge program will communicate with other bridge programs to determine how to set the single-route broadcast parameters ("Y" or "N") to compensate for changes in the network. You are asked to specify a **bridge label** and **path cost**. All other bridges in the network must be configured also with automatic mode.

10. The fourth configuration panel asks about link passwords.

- **Link Passwords.** These passwords are used by the bridge program to determine that a network manager program has authority to establish a reporting link with the bridge program.

The network manager program will have to give a valid password when trying to establish a link or the link request will be rejected.

31.3.3 Bridge Definition on the LAN Manager

When the bridges are operational, you should go to the LAN Manager station with your Bridge Planning Charts to define and control them from the LAN Manager station. You should then perform the following tasks:

1. Define the symbolic name and address for each bridge adapter.

You must specify the locally administered addresses or the universal addresses specified at bridge installation.

2. Define the bridges, using the previously defined adapter symbolic names.
3. Establish a link to each bridge from the LAN Manager.
4. Change the bridge configuration parameters if necessary using the "bridge configure" option.

31.4 Where To Go For More Information

- *IBM Token-Ring Network Bridge Program User's Guide, version 2.0*
- *GA27-3748 IBM Token-Ring Network Administrator's Guide*
- *SX27-3710 IBM Token-Ring Network Problem Determination Guide*
- *GA27-3678 IBM Token-Ring Network Installation Guide.*

Chapter 32. Token-Ring Network Bridge Program V2.1

32.1 Overview

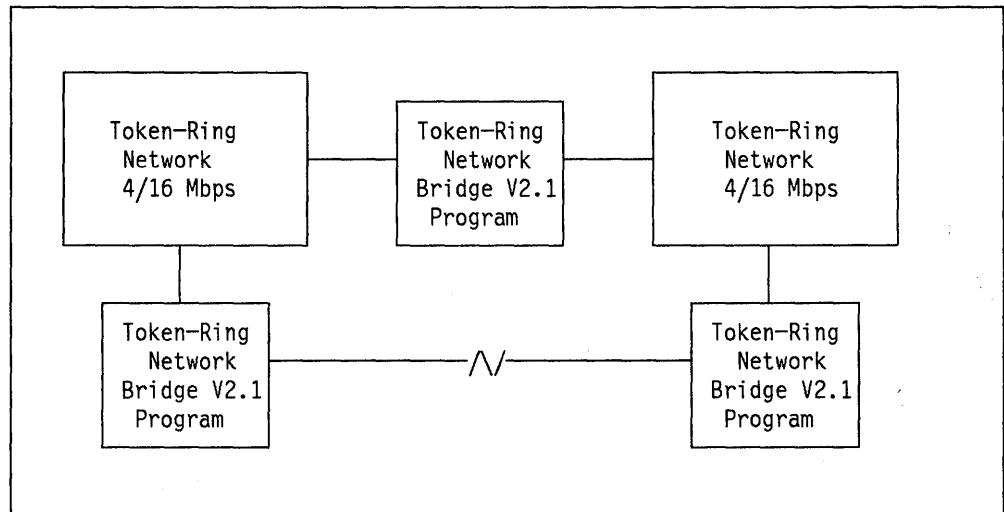


Figure 104. Token-Ring Network Bridge Program V2.1

The IBM Token-Ring Network Bridge Program Version 2.1 allows you to connect two LAN segments into a single logical network by transferring Token-Ring Network frames between the two interconnected LAN segments. Each of the interconnected LAN segments may be operating either at 4 or 16 Mbps independently of the data rate in the other LAN segment.

“LAN segment” is used to refer to a ring in the LAN.

The bridge program supports the local bridge function and the remote bridge function.

The local bridge function uses a dedicated computer with two Token-Ring Network adapters to interconnect the ring.

The remote bridge function uses two dedicated computers that remotely connect to each other through a telecommunications link operating at data rates from 9.6 Kbps to 1.344 Mbps. Each of the dedicated computers uses on one side a Token-Ring Network adapter to connect to the ring, and on the other side a communications adapter to remotely connect to the other dedicated computer.

All the LAN segments that are bridged are part of the same network and applications that are written to the IEEE 802.2 Open Interface, to the NETBIOS interface or to the APPC/PC interface, and that implement source routing, can operate across bridges without modification.

You can use the IBM Token-Ring Network Bridge Program to forward a broadcast message through up to seven bridges (hops).

Additional functions of the bridge program are:

- Displays ring status and fault domain details for error conditions.
- Maintains and displays performance statistics.
- Provides network management capability by sending notifications and reports to IBM LAN Manager V2.0.

The Token-Ring Network Bridge Program V2.1 allows filtering of forwarded frames. This filtering capability may be a requirement especially when a remote bridge is operating at a low data rate or when the data traffic is very high across that bridge.

32.1.1 Performance of the Bridge

In most environments using the local bridge function, the impact of bridge processing in response time or throughput will not be seen by the end user. When using the remote bridge function, response time or throughput directly depends on the link speed used to communicate between the two halves of the bridge.

In any case of large multi-ring networks, the system planner may wish to consult with his IBM support to evaluate the impact of high traffic levels on bridge placements in the network.

32.2 Planning Checklist

32.2.1 Prerequisites - Hardware

- Local Bridge Function
 - One of the following with at least 512 Kb of memory:
 - Computers that use PC/IO Channel architecture:
 - PC-AT
 - Industrial Computer 7531 or 7532
 - Personal System/2 Model 30.

These computers must use the Token-Ring Network Adapter II or the Token-Ring Network 16/4 Adapter.
 - Computers that use Micro Channel architecture:
 - Personal System/2 Models 50, 60, 70 or 80.

These computers must use the Token-Ring Network Adapter/A or the Token-Ring Network 16/4 Adapter/A.
 - Two Token-Ring Network adapters
 - At least one 1.2 Mb diskette drive for 5.25-inch media or any of a 720 Kb or 1.44 Mb diskette drive for 3.5-inch media. In any case, there must be at least 300 Kb of free disk space.
 - A monochrome or color display
 - Blank diskettes (2)
 - Printer (optional).
- Remote Bridge Function

A bridge using the remote bridge function is composed of two computers. The following requirements must be covered in each of the bridge computers.

- One of the following with at least 512 Kb of memory:

- Computers that use PC/IO Channel architecture:

- PC-AT
 - Industrial Computer 7531 or 7532
 - Personal System/2 Model 30.

- These computers must use the Token-Ring Network Adapter II or the Token-Ring Network 16/4 Adapter.

- These computers must use the Realtime Interface Co-processor card for telecommunications attachment.

- Computers that use Micro Channel architecture:

- Personal System/2 Models 50, 60, 70 or 80.

- These computers must use the Token-Ring Network Adapter/A or the Token-Ring Network 16/4 Adapter/A.

- These computers must use the Interface Co-Processor/2 card for telecommunications attachment.

- One communications adapter

- A device that provides attachment to the telecommunications link such as a modem, Data Servicing Unit (DSU), or a multiplexor (CBX).

- One Token-Ring Network adapter,

- At least one 1.2 Mb diskette drive for 5.25-inch media or any of a 720 Kb or 1.44 Mb diskette drive for 3.5-inch media. In any case, there must be at least 300 Kb of free disk space.

- A monochrome or color display

- Blank diskettes (2)

- Printer (optional).

Figure 105 on page 252 shows the line data rates and electrical interfaces that can be used with the communications adapters.

Type of Electrical Interface	Realtime Interface Co-Processor	X.25 Interface Co-Processor/2
RS-232C/V.24	9.6 - 19.2 Kbps	9.6 Kbps - 19.2 Kbps*
V.35	9.6 - 64 Kbps	9.6 Kbps - 1.344 Mbps*
X.21 bis/V.24		9.6 Kbps - 19.2 Kbps*
X.21 bis/V.35		9.6 Kbps - 1.344 Mbps*
X.21 (leased)		9.6 Kbps - 64 Kbps

* The X.21 bis/V.24 electrical characteristics are compatible with EIA RS-232C. The X.21 bis/V.35 interface is equivalent to the CCITT V.35 interface.

Figure 105. Electrical Interface and Line Data Rate Combinations

32.2.2 Prerequisites - Software

- Local Bridge Function
 - DOS 3.3 or later
 - Diagnostic diskettes for the Token-Ring Network adapters

These are packaged with the adapters.
- Remote Bridge Function
 - DOS 3.3 or later
 - Diagnostic diskettes for the Token-Ring Network Adapters and for the communications adapters.

These are packaged with the adapters.

 - The Realtime Interface Co-Processor DOS Support V1.0 or later, if the Realtime Interface Co-Processor card is used as the communications adapter.

32.2.3 Coexistence And Compatibility

If you are migrating from V1.0 or V1.1 to V2.1 of the bridge program, you cannot use the old configuration file since there are some new installation and configuration parameters in V2.1. The best thing to do is to make a printed copy of this old file so that you can refer to it when configuring your V2.0 bridge.

If you are migrating from V2.0 to V2.1 of the bridge program and you will be using the local bridge function, there is no change required, except when you use automatic single-route broadcast function. The rest of the ECCPARMS.BIN file remains compatible.

If you are moving from a bridge currently operating with the Bridge Program V2.0 to the Bridge Program V2.1 using the remote bridge function, you need to:

- Change the drive for memory dump and the drive for error log in the ECCPARMS.BIN

- Use the Communications Adapter Configuration Program to specify the communications adapter parameters.
- Install another machine with the bridge program and configure its communications adapter parameters.
- You must have installed a communications adapter on each machine and connected them through a telecommunications link.

32.3 Installation Steps

The whole bridge installation process can be divided into three major steps:

- Bridge planning
- Bridge installation
- Bridge definition on the LAN Manager program.

32.3.1 Bridge Planning

The bridge planning must be done before you start the bridge installation. To complete this bridge planning you are guided by the Bridge Planning Chart, which is contained and described in the *IBM Token-Ring Network Bridge Program User's Guide* Version 2.1.

The Bridge Planning Chart contains four sections to define different planning aspects. The first section deals with the physical location of the bridge in your network. The second section contains parameter values that will be used to install the bridge program. The third section contains parameter values to be used to configure the bridge program. The fourth section contains parameters to be used to define the bridge program communications adapter configuration, and it is used only for remote bridge configurations.

It is strongly recommended that you fill out this chart before installing the bridge.

32.3.2 Bridge Installation

32.3.2.1 Bridge Hardware Installation

This section will cover the installation considerations for the Token-Ring Network adapters as well as the communications adapters (RTIC or X.25 cards). Additional details are contained in the *IBM Token-Ring Network Bridge Program, User's Guide*.

1. Local Bridge Function

In the case of a bridge that uses the local bridge function, there will be two Token-Ring Network adapters installed in the same PC or PS/2. You need to:

- Specify one as primary and the other as alternate
- Select different ROM addresses for each of them
- Select different RAM addresses for each of them
- Select different interrupt levels for each of them

- If you are installing a dual-speed adapter, select also the speed as well as the RAM size.

2. Remote Bridge Function

In the case of a bridge that uses the remote bridge function, there will be one Token-Ring Network adapter and one communications adapter (RTIC or X.25 cards) in each of the PCs or PS/2s building up the bridge. You need to:

- Use adapter "0" for the Token-Ring Network adapter, and adapter "1" for the RTIC or X.25 card.
- Use interrupt level "2" for the Token-Ring Network adapter, and interrupt level "3" for the RTIC or X.25 card.
- Use "CC000" as the Token-Ring Network adapter ROM Address.
- If you are installing a dual-speed adapter, select the speed and set RAM size to 16 Kb.
- For the RTIC card, set SW1 "on," ROS jumpers should be factory set. Set the miscellaneous option jumpers JRA, JRB and JRC according to the PC or PS/2 model you have, and set JP8 jumper to remote clock.
- For the X.25 card, set the physical card number to "02A0H-02A7H," set the shared storage window to "C0000H-C1FFFH (8K window)" and set DCE clock for port "0" (receive and transmit).

For a Token-Ring Network Adapter II, Token-Ring Network 16/4 Adapter and the RTIC card, adapter configuration is done by setting micro switches on the adapter.

For a Token-Ring Network Adapter/A, Token-Ring Network 16/4 Adapter/A and the X.25 card, adapter configuration is done by using the PS/2 Reference Diskette. (If you use the auto-configuration option, you have to change the interrupt level to the correct value.)

In the case that you install one Token-Ring Adapter/A and one Token-Ring Network 16/4 Adapter/A, each of the different Token-Ring Network adapter Option diskettes must be copied to the PS/2 Reference Diskette.

Once you have installed, connected and tested the adapters, proceed to the "Bridge Software Installation and Customization" section.

32.3.2.2 Bridge Software Installation and Configuration

You do not require the LAN Support Program; the bridge program provides its own interface to the adapter microcode.

If you are installing the bridge program to use the remote bridge function, you need to install it in the two machines.

You can install the program to a diskette or a fixed disk. If you decide to install the program to a diskette, the diskette used must have been formatted with the /S option to make it IPLable. Also, the computer must have two diskette drives or a diskette drive and a fixed disk.

Complete installation and configuration instructions are in the *IBM Token-Ring Network Bridge Program V2.1, User's Guide*.

1. Make a "Bridge Program Backup Copy" from the original bridge program diskette by using the DOS DISKCOPY command. You will be using this backup copy diskette to install.
2. On each bridge computer, insert the bridge program backup copy in the diskette A: drive.
3. If you are installing to diskette, make the working copy on a diskette formatted with the /S option.

Type **A:SETUP** at the DOS prompt and press Enter.

4. Follow the instructions and answer the questions on the SETUP program panels.

To complete installation, use the INSTALL program to make the bridge program working diskette or directory.

For every type of installation, new CONFIG.SYS and AUTOEXEC.BAT files will be created. If those files already existed, they are renamed to CONFIG.SAV and AUTOEXEC.SAV before the new files are created. Update the new files if you are missing anything you require from the old files. Make sure that the AUTOEXEC.BAT file does not include DOS commands that require operator intervention such as DATE and TIME since the bridge program will not start/restart until a response to these prompts is made.

5. Follow the instructions and answer the questions on the install program panels. A panel asks you for the installation parameters which basically are **Locally Administered Address**, **Shared RAM Address** and **Early Token Release**. They must be specified for both Token-Ring Network adapters when the local bridge function is used. The early token release parameter is ignored if none of the two adapters is configured to operate at 16 Mbps.
6. When the bridge software installation is concluded, the next panel asks if the bridge configuration is wanted.

If you are going to use the default values for the bridge, you do not need to configure the bridge program and you can skip the rest of this section; otherwise, continue with the next step.

Note also that if you want to change the defaults and you are using the remote bridge function, you **do not** need to customize the configuration file on both computers that build up the remote bridge but **only** in one of them. When the remote bridge initializes, the configuration file is transmitted from one computer (Primary half of the bridge) to the other computer (Secondary half of the bridge).

7. Customization of the configuration file can be done on any PC. This does not require the adapters to be installed. You will be using the information from the Bridge Planning Chart. Tailor these values to your network's requirements.
8. If you are not coming directly from the bridge installation but you need to customize the configuration file, make the bridge program directory the current directory and then type:

```
ECCCNFG
```

9. After the copyright panel is displayed, the first of four configuration panels for the bridge program is displayed. The configuration parameters are:

- **Bridge Number.** This number is used to uniquely identify a bridge to the bridge program when frames are forwarded through the bridge. The bridge numbers specified must be unique for **parallel bridges**³¹; otherwise, any bridge number can be used.
- **LAN Segment Number.** This parameter assigns a number to each of the rings that the bridge program is interconnecting. Every ring in the network must have a unique LAN segment number. All bridges connected to a specific LAN segment must refer to that LAN segment by the same number.
- **Frame Forwarding Active.** Generally, this should be set to YES. If this is set to NO then frames will not be forwarded through the bridge until the function is activated by a network manager program. (An IBM LAN Manager Program V2.0 only, operating in controlling mode, can activate this function.)
- **Maximum Frame Size.** For a bridge using the remote bridge function, this parameter specifies the largest size frame in bytes that the bridge can process. The line data rate of the telecommunications link connecting the two bridge computers affects the maximum frame size. The bridge program discard frames larger than the maximum frame size.
- **Bridge Performance Threshold.** This parameter specifies the maximum allowable number of frames that are not forwarded through the bridge per 10,000 frames arriving at the bridge, due to adapter congestion, a beaconing target ring, or invalid frames. Each time the threshold is exceeded, the bridge program counts a "threshold exceeded" occurrence in the performance statistics and sends a notification to any network manager programs.
- **Telecommunications Link Error Threshold.** This parameter involves frames not received across a bridge due to errors on the telecommunications link connecting the two stations of a bridge using the remote bridge function. This parameter express the maximum allowable number of frames per 10,000 forwarded from one side of the bridge and not received by the other side, before the bridge program counts a "threshold exceeded" occurrence in the performance statistics. The bridge program also sends a notification to network management programs.

The threshold value depends on the line data rate and quality (bit error rate) of the telecommunications link, and the maximum average frame size that crosses the link. Use the default for the threshold until performance statistics and network operation indicate that you should change it.

- **Restart on Error.** This is used to restart the bridge automatically in the event of failure. If you specify YES, then DOS is reloaded and the AUTOEXEC.BAT file (with the entry **ECCMAIN**) is executed.
- **Drive for Memory Dump.** This is used to cause a dump of bridge memory to disk or diskette in the event of program failure. This will only occur on internal bridge program errors and is used for problem determination.

³¹ Parallel bridges are bridges interconnecting the same two LAN segments of a Token-Ring Network.

If the "Restart on Error" option is selected, the drive specified for the dump must be the same or a later sequential character than the system drive for the restart.

- **Drive for Error Log.** This is used to specify the drive onto which errors will be logged in a file called "ECCLOG.DAT." The errors are anything that causes the bridge program to terminate; for example, the reason for a restart. Data is appended to the file until it is full, in which case you will need either to erase it or make a copy for problem determination purposes.

10. The second configuration panel is displayed with the following parameters:

- **Hop Count Limit.** The hop count is a means of limiting the number of bridges that a broadcast frame crosses including this bridge. This parameter does not apply to non-broadcast frames or to single-route broadcast frames.
- **Parameter Server.** If this function is enabled then the bridge will provide the LAN segment number to adapters inserting on that LAN segment.
- **Error Monitor.** If this is enabled then the bridge will collect error frames from the LAN segment and display statistics on these soft errors.
- **Configuration Report Server.** If this is enabled then the bridge program will copy and process configuration report frames coming from the IBM LAN Manager program. The configuration report server will report network configuration changes to the LAN Manager program.

11. The third configuration panel asks about single route broadcast:

These parameters allow you to specify how the bridge program is going to handle the single-route broadcast frames; that is, the bridge program will or will not pass this kind of frame from one LAN segment to the other LAN segment.

- **Single-route broadcast selection mode.** If you specify manual mode, you must indicate with "Y" or "N" for both LAN segments if single-route broadcast frames from that segment will or will not be processed by the bridge. All other bridges in the network must be configured also with manual mode.

If you specify automatic mode, the bridge program will communicate with other bridge programs to determine how to set the single-route broadcast parameters ("Y" or "N") to compensate for changes in the network. You are asked to specify a **bridge label** and **path cost**. All other bridges in the network must be configured also with automatic mode.

12. The fourth configuration panel asks about link passwords.

- **Link Passwords.** These passwords are used by the bridge program to determine that a network manager program has authority to establish a reporting link with the bridge program.

The LAN Manager program will have to give a valid password when trying to establish a link or the link request will be rejected.

13. Communications Adapter Configuration. This step is needed only if you are installing a remote bridge.

Once the installation and the customization of the bridge configuration file (optional) have been done, you must define the characteristics of the communications adapter on each of the computers that are part of the bridge.

14. The Communications Adapter Configuration Program is a component of the bridge program and it allows you to define the communications adapter configuration parameters. To use this program, make sure that the bridge program directory is the current directory and then, type:

ECCSBCF

15. After the copyright panel is displayed, the Communications Adapter Configuration panel is displayed. It asks for the following parameters:
 - **Line Data Rate.** This parameter specifies the speed at which the telecommunications link is to be clocked. The bridge program does not support internal clocking; the DCE performs external clocking for the bridge. The telecommunications link supports line data rates from 9.6 Kbps to 1.344 Mbps.
 - **Electrical Interface.** This parameter indicates what type of electrical interface is being used at the communications adapter (RS-232, V.35 or X.21).
 - **Buffer Size.** This parameter defines the maximum number of bytes that can be on the communications adapter transmit queue at one time. The formulas used by the bridge program to calculate the default value used depend on the line data rate of the remote bridge telecommunications link.

32.3.3 Bridge Definition on the LAN Manager

When the bridges are operational, you should go to the LAN Manager station with your Bridge Planning Charts to define and control them from the LAN Manager station. You should then perform the following tasks:

1. Define the symbolic names and addresses for each bridge adapter.

You must specify the locally administered addresses or the universal addresses specified at bridge installation.
2. Define the bridges, using the previously defined adapter symbolic names.
3. Establish the link to each bridge from the LAN Manager.
4. Change the bridge parameters if necessary using the "Bridge Configure" option.

32.4 Where To Go For More Information

- *IBM Token-Ring Network Bridge Program User's Guide*
- *GA27-3748 IBM Local Area Network Administrator's Guide*
- *GA27-3678 IBM Token-Ring Network Installation Guide*
- *IBM Realtime Interface Co-Processor DOS Support*
- *IBM Realtime Interface Co-Processor Hardware Maintenance and Service*
- *IBM Realtime Interface Co-Processor Technical Reference*
- *IBM Realtime Interface Co-Processor Guide to Operations*

- *IBM X.25 Interface Co-Processor/2 Hardware Maintenance Library*
- *IBM X.25 Interface Co-Processor/2 Guide to Operations*
- *IBM X.25 Interface Co-Processor/2 Technical Reference.*

Chapter 33. PC Network Bridge Program 1.0

33.1 Overview

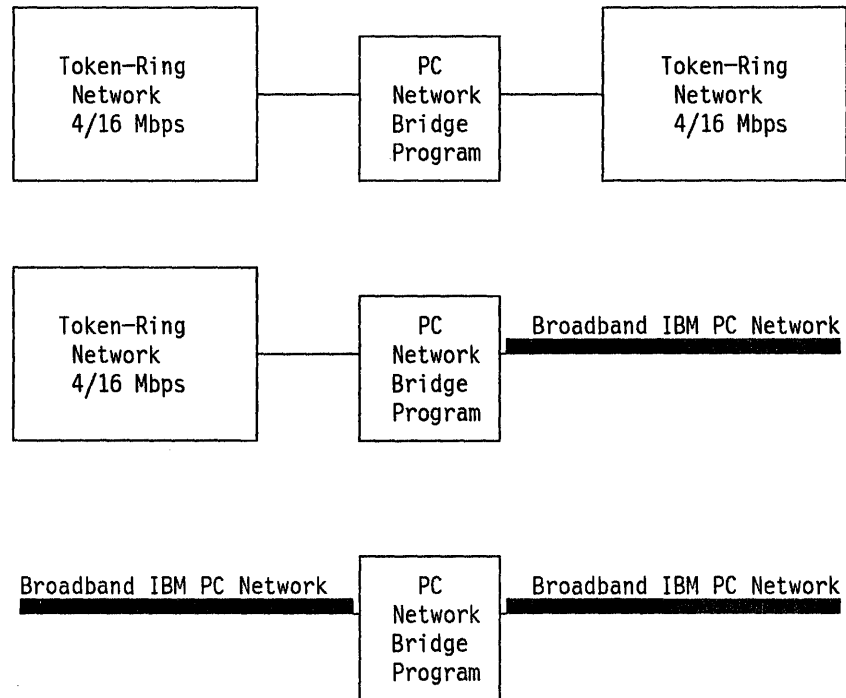


Figure 106. PC Network Bridge Program

The IBM PC Network Bridge Program provides the capability of connecting multiple segments of the IBM PC Network and/or the IBM Token-Ring Network into a single logical local area network. The IBM PC Network Bridge Program communicates with the IBM LAN Manager Version 2.0 to extend network management support to the mixed IBM PC Network and Token-Ring Network environment.

Specifically, the IBM PC Network Bridge Program connects:

- Two Broadband IBM PC Network segments, operating at the same or different frequency pairs.
- Adapters operating at two different frequencies on the same Broadband IBM PC Network segment.
- One Broadband IBM PC Network segment and one IBM Token-Ring Network segment.
- Two IBM Token-Ring Network segments.

The bridge program extends the host attachment capability of the IBM Token-Ring Network to the IBM PC Network. Devices attached to an IBM PC Network can communicate with Token-Ring Network attached hosts through the bridge.

Communication across the bridge is transparent to applications written to the IEEE 802.2 Standard logical link control interface.

The IBM PC Network Bridge Program also supports communication with up to four stations running the IBM LAN Manager program. It can be configured locally or by the IBM LAN Manager Version 2.0 to communicate with other active bridges in the network to dynamically maintain the network single-route broadcast path. If this capability is desired, all bridges in the network must be configured to use automatic single-route broadcast.

The IBM PC Network Bridge Program provides problem determination information by displaying the operating status and network-specific error data for the network segments to which it is connected. It also maintains and displays bridge performance information.

The IBM PC Network Bridge Program communicates with the IBM LAN Manager Version 2.0 to provide consistent network management for the IBM PC Network and the IBM Token-Ring Network. The network management information sent to the LAN Manager is as follows:

- Network error conditions
 - Continuous-carrier and no-carrier conditions for the IBM PC Network.
 - Soft error and beaconing conditions for the IBM Token-Ring Network.
- Bridge status and performance data
- Configuration reports.

33.2 Planning Checklist

33.2.1 Prerequisites - Hardware

- A dedicated IBM Personal System/2 Model 50, 55, 60, 70, or 80.
- Standard or enhanced keyboard
- Two IBM local area network adapters - any combination of the following:
 - IBM PC Network Adapter II/A
 - IBM PC Network Adapter II/A - Frequency 2
 - IBM PC Network Adapter II/A - Frequency 3
 - IBM Token-Ring Network Adapter/A
 - IBM Token-Ring Network 16/4 Adapter/A
- 512 Kb memory
- One 720 Kb 3.5-inch diskette drive
- Monochrome or color monitor
- Printer (optional)

33.2.2 Prerequisites - Software

IBM Personal Computer Disk Operating System (DOS) Version 3.3 or higher is required.

Note: Devices attached to a Broadband IBM PC Network segment being bridged by the IBM PC Network Bridge Program and using IBM Local Area Network Support Program Version 1.0 will require PTF UR22583.

33.2.3 Coexistence and Compatibility

In addition to the IBM PC Network adapters identified under "Machine Requirements," the following Broadband IBM PC Network adapters may be used in devices attached to the network:

- IBM PC Network Adapter II
- IBM PC Network Adapter II - Frequency 2
- IBM PC Network Adapter II - Frequency 3
- IBM PC Network Adapter (when used with the IBM Local Area Network Support Program module DXMG@MOD.SYS)

The IBM PC Network Bridge Program will communicate with the IBM LAN Manager Version 2.0.

The IBM PC Network Bridge Program is not sensitive to differences among supported keyboards in the U.S. and World Trade. The supported keyboards are listed in "Machine Requirements."

33.3 Installation Steps

The bridge installation process can be divided into three major steps:

- Bridge planning
- Bridge installation
- Bridge definition on the LAN Manager.

33.3.1 Bridge Planning

The bridge planning must be done before you start the bridge installation. To complete this bridge planning you are guided by the Bridge Planning Chart, which is contained and described in the *IBM PC Network Bridge Program User's Guide Version 1.0*.

The Bridge Planning Chart contains three sections to define different planning aspects. The first section deals with the physical location of the bridge in your network. The second section contains parameter values that will be used to install the bridge program. The third section contains parameter values to be used to configure the bridge program.

It is strongly recommended that you fill out this chart before installing the bridge.

33.3.2 Bridge Installation

33.3.2.1 Bridge Hardware Installation

This section will cover the installation considerations for two network adapters suitable for the bridge computer.

1. Consult Figure 107 on page 265 to configure the adapters according to your network configuration.
 - a. Check the box corresponding to the adapter combination.
 - b. Choose one adapter to be the **primary adapter**.
 - c. Configure the other adapter as the **alternate adapter**.

Note:

- 1) If you are using an IBM PC Network adapter and an IBM Token-Ring Network adapter in the bridge computer, configure the **IBM PC Network adapter** as the **primary adapter**.
 - 2) For all network adapters, configuration is done by using the PS/2 Reference Diskette.
2. Test the adapters
 3. Proceed to the bridge software installation and configuration.

33.3.2.2 Bridge Software Installation and Configuration

You do not require the LAN Support Program; the bridge program provides its own interface to the adapter microcode.

1. Decide whether to install the program to diskette or fixed disk.

Type **A:INSTALL C** to install the program on a fixed disk.

Type **A:INSTALL B** to install the program on a diskette.

Type **A:INSTALLH** to temporarily install the program on fixed disk for further creation of diskette installations for other systems.

Note: Do not enter "a:install b" in lowercase characters. This will give you the message "Batch file missing.....".

For every type of installation, new CONFIG.SYS and AUTOEXEC.BAT files will be created. If those files already existed, they are renamed to CONFIG.SAV and AUTOEXEC.SAV before the new files are created. Update the new files if you are missing anything you require from the old files. Make sure that the AUTOEXEC.BAT file does not include DOS commands that require operator intervention such as DATE and TIME since the bridge program will not start/restart until a response to these prompts is made.

If you install to diskette you must have formatted it to be a system diskette (that means, formatted using the /S option).

Network Adapter Configuration Option Settings Configure the adapters according to this table		
Check Adapter Combination	Primary Network Adapter Option Settings	Alternate Network Adapter Option Settings
	PC Network and PC Network	
	Adapter: 0 Interrupt Request: 2 Memory Mapping: Standard ROM: Enabled	Adapter: 1 Interrupt Request: 3 Memory Mapping: Alternate ROM: Disabled
	PC Network and Token-Ring Network	
	Adapter: 0 Interrupt Request: 2 Memory Mapping: Standard ROM: Enabled	Adapter: 1 Interrupt Level: 3 ROM Address: DC000
	Token-Ring Network and Token-Ring Network	
	Adapter: 0 Interrupt Level: 2 ROM Address: CC000	Adapter: 1 Interrupt Level 3 ROM Address DC000
NOTE: If you are installing an IBM Token-Ring Network 16/4 Adapter/A in the bridge computer, you must set the RAM size to 16 KB. See the "Guide to Operations" packaged with the adapter for more information.		

Figure 107. Network Adapter Settings

- After the IBM copyright panel, you will be presented with an option panel asking you to specify if the installation is for the machine you are working with or if it is for another machine.

In case you specify to be installing for the machine you are working with, the installation program will require that the two network adapters are already installed.

- The next panel requests the installation parameters which are **Locally Administered Address**, **Shared RAM Address** and **Early Token Release**. They must be specified for both network adapters. The early token release parameter is ignored if none of the two adapters is a dual-speed adapter.
- Exit when the bridge software installation is concluded. The next panel asks if you want to run the Bridge Configuration Program.

If you are going to use the default values for the bridge, you do not need to configure the bridge program and you can skip the rest of this section. Otherwise, continue with the next step.

- Customization of the configuration file can be done on any PS/2. This does not require the adapters to be installed. You will be using the information from the Bridge Planning Chart. Tailor these values to your network's requirements.
- If you are not coming directly from the bridge installation but you need to customize the configuration file, make the bridge program directory (BRIDGE) the current directory and then type:

```
CONFIG
```

- After the copyright panel is displayed, the first of four configuration panels for the bridge program is displayed and the configuration parameters are:

- **Bridge Number.** This number is used to uniquely identify a bridge to the bridge program when frames are forwarded through the bridge. The bridge numbers specified must be unique for **parallel** bridges³²; otherwise, any bridge number can be used.
- **LAN Segment Number.** This parameter assigns a number to each of the LAN segments that the bridge program is interconnecting. Every LAN segment in the network should have a unique LAN segment number. All bridges connected to a specific LAN segment must refer to that LAN segment by the same number.
- **Frame Forwarding Active.** Generally, this should be set to YES. If this is set to NO then frames will not be forwarded through the bridge until the function is activated by a network manager program. (An IBM LAN Manager Program V2.0 only, operating in controlling mode, can activate this function).
- **Bridge Performance Threshold.** This parameter specifies the maximum allowable number of frames not forwarded through the bridge, per 10,000 frames arriving at the bridge, due to adapter congestion, an inoperative target LAN segment, or invalid frames. Each time the threshold is exceeded, the bridge program counts a "threshold exceeded" occurrence and sends a notification to any linked network management programs.
- **Restart on Error.** This is used to restart the bridge automatically in the event of failure. If you specify YES, then DOS is reloaded and the AUTOEXEC.BAT file (with the entry **ECCMAIN**) is executed.
- **Drive for Memory Dump on Error.** This is used to cause a dump of bridge program memory to disk or diskette in the event of program failure. This will only occur on internal bridge program errors and is used for problem determination.

If the "Restart on Error" option is selected, the drive specified for the dump must be the same or a later sequential character than the system drive for the restart.

- **Drive for Error Log.** This is used to specify the drive onto which errors will be logged in a file called "ECCLOG.DAT." The errors are anything that causes the bridge program to terminate; for example, the reason for a restart. Data is appended to the file until it is full, in which case you will need either to erase it or make a copy for problem determination purposes.

8. The second configuration panel is displayed with the following parameters:

- **Hop Count Limit.** The hop count is a means of limiting the number of bridges that a broadcast frame crosses including this bridge. This parameter does not apply to non-broadcast frames or to single-route broadcast frames.
- **Parameter Server.** If this function is enabled then the bridge program will provide the LAN segment number to adapters inserting on that LAN segment.

³² Parallel bridges are bridges interconnecting the same two LAN segments of a Token-Ring Network.

- **Error Monitor.** If this is enabled then the bridge program will collect error frames from the LAN segment and display statistics on these errors (soft errors on IBM Token-Ring Network and continuous carrier, or no carrier on an IBM PC Network).
- **Configuration Report Server.** If this is enabled then the bridge program will copy and process configuration report frames coming from the IBM LAN Manager. The configuration report server will report configuration changes to the LAN Manager program.

9. The third configuration panel asks about single-route broadcast:

These parameters allow you to specify how the bridge program is going to handle the single-route broadcast frames; that is, the bridge program will or will not pass this kind of frame from one LAN segment to the other LAN segment.

- **Single-Route Broadcast Selection Mode.** If you specify manual mode, you must indicate with "Y" or "N" for both LAN segments if single-route broadcast frames from that segment will or will not be processed by the bridge. All other bridges in the network must be configured also with manual mode.

If you specify automatic mode, the bridge program will communicate with other bridge programs to determine how to set the single-route broadcast parameters ("Y" or "N") to compensate for changes in the network. You are asked to specify a **bridge label** and **path cost**. All other bridges in the network must be configured also with automatic mode.

10. The fourth configuration panel asks about link passwords.

- **Link Passwords.** These passwords are used by the bridge program to determine that a network manager program has authority to establish a reporting link with the bridge program.

The network manager program will have to give a valid password when trying to establish a link or the link request will be rejected.

33.3.3 Bridge Definition on the LAN Manager

When the bridges are operational, you should go to the LAN Manager station with your Bridge Planning Charts to define and control them from the LAN Manager station. There are major differences in using either LAN Manager Version 1.0 or Version 2.0.

33.3.3.1 Using the Bridge Program with the IBM LAN Manager Version 1.0

If you are using this LAN Manager, be aware of the following:

- The IBM LAN Manager Version 1.0 *can* communicate with the bridge program **only when it connects two Token-Ring Network segments.**

This version of the LAN Manager *cannot* communicate with the bridge program when it connects two PC Network segments or a Token-Ring Network segment and a PC Network segment.

- This version of the LAN Manager can provide Bridge Profile information *only* about bridges that connect two Token-Ring Network segments.
- You may change *only* the manual single-route broadcast parameters of the bridge program to "on" or "off."

If you use Version 1.0 to change the single-route broadcast parameter value of the bridge program, the values will be permanently recorded by writing them to the ECCPARMS.BIN file.

- You *may not* change any other bridge configuration parameter using this version of the IBM LAN Manager.

33.3.3.2 Using the Bridge Program with the IBM LAN Manager Version 2.0

If you are using this version of the LAN Manager, be aware of the following:

- The IBM LAN Manager Version 2.0 *can* communicate with the bridge program when it connects:
 - Two PC Network segments using the same or different frequency pairs
 - Adapters using different frequency pairs on the same PC Network
 - A Token-Ring Network segment with a PC Network segment
 - Two Token-Ring Network segments operating at 4 or 16 Mbps.
- Version 2.0 provides Bridge Profile information about all IBM bridges in the network.
- You *can* change the following bridge configuration parameters using Version 2.0 of the LAN Manager program:
 - Bridge number
 - LAN segment number (for primary and alternate adapters)
 - Frame forwarding active
 - Bridge performance threshold
 - Hop count limit
 - Single-route broadcast (selection mode and parameter values)
 - Link passwords.
- Bridge configuration parameter values changed by the LAN Manager will be permanently recorded by writing them to the ECCPARMS.BIN file.

33.4 Where To Go For More Information

PC Network Publications

- *IBM PC Network Program, User's Guide*
- *IBM PC Network Broadband Planning Guide, S68X-2268.*

Token-Ring Network Publications

- *IBM Local Area Network Administrator's Guide, GA27-3748*
- *IBM Token-Ring Network Introduction and Planning Guide, GA27-3677*
- *IBM Token-Ring Network Problem Determination Guide, SX27-3710*
- *IBM Token-Ring Network Installation Guide, GA27-3678*
- *IBM Token-Ring Network Architecture Reference, SC30-3374*

Local Area Network Publications

- *LAN Concepts and Products, GG24-3178*
- *IBM Local Area Network Host Information, GC30-3479*
- *IBM Local Area Network Technical Reference, SC30-3383-2*
- *LAN Manager Version 2.0 and LAN Manager Entry Version 1.0 Installation Guidelines, GG24-3388*
- *IBM Token-Ring Network Bridges and Management, GG24-3062*
- *IBM Multi-Segment LAN Design Guidelines, GG24-3398.*

NetView Publications

- *NetView Resource Alerts Reference*, SC31-6024.

Chapter 34. LAN Asynchronous Connection Server (LANACS)

34.1 Overview

The LAN Asynchronous Connection Server (LANACS) is a program that runs on a **dedicated** workstation attached to a LAN which can be either a Token-Ring or a PC Network (Broadband). There may be various LANACSs on a LAN.

The LANACS program provides asynchronous communications services for LAN workstations and for non-LAN devices. The LAN workstations can use any of the available LANACS devices on a LAN.

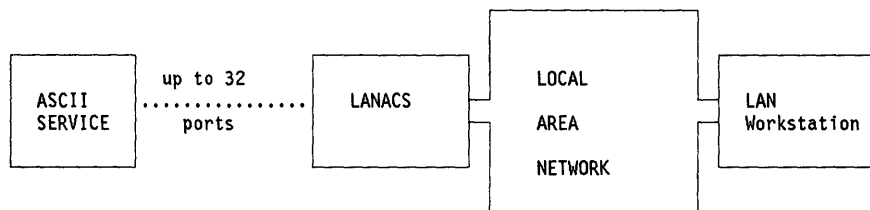


Figure 108. LANACS - A Simple Configuration

Communications across the LAN use the NETBIOS interface.

The communications between LANACS and workstation uses one of two possible software interfaces: Extended BIOS (Basic Input Output Services) Interface (EBI) or the Asynchronous Connection Server Protocol Interface (ACSI). It is recommended that you initially choose one of these and stay with it.

An Extended BIOS Interface gives an appearance of direct communications control between the two communicating devices, for example, the LAN Workstation will send commands directly to a modem. Alternatively, an ACSI application communicates via the server, and the server sets up and controls the connections, which means that an administrator can have better control over access. For example, a workstation requests a connection and the server will operate the modem, etc, to establish the connection.³³

Applications like Crosstalk³⁴, PFS Access³⁴, YTERM or FTTERM V2.1 conform to these interfaces and can be used by LAN-attached workstations. The functions of these applications (with the software interface shown in parentheses) is as follows:

³³ The Asynchronous Communications Server Program also uses the ACSI protocol. The EBI protocol is unique to LANACS.

³⁴ *Crosstalk* is a trademark of MICROSTUF Inc. and *PFS* is a trademark of Software Publishing Corporation.

- | | |
|--------------------------|--|
| Crosstalk (ACSI) | Emulates the following ASCII terminals as well as providing other functions such as file transfer: VT100, VT52, IBM 3101, Televideo (TVI) 910/920, ADDS Viewpoint, TI 960. |
| PFS Access (ACSI) | Emulates a VT100 or a VT52. |
| YTERM (EBI) | Emulates a VT100, Datamedia 1520, Tektronics 4013 and provides other functions. |
| FTTERM V2.1 (EBI) | Emulates a IBM 3101, IBM 3270, VT100 or VT220 and provides other functions. |

Off-LAN devices must operate with a communications application program compatible with the program on the LAN workstation.

Off-LAN devices can be:

- ASCII workstations
- IBM workstations
- V.24 and V.28 compatible devices
- Protocol conversion devices that attach to IBM hosts
- Devices attached to the ROLM CBX
- Modems.

These devices can be attached via switched and non-switched communications lines and external modems or can attach directly to an ASCII host.³⁵

Remote workstations are workstations that are not attached directly to the LAN but wish to access, through LANACS, resources on or across the LAN. These remote workstations can do this by having a connection to LANACS and by using one of the following emulators:

- Crosstalk XVI PC Program
- PFS Access PC Program
- FTTERM PC Program
- 3101 Emulation
- YTERM Communication Program.

The diagram in Figure 109 on page 273 shows the variety of configurations and connections that can be established with the LANACS program.

The server provides LAN-attached devices with access to asynchronous services attached to the server's outgoing ports.

Devices attached to the incoming ports can gain access to LAN workstations and the servers outgoing ports.

³⁵ If you directly attach devices to an ASCII host, you must have a 'null modem cable' which is a cable that functions like a modem eliminator.

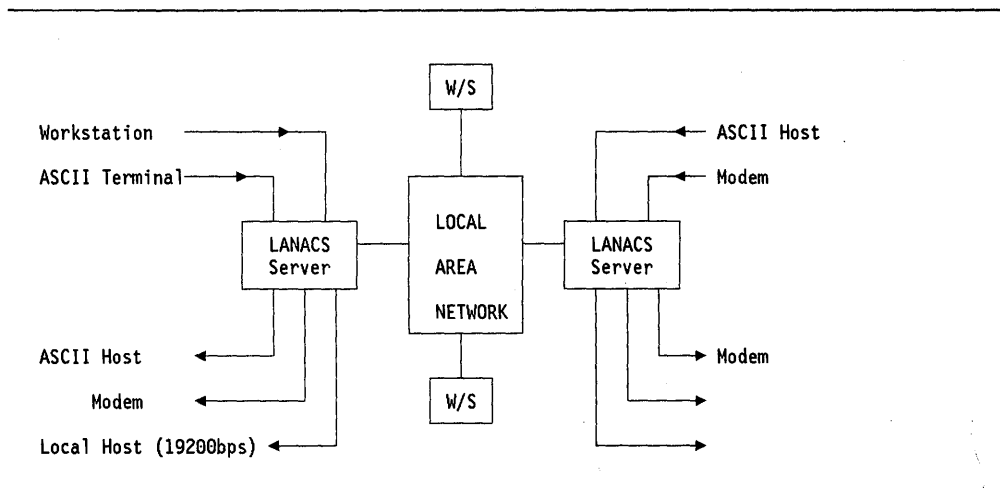


Figure 109. LANACS Services. Different connections, directions, speeds, protocols etc., can all coexist on the same server. The ports can be: incoming telephone calls, outgoing telephone calls, leased lines or direct connections.

If multiple servers are installed, then non-LAN devices can gain access to other non-LAN devices on a different server using the LAN to provide the connection medium. See Figure 110.

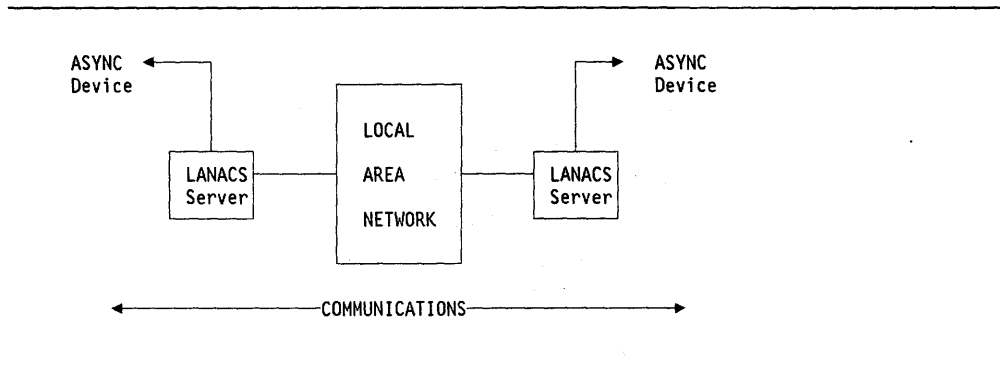


Figure 110. Multiple Server Facilities. Asynchronous devices can communicate across the LAN using multiple servers.

The LANACS package contains a set of 2 x 3.5" diskettes and 2 x 5.25" diskettes. One contains the LANACS program and the other has the EBI (Enhanced BIOS Interface) for workstations.

34.2 Planning Checklist

34.2.1 Prerequisites - Hardware

1. 640 Kb of memory
2. Two diskette drives or one drive and a fixed disk

The following table in Figure 111 on page 274 lists the hardware combinations that are possible. Figure 112 on page 275 shows the possible speeds of operation of each adapter.

Machine	Max Number of Ports	Communications Adapter Type	Max. No. Of Comms. Slots	LAN Adapters Allowed
PS/2 Md130	9*****	A, B	2	I, J, K, L
PC XT	8	B	1	I, J, K, L
PC XT-286	24*****	A, B	3	I, J, K, L
PC AT or Industrial Computer	32*****	A, B**	5	I**** J, K, L
PS/2 Md1s 50, 70	17*	C***, D***, E	2	M, N
PS/2 Md1s 60, 80	32*	C***, D***, E	4	M, N

Figure 111. LANACS - Adapter Coexistence

KEY FOR TABLE:

- I** PC Network Adapter
- J** PC Network Adapter II
- K** PC Token-Ring Network Adapter
- L** PC Token-Ring Network Adapter II
- M** PC Network Adapter/A
- N** Token-Ring Adapter/A
- A** Serial/Parallel Adapter
- B** Realtime Interface Co-Processor Multiport (RTIC)
- C** PS/2 Multiport Adapter/A
- D** PS/2 Dual Asynchronous Adapter/A
- E** Realtime Interface Co-Processor Multiport/2
- *** Includes factory-installed communications port. A maximum of two COM ports are permitted in a server workstation.
- **** Maximum of four adapters of this type are permitted.
- ***** Maximum of two active ports of this type are permitted, including a factory-installed communications port if any.
- ****** Maximum of two adapters of this type are permitted. Alternate adapter can only operate with EBI LAN applications.
- ******* Installation of up to two serial/parallel adapters on a Multiport Adapter requires that the Token-Ring Network Adapter interrupt level be changed to at least level 7 for use with COM ports.

Adapter Type	Number Of Ports	Speed Of Operation
Serial/Parallel Adapter	1	9600 bps
PS/2 Multiprotocol Adapter	1	9600 bps
PS/2 Dual Asynchronous Adapter	2	9600 bps
RTIC Multiport (PC)	4 - 8	19200 bps
RTIC Multiport/2 Card (PS/2)	0 - 8	19200 bps

Figure 112. LANACS - Adapter Speeds of Operation

When deciding on a LAN adapter, bear in mind that if you intend to have more than 16 sessions through the server, you should use the "II" or "/A" versions of the LAN adapters.

34.2.2 Prerequisites - Software

- DOS 3.3 or higher
- LAN adapter support such as LAN Support Program which must include NETBIOS (see "LAN Support Program V1.1" on page 87).
- RTIC Multiport Adapter requires

IBM Realtime Control Program DOS Support V1.02 or later.

- Multiport/2 Adapter requires

IBM Realtime Interface Co-Processor DOS Support

- LAN workstation will require either

A LAN ACSI Communications application program when the ACSI (Asynchronous Communications Server Protocol Interface) is used.

OR, a LAN EBI (Enhanced BIOS Interface) asynchronous communications application.

A server can operate both EBI and ACSI protocols simultaneously.

34.2.3 Coexistence and Compatibility

For an overview of the adapter coexistence permutations, see Figure 111 on page 274.

34.3 Installation Steps

34.3.1 Preparation

1. Install Token-Ring or PC Network adapters. See "PC Token-Ring Network Adapter Installation" on page 9 or "PS/2 Token-Ring Adapter/A Installation" on page 17.
2. Install one of the communications adapters, shown in Figure 112 on page 275. **RTICM installation**

Figure 113 gives suggested switch and jumper settings for the RTIC Multi-port Adapter for the PC.

The PS/2 cards are set up using the System Reference Diskette.

Use the following information along with the *RTIC Guide to Operations* to set up the RTICM card.

	SW1	SW2	SW3	SW4	Base Address
Card 0	on	on	on	on	02A0
Card 1	off	on	on	on	06A0
Card 2	on	off	on	on	0AA0
Card 3	off	off	on	on	0EA0

Figure 113. Address Switch Settings for Each Card

Jumpers

- J1** Factory set and should not be changed.
- J2, J3** Can use any settings.
- J8, J9** Settings depend on how J2 and J3 have been set; see the *RTICM Guide To Operations*.
- J12** For an AT or XT286 this jumper should be set to indicate that the card will be in a two-edge connector slot. For an XT or PS/2 Mod 30, remove the jumper since the card will be in a one-edged slot.
- J15** Interrupt-Acknowledge Level (IAL).
Any or all four RTICM cards may use the same or different interrupt levels as long as they do not conflict with other devices such as network adapter cards, printers LPT1 and LPT2, PS/2 COM ports.
The level set here must match the Interrupt-Request Level jumpers (see JRA, JRB and JRC below).
- JRA** M1 and M2 should be factory set.
- JRB** Should be factory set.

JRC BW - Bus width recommendations.

PC/AT and PC/XT-286 set BW to 16; otherwise set to 8.

Note: using an 8-bit device in a 16-bit region may cause a flashing screen or other conflict. If this occurs on the AT or XT-286, then set BW to 8 or change the 8K page value in the ICAPARM.PRM file.

ED - Edge connector (also see J12). Set AT and XT286 for a two-edge connector, otherwise set to one-edge.

BN - Should be factory set.

L1, L2, L4 - Interrupt-Request Level must match J15.

3. Connect the server to the LAN.
4. Use the DOS "diskcopy" to make a working copy of the server program diskette.
5. Make sure that the LAN Support Program is installed and in particular that NETBIOS support is present.

NETBIOS Parameters. Enough NETBIOS sessions must be made available for the connection server PC to initiate and answer connection requests. The more connection requests required, the more NETBIOS sessions required. The following chart gives, as an example, the maximum requirements for each type of communications adapter.

Adapter	STATIONS	SESSIONS	NAMES	COMMANDS
1 RTIC Multiport	08	12	16	24
4 RTIC Multiport	32	48	64	96
2 COM Ports	02	03	04	06

Figure 114. LANACS - NETBIOS Considerations. Note, these parameters are in addition to any other applications requiring NETBIOS sessions.

Calculate the number of NETBIOS resources using the following:

L = number of NETBIOS connections being used

S (sessions) = L

C (commands) = 2 x L (EBI and outgoing ACSI)

or 3 x L (incoming when ACSI service requested)

Notice that the values 'S : N : C' are in the ratio of '2 : 3 : 4 : 6'.

The NETBIOS parameters are coded in the CONFIG.SYS file on the 'device=dxmT0mod.sys' line. See "LAN Support Program V1.1" on page 87 for a complete discussion and explanation of NETBIOS and the LAN Support Program parameters.

6. If you have installed any multiport adapters you will need to modify the ICAPARM.PRM file depending on the number of adapters that you have installed.

This file is found on the Asynchronous Connection Server program diskette and is used to set up the multiport adapters. If you are using multiport adapters you must modify the ICAPARM.PRM file for one to four adapters. The parameters shown in Figure 115 are an example only; other devices may conflict with these parameters. Refer to the "READ.ME" file on the program diskette for more information.

```
#02A0 0 40 10 10 10 10 0F E010;  
#06A0 0 41 10 10 10 10 0F E010;  
#0AA0 0 42 10 10 10 10 0F E010;  
#0EA0 0 43 10 10 10 10 0F E010$
```

Figure 115. ICAPARM.PRM Suggested Values. All values are in HEX. Note that the last entry is terminated with the character "\$."

7. If you are using multiport adapters, perform this step. Otherwise go on to the next step.

Copy the following files onto the server diskette from the RTIC DOS Support diskette.

```
ICAINTH.COM  
ICAINTH.MSG  
ICALOAD.COM  
ICALOAD.MSG
```

If you are using Multiport/2 then you must also copy ICAINTH.SYS to the working DOS diskette or the fixed disk and include the following statement in the CONFIG.SYS file.

```
device=ICAINTH.SYS
```

Copy ICAAIM.COM from the RTIC diagnostics diskette to the server diskette.

8. Edit RTLOAD.BAT on the server diskette. You should remove all lines which do not apply to your configuration.

```
netreset lana0  
netreset lanal  
icainth  
rtreset 0  
icaload 0 icaaim.com 0  
icaload 0 lcsrticm.exe 1  
rtreset 1  
icaload 1 icaaim.com 0  
icaload 1 lcsrticm.exe 1  
rtreset 2  
icaload 2 icaaim.com 0  
icaload 2 lcsrticm.exe 1  
rtreset 3  
icaload 3 icaaim.com 0  
icaload 3 lcsrticm.exe 1
```

Figure 116. RTLOAD.BAT

Use the NETRESET command only if you installed the PC Network Protocol Driver. See the README.LCS file for information about this parameter. "lana0" refers to the primary adapter and "lana1" refers to the alternate adapter.

Delete the rest of the file if you have no RTICM cards installed.

If RTICM cards are installed, you must include the line "icainth".

The next lines are four sets of repeated commands. Retain a set of commands for each adapter that you have installed starting with the "0" group.

9. The configuration file that you have built should be copied to the working diskette using any name. "LCS.CFG" is an example. Refer to "Configuration Parameters" for additional information on this subject.
10. Now copy the server program working diskette to the root directory if you intend to use a fixed disk.
11. Restart the system and type "RTLOAD" from the relevant drive. This batch file should only be run once per IPL. You should then see some messages indicating the success of the load. If this occurs too fast then redirect the screen output to a printer.
12. To initialize the server type "LCS" or "LCS filename". If you do not specify "filename" then "LCS.CFG" will be assumed.
13. To shut down the server use Ctrl-Break. To restart again type "LCS" or "LCS filename".
14. If you want to automatically start the server, include the following in your AUTOEXEC.BAT file.

```
RTLOAD
```

```
LCS    or LCS filename
```

Then restart your system.

34.3.2 Configuration Parameters

Before attempting to define any configurations, make a sketch of the configuration you require.

Initially you should configure one simple connection. Then, on understanding how the product works, you can proceed to more complex configurations.

Create a file (for example, "LCS.CFG", but any name can be used) in which to place your configuration statements.

The connection server configuration file contains all the definition details and statements to assign the communications ports and NETBIOS sessions to carry out the different possible connection functions.

The diagram in Figure 117 on page 280 will serve to illustrate how LANACS works and the components that need customizing.

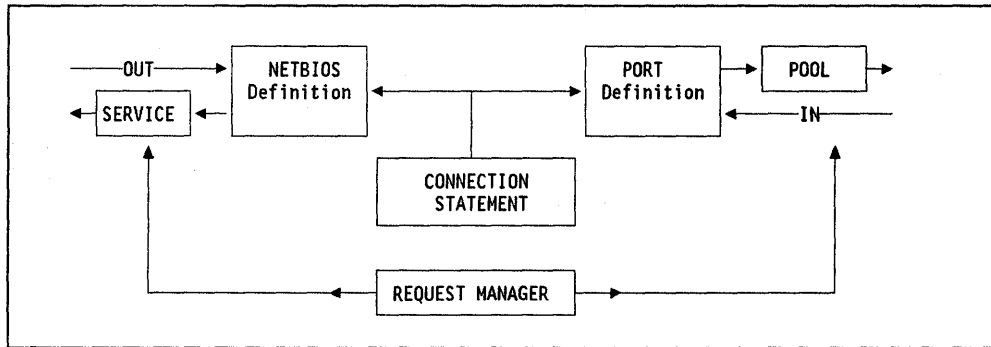


Figure 117. LANACS Operation

Five different statements are associated with the five facilities defined in the configuration file.

- Statements for server status.
- Statement for the server console.
- Statements for LAN sessions.
- Statements for communications adapter ports.
- Statement for the request manager.

The TYPE=STATUS statement allows the user to define a status display for a remote or LAN-attached PC. This allows users in remote sites to see the same details as on the console display.

A TYPE=CONSOLE statement allows the user to configure the Connection Server screen to display connection details.

The server has two sets of resources: a LAN adapter (including NETBIOS resources, etc) and External Communications Ports. The LAN resource is defined in a NETBIOS definition (TYPE=NETBIOS) and the external communications are defined in PORT definitions (TYPE=RTICM or COM).

To establish communications, the NETBIOS resource is connected to an appropriate PORT with a CONNECT statement.

If a LAN device wishes to connect to an external resource for which there are multiple lines set up, then his request for connection to a PORT is selected from a POOL of PORT resources (this function is only available when using the ACSI protocol).

Alternatively, an external device making an inbound connection can select one of several services that the LAN may provide.

The selection of NETBIOS SERVICE or PORT is done by a request manager (TYPE=REQM).

The TRACE statement allows the user to capture details of NETBIOS sessions, communication ports and internal connection server details in a file to assist in problem determination.

The configuration file defining the server operation consists of these parameters and statements. The general structure of a configuration file is shown in Figure 118 on page 281.

To establish a communications link, we connect two resources, with orientations "originate" and "answer". The orientation defines how a resource can be used. For example, an outgoing connection requires a NETBIOS orientation of "answer" as the NETBIOS name will answer a request from a LAN device for a LANACS service. An incoming connection has the NETBIOS name make a call out across the LAN; thus it is the "originator" of the LAN session. The PORT and NETBIOS definitions must have opposite orientations.

```

** General Server Definitions **
disp      TYPE=STATUS
          Parameters and Variables
con       TYPE=CONSOLE
          Parameters and Variables
CONNECT  disp TO con

** Outgoing Definitions **
name1    TYPE=NETBIOS  ORIENTATION=ANSWER
          Parameters and Variables
name2    TYPE=RTICM    ORIENTATION=ORIGINATE    *** This is a PORT
          Parameters and Variables                                                    *** definition
CONNECT  name1 TO name2

** Incoming Definitions **
name3    TYPE=NETBIOS  ORIENTATION=ORIGINATE
          Parameters and Variables
name4    TYPE=COM1     ORIENTATION=ANSWER       *** This is a PORT
          Parameters and Variables                                                    *** definition
CONNECT  name3 TO name4

** Request Manager **
name5    TYPE=REQM
          POOL=name6    DEVICES=list_of_POOL_names
          Parameters and Variables
          SERVICE=name7 SERVICE_NETNAME=name8  TARGET=name9
          Parameters and Variables

** Trace, and other Statements**
TRACE.....

```

Figure 118. LANACS Configuration File Structure

34.3.2.1 LAN Session Statements

The LAN session statements define which adapter ports are associated with which LAN sessions.

Parameter	Definition
Session Name	This begins each statement in the first column.
TYPE	For a LAN session statement this is always NETBIOS and must be on the same line as the session name.
ORIENTATION	Either "ANSWER" or "ORIGINATE". If the LAN session is waiting for a connection from a network device then the orientation is ANSWER. If the LAN session issues a call to a LAN device then the orientation is ORIGINATE. This must also be on the same line as the session name.
NETNAME	This is optional. It is required if you have an outgoing EBI connection.
PROTOCOL	Required only for LAN sessions connected to outgoing ports.
NAMETYPE	Can be UNIQUE or GROUP. If GROUP is specified then the NETNAME can be found on multiple Connection Servers on the network. By using the UNIQUE parameter the connection server is informed that the NETBIOS name will not be found on another connection server.
SERVICE	This is optional. It specifies a pre-defined connection to be made each time the service is requested and equals the service name in the Request Manager Service statement. It is only used when calling in to the server from an off-LAN location.

34.3.2.2 PORT Definitions

It is important to make sure that these entries are correct and match the details required by attached devices.

Parameter	Definition
PORT Name	This begins each PORT definition in the first column.
TYPE	Either RTICM or COM. COM indicates that the port used is an internal communications port which will be defined via its DOS address in the ADAPTER parameter. RTICM indicates that the Realtime Interface Co-processor Multiport Adapter Card is being used - the card and the port are defined in the ADAPTER and PORT definitions respectively.
ORIENTATION	Either ANSWER or ORIGINATE. "ORIGINATE" is for outbound calls. "ANSWER" is for incoming calls. This should be the opposite of the NETBIOS orientation.
ADAPTER	Either num or COMx. "num" indicates the RTICM card used; up to four adapters are supported, 0-3. COM indicates the DOS adapter address COM1 or COM2.

PORT	From 0 to 7. Only required with RTICM cards.
SPEED	Range 300 - 19200 or AUTOBAUD ³⁶
PARITY	EVEN/MARK/ODD/SPACE/NONE. "NONE" is the default. This is required for incoming calls and must match the parity with the connected device.
DATA_BITS	7 or 8. This is required for inbound calls and must match the data_bits of the attached device.

For OUTBOUND ACSI ports, the line parameters (speed, parity, data, stop-bits) specified in the request manager may override these in the port definition. OUTBOUND EBI port line parameters are taken only from the port definition.

INBOUND line parameters are only specified in the Port Definition.

34.3.2.3 CONNECT Statements

Connect statements are in the form:

CONNECT x TO y

and are used to connect previously defined facilities.

Using the CONNECT statement, we can connect

- NETBIOS session to PORT session
- PORT session to NETBIOS session
- STATUS to CONSOLE (server terminal)
- STATUS to PORT (dial out to remote device)
- STATUS to SESSION (connect to LAN PC)
- PORT to STATUS (remote calls in)

A CONNECT statement is required for each connection to be made in the server.

The order of facilities usually indicates the order in which you start up the connection.

34.3.2.4 Request Manager

The Request Manager allows the server to:

- Match incoming service requests to LAN or off-LAN services using the EBI or ACSI protocol.
- Match outgoing ACSI protocol connection requests from LAN workstations to ports capable of providing the connection.

There are two sets of parameters, one for inbound calls, the other for outbound calls. Outbound uses POOL, DEVICES, NETNAME, NAMETYPE and TARGET etc., and the inbound uses SERVICE, SERVICE_NETNAME, PROTOCOL, PASSWORD and TARGET.

³⁶ AUTOBAUD is recommended for inbound terminal connection.

Parameter	Definition
Name	The Request Manager name starts the statement in the first column.
TYPE	This must be REQMGR.
POOL	Specify a POOL name.
DEVICES	This comes after POOL (if specified) and consists of a list of PORT names.
NETNAME	A NETBIOS name which identifies this POOL to LAN devices.
NAMETYPE	UNIQUE or GROUP, comes after NETNAME. If GROUP is specified then the NETNAME can be found on multiple Connection Servers on the network. By using the UNIQUE parameter the connection server is informed that the NETBIOS name will not be found on another connection server.
TARGET	The name of the TARGET definition. A target must be specified if using the ACSI protocol. If specifying a TARGET, you will also specify the following: <ul style="list-style-type: none"> • PHONE = phone number • SPEED = 300 - 19200 bps • PARITY = Even/Mark/Odd/Space/None • Data_Bits = 7 or 8 • Stop_Bits = 1 or 2
SERVICE	Specify a SERVICE name.
SERVICE_NETNAME	A NETBIOS name assigned to this service.
PROTOCOL	ACSI or EBI
PASSWORD	This is optional.

34.4 Where To Go For More Information

- *LANACS Installation and Configuration Guide* which comes with the program.
- *GG22-9425 LANACS Configuration Samples, Tips and Techniques*
- *G320-9323 IBM PC Seminar Proceedings for the ACSI Protocol Vol 3 Nr.4.*

Chapter 35. Remote NETBIOS Access Facility Version 2

35.1 Overview

The Remote NETBIOS Access Facility Program enables applications installed in a personal computer to access a local area network with the appropriate software without being directly connected to the LAN. Using the Remote NETBIOS Access Facility Program, a user can access files and devices on either a Token-Ring Network or a PC Network using applications written to the NETBIOS interface such as PC LAN Program, Crosstalk XVI (TM) LAN Version, PFS Access (TM) LAN Version or user-written applications.

The primary objective of the Remote NETBIOS Access Facility Program is to allow access to data and applications within the user's company.

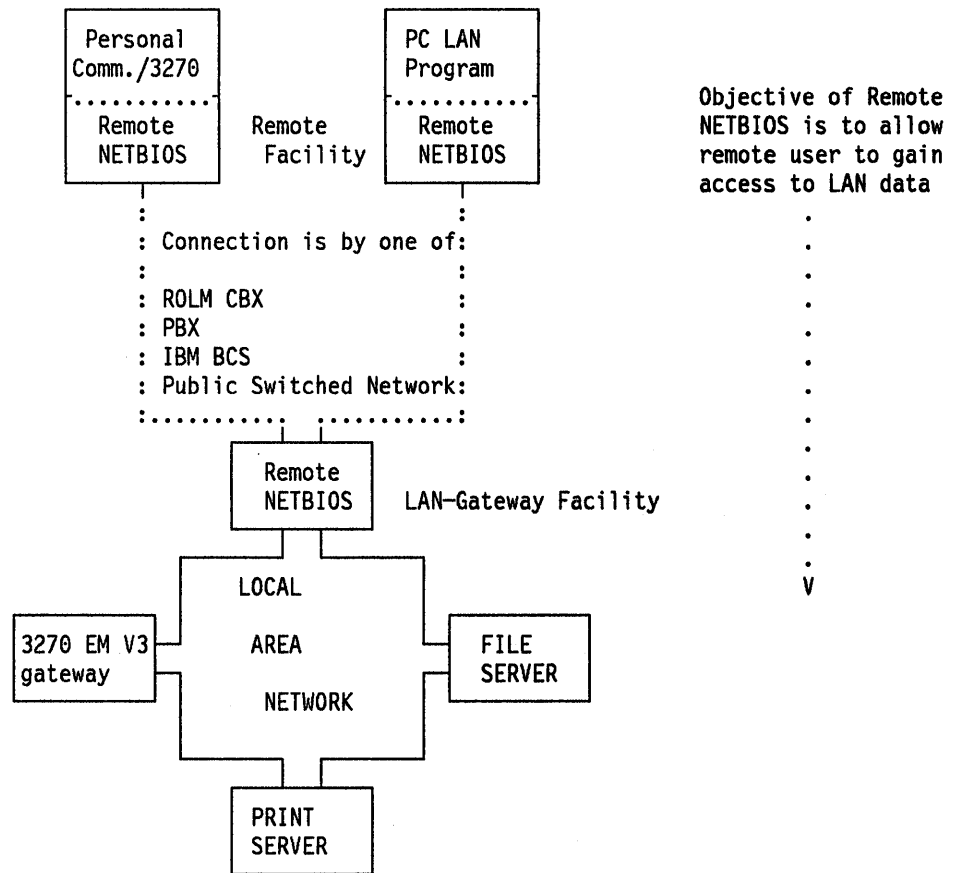


Figure 119. The Remote NETBIOS Access Facility

There are two configurations for the Remote NETBIOS Access Facility Program:

1. The Remote facility - installed in a PC that is not physically connected to the LAN
2. The LAN-gateway facility - installed in a PC that is connected to the LAN and through which the remote facility accesses the LAN.

Both the Remote and LAN-gateway facilities operate in the background of the PCs, allowing other programs to run in the foreground.

To use the facility, the remote facility dials the LAN-gateway facility. The gateway can then optionally dial-back the remote facility for security. Once connected, the remote facility and the LAN-gateway facility emulate a NETBIOS interface between the remote PC and the LAN.

The LAN-gateway Facility is installed in a PC that is attached to a LAN through a LAN adapter. Although only two Remote Facilities can connect to it concurrently, the LAN-gateway facility can be configured to recognize up to 255 different Remote Facilities.

The remote facility can select up to ten LAN-gateway facilities. Transmission speeds up to 2400 bps can be used over a modem connection. If you are using the ROLM CBX DataCom interface then 19200 bps is possible.

The asynchronous lines used by the LAN-gateway facility can be shared with the Asynchronous Communications Server Program.

35.2 Planning Checklist

35.2.1 Prerequisites - Hardware

- Asynchronous communications hardware³⁷ :
 - PC and PC-XT Asynchronous Communications Adapter
 - PC-AT Serial/Parallel Adapter
 - PC Convertible Serial/Parallel Adapter (remote only)
 - Dual-Port Asynchronous Communications Adapter (PS/2)
 - Built-in Asynchronous Communications Port (PS/2)
 - Multi-Protocol Adapter (PS/2)
- PC or PS/2; including (for remote) PC Portable or PC Convertible
- Analog access of a switched line:
 - Internal modems on COM1 or COM2:
 - IBM 1200 bps internal modem
 - IBM 2400 bps internal modem
 - HAYES 1200-B Smartmodem or compatible
 - IBM Convertible PC Internal 1200 bps modem (remote only)
 - External modems on COM1 or COM2:
 - IBM 5841 BAUD modem

³⁷ The RTIC card is not supported.

- IBM 5842 BAUD modem
- Other V.25 bis or Attention Set compatible 1200 or 2400 bps modem
- Connection established through one of:
 - Public Switched Network (PSN)
 - ROLM CBX
 - Other CBX
- Digital Access of a Switched Line:
 - ROLM Data Terminal Interface (DTI)
 - IBM/ROLM PC Interface Card (IPCI)
 - ROLMPHONE Program Interface (RPI)
 - ROLM JUNIPER II Data Communications Module (DCM).

35.2.1.1 Remote Facility

- Memory required for initialization is 155K (mono) 169K (color)
- 100 Kb to execute the facility plus sufficient memory for application, for example, PC LAN Program V 1.2 or V 1.3 Redirector configuration.
- Diskette drive and display.

35.2.1.2 LAN-Gateway Facility

- Memory required for initialization is 158 Kb (mono) 172 Kb (color)
- 100 Kb to execute the facility
- Diskette drive and display
- LAN adapter: Token-Ring adapter or PC Network adapter.

35.2.2 Prerequisites - Software

- DOS 3.3 or later
- NETBIOS on the LAN-gateway facility.

35.2.3 Coexistence and Compatibility

The remote facility will work with the redirector function of the PC LAN Program Version 1.2 or Version 1.3.

It is also compatible with the Asynchronous Communications Server program.

35.2.4 Configuration Parameters

The facility provides predefined configuration files. It is only necessary to change data that is not appropriate for your system.

The *IBM Remote NETBIOS Access Facility Ver 2.1 Installation and Configuration Guide* contains detailed configuration information checklists which should be used to assist you in assessing the environment your station is in and relating this to the configuration files. You should photocopy the checklists from the planning manual and use them wherever required.

There are three elements to configure:

- Remote facility
- Gateway facility
- LAN-gateway security file.

There are several groups of information to be collected necessary for configuration of the facility:

- System definition data
- System communication data
- System timing parameters
- LAN-gateway access table (for remote facility)
- LAN definition data (for LAN-gateway).

If you are using a ROLM CBX or an IBM BCS (Business Communication System), you may need information about these products before you start to customize the workstations.

35.3 Installation Steps

Before you start to install or customize the facility, you should print the README.MSG which are on the program diskette. The README.MSG file contains supplemental information for the *IBM Remote NETBIOS Access Facility Program Version 2.1 Installation and Configuration Guide*.

The installation procedure is split into two parts; one for the remote facility and the other for the gateway facility.

Before you start, make a backup copy of the program diskettes and use these for installation of the code.

There are three stages to complete before the facility is operational:

1. Install the code
2. Customize and configure
3. Initialize.

This guide will cover the installation and customization. For instructions on initialization, see the *IBM Remote NETBIOS Access Facility Ver 2.1 Installation and Configuration Guide*.

35.3.1 Remote Facility Installation

1. Insert the program diskette 1 into the A: drive and type

```
REMINSTL d1:<path1> <d2>:<path2> <name>
```

where parameters enclosed in brackets are optional and

d1: The target drive to which the remote facility files are to be copied.

<path1> Specifies an optional directory on the target drive for the remote facility files.

d2: Specifies an optional target drive for the remote facility configuration file.

<path2> Specifies an optional directory on the target drive for the remote facility configuration files.

<name> An optional name for the remote facility configuration file. If the file is not renamed, the default is REMOTE.CFG.

2. After the installation is complete, a message will be displayed confirming installation.
3. The next stage is to configure and customize the remote facility. This is a menu-driven process. The menus provide you with options and valid choices based upon your previous menu selections.

Before customizing the files, you should have completed the checklists 1 through 4 in Appendix C of the *IBM Remote NETBIOS Access Facility Ver 2.1 Installation and Configuration Guide*. You will need this information before configuring.

4. Type

CONFIG

After the IBM logo screen, you will see the main menu selection.

- a. Select **option 1** to configure the remote facility.
- b. If you want to change the default filename used for the configuration file select "Y", otherwise select "N" and enter at the following screen the name of an existing configuration file.
- c. The next five options reflect the worksheet questions. Start with **option 1 and 2** of the 'System Definition Data' panel. Verify or change any options on the next screen as required.
- d. By selecting an option on the next screen, the allowable values for that parameter are displayed from which you choose the required values.
- e. Now return to the previous menu and select **option 3**, "System Communication Data", then select each of the options on the next screen and fill in the parameters on the panel following the option.
- f. Now return to the previous menu and select **option 4**, "System Timing Data".
- g. The system timing values displayed on the next screen are used to tailor certain timing parameters related to the autodial and auto-answer operation. All values are in seconds unless otherwise stated. (Refer to *IBM Remote NETBIOS Access Facility Program Version 2.1 Installation and Configuration Guide* page 2-4 for information about each of the parameters)
- h. Now return to the previous menu and select **option 5**, "LAN-gateway access table".
- i. On the following screen you can add, change or delete the name(s) of the LAN-gateway(s) for which the remote facility will have access.
- j. After the gateway name selection you can enter your remote facility user identification and password. (The password is optional but has to be entered if the gateway is configured with a user ID including a password.)
- k. Option 3 can be used for changing the LAN-gateway table entry to include the telephone number of the LAN-gateway; or, if you will be using a ROLM interface, the ROLM CBX datagroup or dataline number.
 - If you are using a PC Convertible with internal modem, the maximum length of the telephone number field is 32 characters.

- If you are using a ROLM CBX, you will also be asked for a CBX dataname and an optional dataline account code (these screens are not shown).
 - As an additional security feature, you can configure the LAN-gateway access table so that selected information must be entered manually before the remote facility will dial the LAN.
- I. Finally, return from each menu, selecting to save any new files.
- m. You are now ready to initialize the remote facility. End the program to return to DOS and follow the instructions for initialization as indicated in the *IBM Remote NETBIOS Access Facility Program Version 2.1 Installation and Configuration Guide*.

35.3.2 LAN-Gateway Installation

1. Insert the program diskette 1 into the A: drive and type:

```
GATEINSTL d1:<path1> <d2>:<path2><name1> <d3>:<path3><name2>
```

where parameters enclosed in brackets are optional and

- d1:** The target drive to which the LAN-gateway files are to be copied.
- <path1>** Specifies an optional directory on the target drive for the LAN-gateway files.
- d2:** Specifies an optional target drive for the LAN-gateway configuration file.
- <path2>** Specifies an optional directory on the target drive for the LAN-gateway configuration files.
- <name1>** An optional name for the LAN-gateway configuration file. If the file is not renamed, the default is GATEWAY.CFG.
- <d3>** Specifies an optional target drive for the security file.
- <path3>** Specifies an optional directory on the target drive for the security file.
- <name2>** An optional name for the security file. If the file is not renamed, the default is GATEWAY.SEC.

2. After the installation is complete, a message will be displayed confirming installation.
3. The next stage is to configure and customize the LAN-gateway. This is a menu-driven process. The menus provide you with options and valid choices based upon your previous menu selections.

Before customizing the files, you should have completed the checklists 5 through 8 in Appendix C of the *IBM Remote NETBIOS Access Facility Ver 2.1 Installation and Configuration Guide*. You will need this information before configuring.

4. Type

CONFIG

After the IBM logo screen, you will see the main menu selection.

- a. To customize the LAN-gateway, select **option 2**.

- b. If you want to change the default filename used for the configuration file select "Y", otherwise select "N" and enter at the following screen the name of an existing configuration file.
- c. The next menu shows all the items you must work through to configure the LAN-gateway.
Select **option 1 and 2** first, "System Definition Data".
On completing each section, you will return to this menu. Notice that some of the options are duplicated, this is because each definition relates to a particular COM port.
- d. After completing the "System Definition Data" screen return to the previous menu and select **option 3**, "System Communication Data" for the first COM port. (This is a menu that must be completed for each COM port being used.)
- e. Now return to the previous menu and select option 4, to complete this menu again for for the next COM Port if another is being used.
- f. When the other port is configured, return again to the previous menu and select option 5.
- g. The system timing values are used to tailor certain timing parameters related to the autodial and auto-answer operation. All values are in seconds unless otherwise stated. (Refer to *IBM Remote NETBIOS Access Facility Program Version 2.1 Installation and Configuration Guide* for information about each of the parameters.)
- h. Return to the previous menu and select option 6, to set the System Timing Data for the other COM port if you have another one.
- i. When this is complete, return to the previous menu and select option 6, "LAN Definition Data".
- j. This menu requires the first two options to be given values as listed below, options 3 to 5 are for further customization of the LAN environment.
 - 1) LAN adapter: One of Token-Ring Network adapter, PC Network Baseband adapter or PC Network (Broadband) adapter.
 - 2) Adapter Address: This can be either "0" or "1" (primary and alternate respectively).
 - 3) Now select **option 3**, COM1 definitions.
These LAN parameters are NETBIOS parameters. For a complete discussion of what these parameters do and how they are related, see "LAN Support Program V1.1" on page 87.
 - 4) Previous menu must also be completed for the other COM port if another is being used.
To do this, return to the previous menu and select **option 4** "COM2 Definition Data".
 - 5) Once this is completed, return again to the previous menu and select **option 5**, "Application Definition Data".
- k. Application Definition Data - These parameters must be completed if you are running other applications that are using the LAN adapters in the same PC as the LAN-gateway facility.

The number of NCBs, LAN names and sessions to be defined will depend on the requirements of the applications you are using, the LAN adapter and support software you are using.

The internal network buffer size depends on the size of the buffers required by the application. The size of the NCB buffers used by the facility is defined as the size of the internal network buffer divided by the number of NCBs defined. This buffer size must exceed the size of the buffer used by the application by at least 250 bytes per NCB.

For the PC LAN Program, this is the RQB buffer for which the default is 8 Kb.

For example:

$$\begin{aligned} & 8 \text{ NCBs} \times 8 \text{ Kb (application buffer size)} \\ + & 8 \text{ NCBs} \times 250 \text{ bytes} \\ = & 66 \text{ Kb.} \end{aligned}$$

The combined number of NCBs, LAN names and sessions defined as well as the combined network buffer size cannot be any larger than the noted maximums which depends on the hardware available.

35.3.3 LAN Security File

To configure the security file, you should have completed the checklist 9 in Appendix C-13 of the *IBM Remote NETBIOS Access Facility Ver 2.1 Installation and Configuration Guide*.

The security file provides you with the facility to restrict access to the LAN, for example, by enforcing dial-back and the use of passwords.

1. From the main selection menu, choose **option 3**, "LAN Security File".
2. Choose whether or not to use the default file.
3. The default password for initial use is "PASSWORD."
4. You are now given the option to change the password if you wish, or to change the security file information.
5. We will choose **option 2** and change the security file information.
6. As you can see, in this instance the table already contains one entry. When you first look at this file it will be empty. Choose **option A** to add new entries. You will then have to specify the password/user IDs to be used and dial-back numbers.

35.4 Where To Go For More Information

- *IBM Remote NETBIOS Access Facility Ver 2.1 Installation and Configuration Guide*.

Chapter 36. APPC/PC

36.1 Overview

This section describes how to install and configure Advanced Program-to-Program Communication for the IBM Personal Computer (APPC/PC).

APPC/PC is a data communications system that enables IBM PCs and IBM PS/2 to communicate with APPC in other systems such as:

- IBM PC and PS/2 family
- Series/1
- System/36
- System/38
- AS/400
- System/370 Customer Information Control System (CICS)

This communication can take place over a Token-Ring Network if the participating nodes are connected to it. The communication can also take place over an SDLC link. The SDLC connection is not covered in this publication.

APPC/PC provides distributed transaction processing capability by enabling a program in an IBM PC to communicate with another program in another system without operator intervention.

APPC/PC provides SNA APPC node support (LU T6.2/PU T2.1) for peer-to-peer connections to other APPC nodes. If you are communicating with S/370 CICS via a Token-Ring gateway, the only gateway that supports PU T2.1 connection is a 37XX running NCP V4R3 (or later), or NCP V5R2 (or later).

The 3174 gateway and earlier releases of NCP only supports APPC/PC as PU T2.0 nodes, meaning that parallel sessions are not supported. You can achieve a function similar to parallel session by specifying multiple LUs on the PU T2.0 node.

APPC/PC runs as a resident extension of DOS.

This is an example of a configuration where two PCs running APPC/PC are connected with a Token-Ring Network:

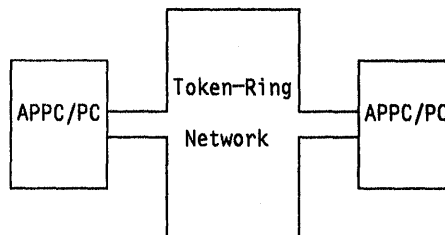


Figure 120. APPC/PC Connection over Token-Ring Network

This figure shows an IBM PC running APPC/PC connected to a S/370 running CICS:

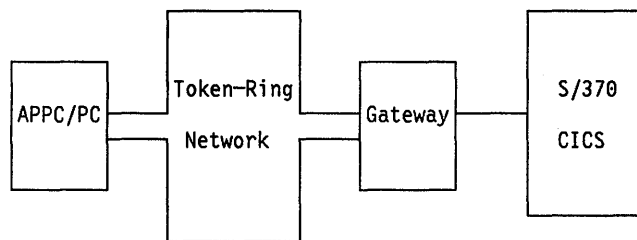


Figure 121. APPC Connection Between a PC and a S/370 Host

36.2 Planning Checklist

APPC/PC always uses SAP x'04', both for remote and local SAP.

36.3 Prerequisites - Hardware

- One of the following PCs:
PC, PC-XT, PC-AT, PS/2 Mod 30, 50, 60, 70, 80
- Required memory - at least 320 Kb
- Connection to Token-Ring
- PC LAN Support Program.

36.4 Prerequisites - Software

- PC DOS 3.3 and later releases.

36.5 Coexistence and Compatibility

In general, if you have more than one communication card in the PC, you must use different interrupt levels for each card. For more information on interrupt levels see "PC Token-Ring Network Adapter Installation" on page 9. The process to alter the interrupt levels is documented in that section, and for the PS/2 card is covered in "PS/2 Token-Ring Adapter/A Installation" on page 17.

APPC/PC supports the IBM Token-Ring Network PC Adapter and the SDLC Adapter concurrently, if they are both installed in the PC. Anyhow, the adapters and APPC/PC cannot be used as a "gateway" without user-coded support application programs.

If you are using both Token-Ring and SDLC adapters, the Token-Ring adapter interrupt level must be either 2 or 7, since the SDLC adapter always uses interrupt level 3.

36.6 Configuration Parameters

This guide will cover only customization parameters that deal with the Token-Ring communication. To understand how to configure APPC/PC in general, see the *Installation and Configuration Guide* which comes with the program.

36.6.1 Host Parameters

The parameters needed for the 37XX gateways and the 3174 gateways in order to support a PC running APPC/PC are covered in complete detail in the sections for these products in this publication.

The only parameter that relates to host definitions is the "node ID". This must match "IDNUM" in the VTAM Switched Major Node if you are using a 37XX gateway.

36.6.2 APPC/PC Parameters

When customizing APPC/PC you need to know if you are using the primary or the secondary Token-Ring Network Adapter. You must also know which Token-Ring Address you should use for the Token-Ring Adapter. You can choose between:

- Burned-in address
- locally administered address specified in CONFIG.SYS
- locally administered address specified in APPC/PC configuration.

36.7 Installation Steps

The installation process for APPC/PC is divided into three parts:

- Installation of the code
- Configuration
- Loading the APPC/PC code.

These steps are described below:

1. Installation of the code

If you have a diskette-based system: Copy the program diskette to a working diskette. Insert the working diskette in the default diskette drive.

If you have a hard disk-based system: Copy the files on the program diskette to a directory on your default hard disk.

2. Configuration

The configuration process is very simple. There are only three menus in the process, of which you have to use only two (the third one is for SDLC connection) This is a description step-by-step of the configuration process:

- a. From the directory where the program resides, type APPCONF and press Enter. The IBM logo will be displayed.

- b. Press Enter. You will get a message warning that you have no configuration file on the system. Since it is the first time you configure your system this is OK.
- c. Press Enter. The 'Configuration Tasks' menu will be displayed. It looks like this:

```

                                CONFIGURATION TASKS

Select the ID for one of these activities; press ENTER

ID ACTIVITY

1 Define/Update System Parameters
2 Define/Update IBM Token-Ring DLC Parameters
3 Define/Update SDLC DLC Parameters

Select ==>

                                F1=Help  F10=Quit

```

Figure 122. Configuration Tasks Menu

To define the Token-Ring you only have to use selection 1 and 2.

- d. Type in "1" and press Enter. The following screen will appear:

```

                                DEFINE/UPDATE SYSTEM PARAMETERS

Type in system parameters; press ENTER to save changes.

ITEM                                CHOICE          POSSIBLE CHOICES
Machine Type.....                  0000            0 - 9999
Machine Serial Number.....         0000000        7 alphanumeric
                                         uppercase char
Node ID.....                        00000          1 - 5 hex digits
Translation Table File Name.
DOS Control Break.....              1              1 = Yes  2 = No
Workspace Size.....                 021            18 - 400 Kbytes

                                F1=Help  F10=Quit  ENTER=Save

```

Figure 123. Define/Update System Parameters Menu

The only parameter relevant for the Token-Ring is "node ID". If you are defining a connection to host through a 37XX gateway ³⁸, this value must match the value of the IDNUM parameter in the VTAM Switched Major Node definition. The node ID is also required when communicating with a S/1, S/36, S/38 or AS/400.

For a detailed description of the other parameters in this menu, refer to the *Installation and Configuration Guide* that comes with the product. Fill in the appropriate values for your environment.

- e. Press Enter and then F10. You will be returned to the "CONFIGURATION TASKS" menu.

³⁸ Token-Ring Network stations in session to host applications through 37XX or 9370 gateways are supported as PUs over switched lines.

f. Type in "2" and press Enter. The following menu will be displayed:

```
DEFINE/UPDATE IBM TOKEN-RING DLC PARAMETERS

Type in IBM Token-Ring DLC parameters; press ENTER to save changes

ITEM                               CHOICE    POSSIBLE CHOICES
CHOICES
DLC Name..... ITRN
Load Option..... 1                1 = Yes  2 = No
% Incoming Calls..... 050        0 - 100
Congestion Tolerance..... 080      0 - 100
Receive Window Count..... 1         1 - 8
Send Window Count..... 2         1 = 8
Maximum Number of Link Stations.. 02     1 - 32
Local Node Address..... 000000000000 12 hex digits
Maximum RU Size..... 0256        256 - 1920
Adapter Number..... 0            0 = Primary
                                   1 = Secondary
Free Unused Link..... 1         1 = Link Take-down
                                   2 = No Link Take-down

F1=Help  F10=Quit  ENTER=Save
```

Figure 124. Token-Ring DLC Parameters Menu

Some important parameters are described here:

Load Option

Enter "1" to indicate that you want to use the Token-Ring Network Adapter for communication.

Local Node Address

This is the Token-Ring address of the adapter in this PC.

If you leave this field with all zeroes, the universal (burned-in) address on the adapter card will be used or the locally administered address specified in CONFIG.SYS.

If you specify an address in this field, it will override the universal (burned-in) address, but it will **not** override the locally administered address you specify to the LAN Support Program in the CONFIG.SYS file. You must be sure that the address specified here matches the address specified through the LAN Support Program. (For details refer to "LAN Support Program V1.1" on page 87.) The address you specify here consists of 12 hexadecimal digits, the format being 4000yxxxxxxx where y may be any digit from 0 to 7 and x may be any digit from 0 to 9.

Maximum RU Size

This is the maximum RU size that the station can receive. This value must be equal to or greater than the RUs transmitted to this station.

Adapter Number

If your Token-Ring adapter is set to primary, enter "0" here. If your Token-Ring adapter is set to secondary enter "1" here.

Free Unused Link

If you are using a 3174 as gateway to host, this parameter should be specified with "2" to avoid problems with the link take-down procedures. The rest of the parameters in this screen are not directly involved in the Token-Ring connection. For a description of these parameters refer to the *Installation and Configuration Guide* that comes with the product.

3. Loading the APPC/PC code

To load APPC/PC just type APPC from the directory where the program resides. The message "APPC/PC is now loaded" will be displayed, followed by the DOS prompt. At this point, you can load your application subsystem.

36.8 Verifying The Installation

If you have two PCs connected to the same Token-Ring Network, you can easily verify your installation by using the sample programs that are shipped with the product.

Follow these steps for verifying:

1. Install APPC/PC on the first PC according to the instructions above. The "Local Node Address" must be specified as '400000000001' in order to run the verification. Of course you can later on change this address to any valid locally administered address.

Load APPC/PC.

2. Install the second PC with "Local Node Address" specified as '400000000002'.

Load APPC/PC.

3. At the PC with address 400000000001, go to the directory containing the "Sample Programs" from the diskette shipped with the product, and type in "SEND_AS" and press Enter. At the other PC, type in (from the directory as described above) "RCV_AS".

These commands executes a small sample application subsystem that sends a message from the first PC to the second. A row of messages on the screens of the PC indicates that the adapter opens and that a session is started, and then this string of data will be sent from the sending to the receiving PC: "Data transmitted from SENDTP to RCVTP". The string will be displayed at both screens indicating that your installation works.

36.9 Where To Go for More Information

For more information about APPC in general and for APPC specific, refer to the following publications:

- *Advanced Program-to-Program Communication for the IBM Personal Computer, Installation and Configuration Guide*, Part number 84X0537
- GG24-3034 *An Introduction to Programming for APPC/PC*
- GG24-1584 *Introduction to Advanced Program-to-Program Communication*
- GG66-0287 *Experiences of Connecting APPC/PC and CICS/VS with the 3174 Token Ring Network Gateway Feature*.

Chapter 37. TCP/IP

37.1 Overview

TCP/IP is the acronym for *Transmission Control Protocol/Internet Protocol*. The TCP/IP protocol has been defined by the Defense Advanced Project Research Agency (DARPA) and is documented in the Requests for Comments (RFCs).

A collection of networks interconnected through TCP/IP is known as an *Internet*. Each of the networks uses a gateway, a bridge or a router to connect into an Internet. All nodes on all networks within an Internet communicate with each other as if all other nodes were in the same network.

Many vendors offer hardware and software products that support TCP/IP. Implementations differ in both the connectivity options supported and the applications functions that are available to the user. Customers must determine whether a particular TCP/IP implementation meets their requirements.

TCP/IP connectivity includes a routing capability for both local area networks (LANs) and wide area networks (WANs).

When TCP/IP is used on a token-ring network, all the normal token-ring network management functions are available (token-ring network management is independent of the higher-level protocol). This applies as well to environments using an SNA network as the transport mechanism for TCP/IP.

37.1.1 Architecture

TCP/IP is a peer-to-peer architecture. All systems, regardless of size, appear the same to all other systems in the network.

Systems using TCP/IP functions are logically paired in a *client/server* relationship. TCP/IP requests are issued from the client, or *local* host and forwarded through the Internet to the server, or *foreign* host. The server executes the function and returns the result to the client. For example, to transfer a file from a foreign TCP/IP host to the local system, the user would invoke the client function of the file transfer application at the local host. The request would be routed through the Internet to the foreign host where the server function would read the file from the disk and send it back through the Internet to the local host. The client function on the local host would then make the file available to the user.

37.1.2 Layered Protocols

Let's start with the *layering*. It can be used for situating (but *not* comparing functionally) the TCP/IP protocol suite against others, such as SNA and Open System Interconnection (OSI). Functional comparisons cannot easily be extracted from this, as there are basic differences, even in the concept of "layers" itself.

The Internet protocols can be modeled in four functional "layers", as seen in Figure 125.

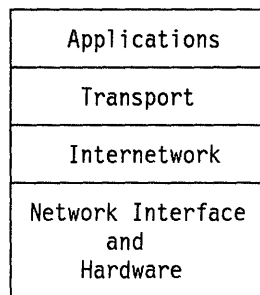


Figure 125. Architectural Model. Layers represent "packaging" of functionality.

Applications

is a user process cooperating with another process on the same or a different host. Examples are Telnet (protocol for remote terminal connections), FTP (File Transfer Protocol) and SMTP (Simple Mail Transfer Protocol).

Transport

provides the end-to-end data transfer. Example protocols are TCP (*connection-oriented*) and User Datagram Protocol (UDP).

Internetwork

provides the "virtual network" image of Internet (that is, this layer shields the higher levels from the typical network architecture below it). IP is the most important protocol here. It does *not* provide reliability, flow control or error recovery and also does not assume reliability from the lower layers. It is a *connectionless* protocol.

Network Interface

is the interface to the actual network hardware. This interface may or may not provide reliable delivery, and may be packet- or stream-oriented. In fact, TCP/IP does not specify any protocol here, but can use almost any network interface available, which illustrates the flexibility of the IP layer. Examples are IEEE 802.2 (for local area networks such as the IBM Token-Ring Network or the collision-detect IEEE 802.3 networks), X.25 (which is reliable in itself), Packet Radio Networks (such as the AlohaNet) and even SNA.

37.1.3 TCP/IP Program Summary

Table 1 shows a complete overview of all TCP/IP implementations offered by IBM.

Hardware	Program/Part Number	Description
System/370	5685-061	TCP/IP for MVS
System/370	5798-FAL	TCP/IP for VM
PC, PS/2 computers (DOS)	75X3259, 75X3271	TCP for the PS/2 Computer
System/370	5713-AFL	AIX/370
RT ³⁹ System	5601-061	AIX RT
PS/2 (AIX ³⁹ PS/2 Operating System)	3713-AEW	TCP/IP for the AIX PS/2 Operating System
AS/400	5728-TC1	TCP/IP for AS/400 (OS/400 Release 2 or later)
SYSTEM/88	5732-039, 5732-047, 5732-048, 5732-053	TCP/IP for SYSTEM/88 (IEEE 802.3/Ethernet Support)

Table 1. TCP/IP Implementations Summary

37.1.4 TCP/IP Connections Summary

Table 2 shows the different physical connections possible with TCP/IP, mapped against the hardware devices needed to accomplish the connection.

Network	9370 integrated adapter	8232 LAN channel station	37xx controller	NSC A220 HYPER channel	AIX PC/RT adapter	AS/400 integrated adapter	PC/DOS adapter
IBM Token Ring	X	X			X	X	X
Broadband PC Network		X					X
Baseband PC Network							X
Ethernet	X	X			X	X ⁴¹	X
X.25 network	X		X		X ⁴⁰		
SNA network	X		X				
NSC HYPERchannel ⁴²				X			
Asynchronous lines					X		

Table 2. TCP/IP Connections Summary. Physical networks versus hardware devices.

³⁹ AIX and RT are trademarks of the International Business Machines Corporation

⁴⁰ TCP/IP over X.25 on the PC/RT requires a customer-supplied X.25 adapter.

37.1.5 TCP/IP Application Summary

Table 3 shows which TCP/IP application is implemented under which operating system.

Function	VM		MVS		RT AIX		PC DOS		OS/400		PS/2 AIX	
	client	server	client	server	client	server	client	server	client	server	client	server
Telnet	X	X	X	X	X	X	X					
Tn3270	X	X	X	X	X		X					
FTP	X	X	X	X	X	X	X					
TFTP	X				X	X	X	X				
SMTP ⁴³	X	X	X	X	X	X	X					
rexec		X			X	X	X					
Name Server ⁴⁴	X	X	X	X	X	X	X					
X-Windows ⁴⁵	X		X		X	X		X ⁴⁶				
RPC	X	X	X	X	X	X						
NFS		X		X	X	X						
ping	X	X	X	X	X	X	X	X				
netstat	X		X		X							
lpr ⁴⁷					X	X	X					
Finger					X	X	X					
Time/Daytime					X	X	X					

Table 3. TCP/IP Applications Summary. TCP/IP functions versus Operating System.

⁴¹ Ethernet Version 2 or IEEE 802.3 LAN connection requires IBM 8209 LAN Bridge.

⁴² HYPERchannel adapter A220 is a product from Network Systems Corporation.

⁴³ Client function of SMTP means that a user interface to the SMTP mailing system exists.

⁴⁴ Client function of name server is the resolver. It is normally included in all other TCP/IP applications. The user is not aware of its existence.

⁴⁵ Attention: the notions client and server are inverted here! The client is an application sending messages to the X-Server terminal.

⁴⁶ X-Window for PC/DOS is sold as a separate product, and is compatible only with AIX X-Window clients.

⁴⁷ Remote Print Server: is not even a standard TCP/IP application, but is an application running on top of TCP/IP in the AIX environment.

37.2 TCP for the PS/2

37.2.1 Introduction

*TCP for the PS/2*⁴⁸ computer is the name for the product that will run on the PC as well as on the PS/2 computer under DOS.

The TCP/IP for PC and TCP/IP for PS/2 supports two configurations:

1. PC or PS/2 as TCP/IP user station: supports most of the TCP/IP application protocols as client.
2. PC AT or PS/2 Model 30 as IP router. The PC/PS is then dedicated to this task (that is, the PC/PS is not available to run normal PC/DOS applications).

The Internet Router supports the following protocols:

- IP for normal data routing
- ICMP
- GGP (Gateway-to-Gateway protocol, which allows gateways to exchange routing information).
- HMP (Host Monitoring Protocol, which allows gateway monitoring (statistics reports and routing updates) from a foreign workstation on the network that has the HMP client application (such as TCP/IP for PC)).
- TFTP (Trivial File Transfer Protocol, which allows remote access to the router's disk, for instance, for updating routing data).

37.3 Planning Checklist

37.3.1 Prerequisites - Hardware

- The network adapters supported on the **IBM PC, PC XT and PC AT** are:
 1. Ethernet⁴⁹ Network:
 - Ungermann-Bass Personal Computer Network Interface Controller, P/N 2274A (PC-NIC card)⁵¹
 - 3COM EtherLink⁵⁰ adapter
 2. IBM Token-Ring Network:
 - IBM Token-Ring Network Adapter (types I and II).
 - IBM Token-Ring Network Adapter/A
 - IBM Token-Ring Network 16/4 Adapter/A
 3. PC Network
 - IBM PC Network Adapter II.
 - IBM PC Network Baseband Adapter.
- The network hardware supported on the **IBM PS/2 Model 30** is:

⁴⁸ PS/2 is a registered trademark of the International Business Machines Corporation

⁴⁹ Ethernet is a registered trademark of the XEROX Corporation

⁵⁰ EtherLink is a registered trademark of the 3COM Corporation

1. IBM Token-Ring Network:
 - IBM Token-Ring Network Adapter.
 2. PC Network:
 - IBM PC Network Adapter II.
 - IBM PC Network Baseband Adapter.
- Supported network adapters for the **IBM PS/2 Models 50, 55, 60, 70 and 80:**
 1. Ethernet Network:
 - Ungermann-Bass Personal Computer Network Interface Controller, P/N 23060-01 (NICps/2 card)⁵¹.
 2. IBM Token-Ring Network:
 - IBM Token-Ring Network Adapter/A.
 3. PC Network
 - IBM PC Network Adapter II/A.
 - IBM PC Network Baseband Adapter/A.

37.3.2 Prerequisites - Software

To run the TCP/IP program, your system must have each of the following:

- For the IBM PC, PC XT, or Personal Computer AT system:
 - 256 Kb or more of memory
 - One 5-1/4-inch diskette drive
 - Monochrome, color/graphics, or enhanced color monitor with the appropriate display adapter
 - One of the following:
 - DOS Version 3.0 or above to run the software on an Ethernet protocol network
 - DOS Version 3.30 or higher and the IBM Local Area Network Support Program to use the package on an IBM Token-Ring Network or an IBM PC Network.
- For the IBM Personal System/2 Model 30, 50, 55, 60, 70 and 80:
 - Token-Ring and PC Network
 - One 3-1/2-inch diskette drive
 - PS/2 computer display with appropriate adapter
 - DOS Version 3.30 or higher
 - The IBM Local Area Network Support Program
 - Ethernet Network Protocol
 - One 3-1/2-inch diskette drive
 - PS/2 computer with appropriate adapter
 - DOS Version 3.30 or higher

⁵¹ NIC and NICps/2 are trademarks of Ungermann-Bass

37.3.3 Coexistence and Compatibility

TCP for the PS/2 computer works in conjunction with several adapters. Several parameters need to be software configured, depending on the type of adapter you have in your system.

You may need to choose the interrupt level, a Direct Memory Address channel that the interface uses, or the base I/O address.

It is important that the chosen interrupt level and DMA channel are not being used by any other hardware adapters in your PS/2 computer.

PC LAN Program can be run at the same time as the TCP program is active.

37.3.4 Installation

The program included with the distribution diskettes provides a simple menu-driven procedure to perform the steps required by the administrator.

The distribution diskettes contain .EXE modules for all the programs included in the TCP for the PS/2 computer. Some of the programs are duplicated because different adapters require different software drivers. Four types of drivers are supplied:

- For the IBM Token-Ring Network and PC Network adapter
- For the Ungermann-Bass PC-NIC adapter
- For the Ungermann-Bass NICps/2 adapter
- For the 3COM EtherLink adapter.

The installation program provides the option for an end user to receive the programs for one of the drivers. After registering with the administrator, the end user may add programs for other drivers, replace the current set of programs with those for a different driver, or replace lost or damaged diskettes.

Installing the administrator's software is a step-by-step procedure:

- Installing TCP for the PS/2 computer onto the administrator's PS/2 computer.
- Registering users
- Preparing user diskettes
- Verifying that a user is registered
- Re-issuing diskettes to an already registered user
- Printing a list of registered users

These steps are completely described in the *Command Reference and Installation Manual* which comes with the product.

37.3.5 Customization

Customize TCP for the PS/2 computer to your environment. To do this, a few facts about the environment must be collected for input to the customizer. A network configuration sheet provides most of the information required to customize your software.

- Obtain the "Internet" address for this system unit.

- If you plan to communicate with hosts not directly attached to the same physical network, you must know the Internet address of a gateway that is attached to the network.
- If other hosts on your network do not use the standard Internet-to-Ethernet network protocol address translation protocol (ARP), you must obtain a list of hardware-to-Internet address translations for the other hosts.
- Decide which DMA channel and interrupt vector is used by your network interface.
- If you want access to time, name and print services, you must obtain a list of name and time servers, and one print server.

If you have access to a name server, the names are all you need. Use either the Host or Netname command to discover the internet address of the name server.

Using the Custom command, prepare the NETDEV.SYS file on diskette or fixed disk with the data from the network configuration sheet. NETDEV.SYS contains a device driver which, when installed, provides the configuration information necessary for TCP for the PS/2 computer commands. Refer to the *IBM DOS Reference Manual* for further information on the DEVICE statement and the file CONFIG.SYS.

37.4 Basic Troubleshooting

TCP for the PS/2 will generate error messages in case of trouble. These messages are fully explained in the Command Reference and Installation Manual, which comes with the product.

37.5 Where To Go For More Information

37.5.1 Publications about TCP/IP

Introducing IBM's TCP/IP Products, GC09-1307

TCP/IP for MVS, Installation and Maintenance, SC09-1256

TCP/IP for MVS, Programmer's Reference Manual, SC09-1261

TCP/IP for MVS, User's Guide, SC09-1255

TCP/IP for VM, Installation and Maintenance, SC09-1203

TCP/IP for VM, Command Reference Manual, SC09-1204

TCP/IP Tutorial and Technical Overview, GG24-3376

TCP/IP for MVS, Installation and Connections, GG24-3412

IBM TCP for the PS/2, Command Reference and Installation, SC09-1270.

37.5.2 Publications About Other Network Products

VTAM Installation and Resource Definition, SC23-0111

NCP, SSP Installation and Definition Guide (NCP V4R2) SC30-3253

NCP, SSP and EP Resource Definition Guide (NCP V4R3), SC30-3349

NCP, SSP and EP Resource Definition Guide (NCP V5R2), SC30-3447

NPSI Installation and Operation (NPSI V1R4.3), SC30-3201

NPSI Planning and Installation (NPSI V3R2), SC30-3470

NPSI Planning and Installation (NPSI V2R1), SC30-3501

X.25 XI/X.25 NSF Planning and Installation, GH19-6577.

37.5.3 Publications about 9370 and X.25

Using the X.25 Communication Subsystem, SA09-1742

X.25 Communication Subsystem Description, SA09-1743.

37.5.4 Publications about the 8232

IBM LAN Channel Support Program User's Guide, SC30-3458

IBM 8232 LAN Channel Station Operator's Guide, GA27-3785.

37.5.5 Publications about the 8209

8209 LAN Bridge Customer Information, SA21-9994

8209 LAN Bridge AS/400 TCP/IP, ZV11-6396.

Chapter 38. System/36 Communicating With The PC and PS/2

38.1 Overview

This section covers how the PC and PS/2 on the Token-Ring Network will communicate with the System/36. It describes the products used and the way in which data is transferred between the two systems, with the PC being used both as an intelligent workstation and emulating a 5250. The product that provides all the facilities to accomplish this is the PC Support/36 Program.

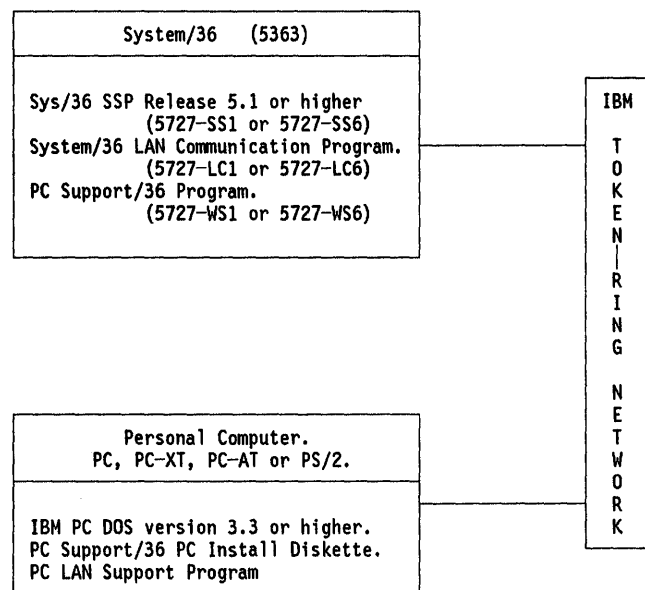


Figure 126. System/36 Communicating with PCs and PS/2s via the IBM Token-Ring Network

38.2 Planning Checklist

The physical attachment of the System/36, PCs and PS/2s were described in the sections on "Attaching The System/36 To A Token-Ring Network" on page 31, "PC Token-Ring Network Adapter Installation" on page 9, and "PS/2 Token-Ring Adapter/A Installation" on page 17.

To install this product, you will need:

1. DOS 3.3 diskettes (5.25" for PC and 3.5" for PS/2)
2. PC support/36 PC INSTALL diskette (5.25" for PC and 3.5" for PS/2)

38.3 Installation Steps

The following steps tell you how to install PC Support/36 on the PC and PS/2. These steps assume that your machine has a fixed disk.

1. Boot-up the PC in DOS.
2. Change the default drive to A > :
3. Insert the PC Support/36 PC INSTALL diskette into drive A:
4. Type one of the following commands and press Enter:
 - INSTALL F (If installing on PCs with fixed disk)
 - INSTALL D1 (If installing on PCs with only one diskette drive)
 - INSTALL D2 (If installing on PCs with two diskette drives)
5. Assuming that we are installing on a PC with a fixed disk drive, type "INSTALL F."
6. As a result of the previous action, a sequence of configuration panels has to be done. Following is a hierarchical sequence of menus, submenus, panels and operands that the user has to follow to complete the system customization. The relevant parameters in terms of connectivity are indicated, and notes with additional information are provided.

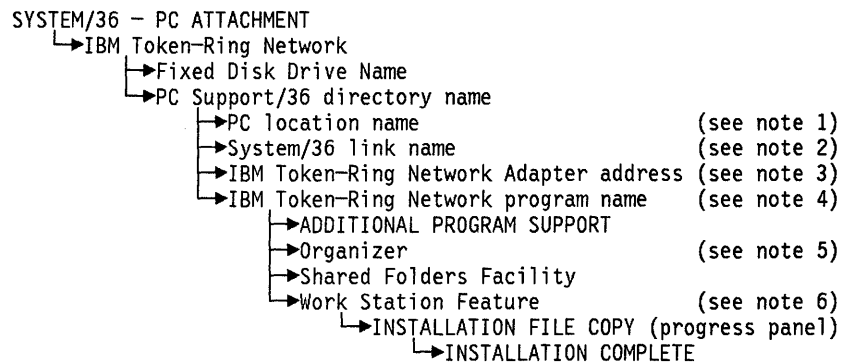


Figure 127. System/36 PC Support Installation Panel Flow

NOTE 1: PC Location name

This is a symbolic name by which your PC can be identified on the network.

NOTE 2: System/36 Link name

This is a symbolic name by which the System/36 is to be known to your PC. Since only one name can appear here, if there is more than one System/36 attached to the network, then this should be the name of the System/36 with which your PC most frequently communicates.

The procedure to communicate with other System/36s on the Token-Ring network is described in the section "User's Guide" on page 311.

NOTE 3: IBM Token-Ring Network adapter address

This is the address of the System/36 LAN Attachment Adapter. This address was obtained when you ran the diagnostics on the 5363.

Alternatively this could be the user-defined address given the LAN Controller Adapter when it was installed. Refer to "Attaching The System/36 To

A Token-Ring Network" on page 31. The advantage of using this address is that there will be no need to re-configure your system if the controller adapter for the System/36 is changed.

NOTE 4: IBM Token-Ring Network program name

Leave this field blank. This will allow the Token-Ring Network device drivers (DXMA0MOD.SYS and DXMCOMOD.SYS) from the PC LAN Support Program to be used.

NOTE 5: The Organizer requires both Shared Folders and Workstation Features.

NOTE 6: The Workstation Feature is required if your PC is to act as a System/36 work station (5250 emulation).

7. Remove the PC Support/36 INSTALL diskette.

This completes the installation of PC Support/36 on your PC. You may now communicate with the System/36 across the Token-Ring Network.

Note: During the installation, the following entries were added to the PC CONFIG.SYS file pointing to device drivers that have to be loaded by DOS to be able to use PC Support virtual disk and folders. These are:

- Device = C:\PCS36\VDSK.SYS
- Device = C:\PCS36\FSDS.SYS
- Device = C:\PCS36\FSDDX.SYS
- Files = 15.

38.4 User's Guide

The PC Support/36 program provides the facilities necessary for the PC to communicate with the System/36 on the IBM Token-Ring Network. These features are supported by:

1. The Organizer
2. The Shared Folders Facility
3. The Workstation Feature.

Since both the Organizer and Shared Folders facilities were also supported on the twinax-attached PC via the Enhanced 5250 Emulation Adapter card, in this document we will confine the discussion to the use of the Workstation Feature.

The Workstation Feature does NOT provide the connection to the System/36; rather it is invoked after this connection has been established by the STARTRTR procedure of PC Support/36. The Workstation Feature (WSF) can support up to five sessions. These can all be display sessions or one printer and four displays. The WFCONFIG command will prompt you through the description of the session profile.

Note: If you choose to configure your own session profiles, and require that they be started automatically, then you must:

- Create and save a master profile. (Use the system default name WSF.DAT and save it in the same directory that has the WSF.EXE program.)

- Create your individual sessions and add them to the master profile.
- Change the WSF command in the LINK36.BAT file to:
 'WSF.EXE WSF.DAT /T' This will direct the WSF program to use your session profiles.
- If you intend to communicate with other System/36s on the network, you must add a TRLI entry describing the system and its adapter address to the CONFIG.S36 file.

During installation of PC Support/36 one default display session was configured with a 5250-style keyboard layout. While the WSF sessions are being established, the PC will display the following screen:

```

          PC Support/36 Work Station Feature.
          Version 1.00 Copyright IBM Corp. 1987

Master profile name
WSF.DAT

Keyboard profile name:
KBX.DAT

Session      Type      Status      System Name
-----
1            Display  Started    Sys5360

          Press any key to continue
  
```

You will next be presented with a System/36 "Sign-On" screen. If password security is active on the System/36, you will need to contact that system's security officer in order to have your user profile added to the security file. Sign on to the System/36 and the PC Support Organizer menu will be presented. Now, follow the screens and select the parameters.

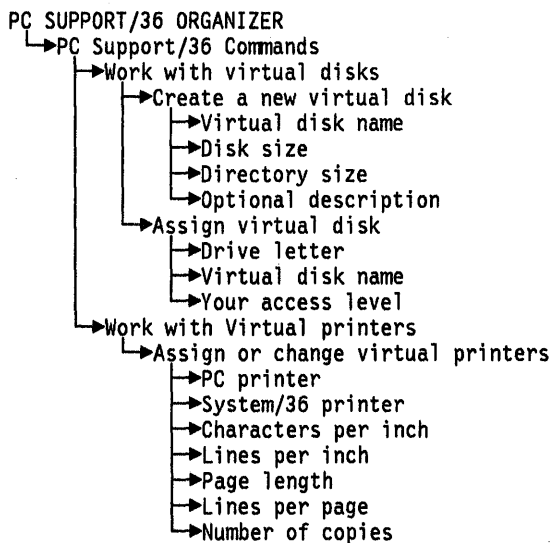


Figure 128. System/36 PC Support Organizer Panel Flow

Any number of virtual disks can be created; the only limitation is the amount of disk space available on the System/36, but a maximum of eight can be assigned at any one time.

Any System/36 printer can be assigned as a virtual printer for the PC.

38.5 Migration Issues

An upgraded version of PC Support/36 is delivered with each new or upgraded release of the System/36 SSP, and must be installed and configured concurrently with the new SSP. Application programs are insulated from PC Support/36 so there need be no changes made to them.

38.6 Basic Troubleshooting

The basis troubleshooting tools are the "Online Problem Determination" (OLPD) for the System/36s and the diagnostics on the "IBM Token-Ring Installation Diskette" that comes with the Token-Ring Network adapter card.

38.7 Where to Go for More Information

Additional information about installing the System/36 on a Token-Ring Network can be found in the following IBM publications:

- *GG24-3207 System/36 Token-Ring Attachment In An Intelligent Workstation Environment*
- *GA27-3677 IBM Token-Ring Network Introduction and Planning Guide*
- *GA27-3678 IBM Token-Ring Network Installation Guide*
- *SY27-0280 IBM Token-Ring Network Problem Determination Guide*
- *GG24-1739 IBM Token-Ring Network PC Products Description and Installation*
- *SC21-9457 IBM Sys/36 Local Area Attachment Guide to Operations*
- *SC21-9564 IBM PC Support/36 Work Station Feature User's Guide*
- *SC21-9088 IBM PC Support/36 User's Guide.*

Chapter 39. System/36 Advanced Program-to-Program Communication (APPC)

39.1 APPC Peer Communication

39.1.1 Overview

This section describes how the System/36 communicates with another system over the IBM Token-Ring Network using Advanced Program-to-Program Communication (APPC). This is presented in two sections; the first describes communication with like systems (peer-to-peer communication), and the second with 370 architecture systems (host communication).

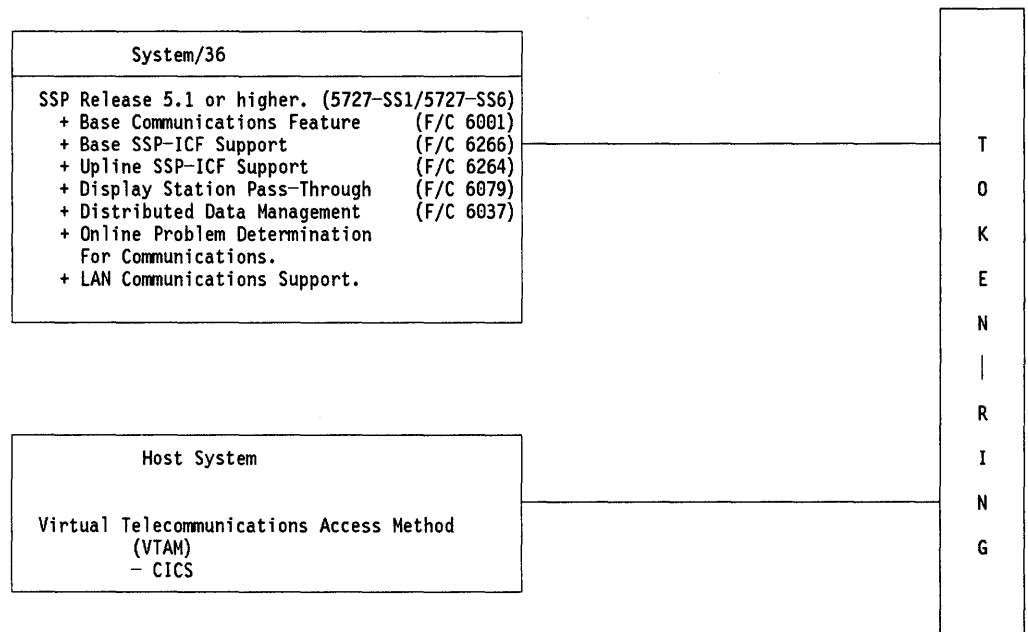


Figure 129. System/36 Communicating With Peer or Host Systems on The IBM Token-Ring Network

39.1.2 Planning Checklist

- The latest level of the System Support Program (SSP Rel. 5.1 on the System/36) must be installed on all systems communicating with each other, and must include the following features:
 - Base Communication Feature
 - Base SSP-ICF Support
 - LAN Communications Support
 - Display Station Pass-through Support.

39.1.3 Installation

In order to establish communications between the two systems, three basic steps must be performed:

1. Both systems must be actively connected to the network.
2. Active APPC subsystems must be running on both systems.
3. A communications session must be established between the two systems.

STEPS:

1. Connecting the System/36s to the IBM Token-Ring Network.

This was described in "Attaching The System/36 To A Token-Ring Network" on page 31, "Hardware Installation" on page 33, and in "Software Installation" on page 34.

2. Running active APPC subsystems on the System/36.

The following discussion explains how the APPC subsystem is created and activated.

Creating an APPC Subsystem: The APPC subsystem is created by the "CNFIGICF", procedure which allows the description of the type of subsystem being configured.

1. By entering the command "CNFIGICF", the following panel will be displayed.

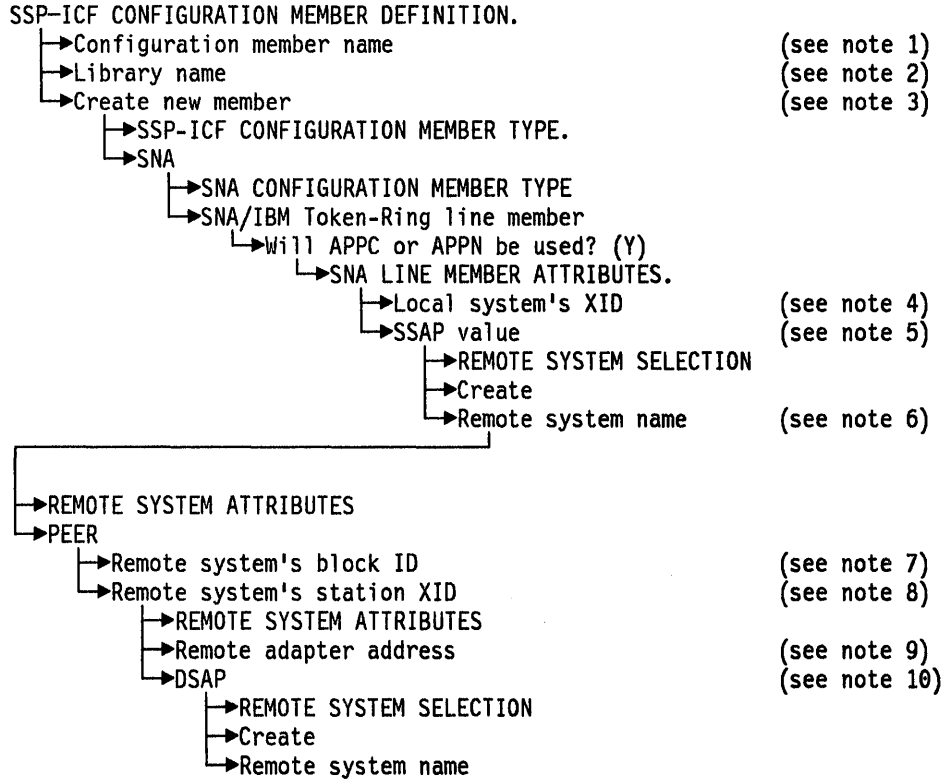


Figure 130. System/36 APPC Subsystem Panel Flow (1 of 2)

Note 1: Configuration member name: The first requirement is to define the type of communications media (line) that will be used. The user should enter the name of the member that the APPC definition will work with.

Note 2: Library name: The name of the library you want to contain this member. A line member and its associated subsystem member **MUST** be in the same library.

Note 3: In this case you will select option 1: "Create a new member".

Note 4: XID. Exchange Identifier is used to identify this System/36. Specify a hexadecimal number between 0000 and FFFFF. For APPC and APPN this number must match the remote system's station XID.

Note 5: SSAP value. For SNA/IBM Token-Ring Network line member, specify the address that allows the remote device to route data to the remote work station support within the system. This value must be non-zero, a multiple of 4 (that is, 04,08,0C,10,1B....FC), and must match the remote system's destination service access point (DSAP).

Note 6: "Remote System Name" is the name of the remote system you are defining. This name will be associated with a remote location name during subsystem configuration.

The remote system will be a host for SNA Upline Facility (SNUF), SNA 3270 Device Emulation, SNA MSRJE or APPC subsystem.

The remote system can be a peer for APPC or APPN subsystems.

Note 7: Remote system's block ID specifies the three-digit hexadecimal character block identification for the remote system. The default value shown is 03E and is unique to the System/36 and should therefore be used.

Note 8: XID (Exchange Identifier) is used to identify the remote system. It must be the same as the "local system's XID" at the remote location and can be any hexadecimal digit from 00000 to FFFFF.

Note 9: Remote adapter address is the hexadecimal address of the Token-Ring Network adapter in the remote system. This is the same address that was determined when the adapter was installed.

Note 10: DSAP value specifies the hexadecimal logical channel address used for routing data at the remote system to the proper support. This value must be non-zero, a multiple of 4 (that is, 04,08,0C,10,1B....FC) and must match the remote system's SSAP value.

2. This completes the line configuration. We now have to configure the subsystem that will use this line to establish communication.

Press CMD 7.

This returns you to the first screen. Now we will configure the subsystem.

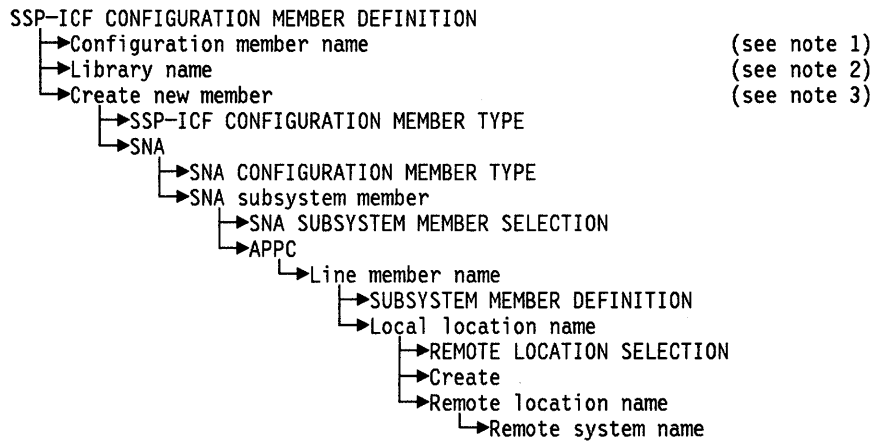


Figure 131. System/36 APPC Subsystem Panel Flow(2 of 2)

Note 1: Configuration member name: The member name has now changed since this is a **new member**

Note 2: Library name: The name of the library you want to contain this member. A line member and its associated subsystem member **MUST** be in the same library.

Note 3: In this case you will select option 1: "Create a new member".

3. Configuration of the member is now complete. Press CMD 7 twice to exit the CNFIGICF procedure.

How to proceed.

- This same exercise must be performed at the remote System/36. Remember that in this case, however, the parameters "remote system

name", "remote system location", "SSAP" and "DSAP" are reversed and the remote adapter address will also be different.

- Once both systems have configured APPC subsystems, then these subsystems can be activated and a communications session started.
- There are two ways to activate the subsystem. Either way achieves the same result. They are:
 - Key the command "ENABLE (subsystem name),(library name), (line no.)" and press Enter. (This command can be included in the "STARTUP2" procedure to cause the subsystem to be enabled automatically at IPL.)
 - Type "help enable" and fill in the prompts.
- When the subsystem is enabled, a message will be displayed at the system console telling you so. If you do not have access to the console, you can display subsystem status from your workstation by entering the command "D I" and the SUBSYSTEM STATUS will be displayed.

You have now established communication between peer systems across an IBM Token-Ring Network.

39.1.4 User's Guide

The APPC subsystem member you created is the vehicle by which data and commands are transported between the systems and the Token-Ring Network is the road on which it travels. To start the 'vehicle', the ENABLE command is used.

- Remember that the subsystems at both locations must be enabled.
- The "STRTPGRP" command is used to start a communications session between the two systems. The session need only be started at one system for the communication to be established.
- Once the session is started, then workstations that are physically connected to one system can be logically connected to the other system and can run applications and use data that physically reside on the remote system.
 - Enter the command "STRTPGRP (remote location name)." The remote location name is the one you used in configuring the subsystem member earlier in this chapter.
 - A message will display on your screen "START GROUP PROCEDURE IS RUNNING". When the session is started the message will go off.
 - It is now possible for the two systems to communicate. You must have application programs coded that will direct the passing of data between them or you can use some IBM utilities such as "PASSTHRU" to demonstrate that the link is established.
- At your screen, type the command "PASSTHRU (remote location name)". After a few seconds a "sign-on" screen of the remote system will be presented. This shows that your workstation is now logically connected to the remote system.

39.1.5 Basic Troubleshooting

After the installation and configuration is completed, run Online Problem Determination (OLPD) to ensure that the system is operating properly. Also be sure to document the configuration parameters you used along with the names of the configuration members you created and the library in which they are stored.

Use the network Trace and Performance Program (if installed) to trace the activities as they occur between the two systems.

39.2 APPC Host Communication

39.2.1 Planning Checklist

The System/36 requirements for host communication are the same as for PEER (see "Planning Checklist" on page 316) with a few additional features. These are:

- Extended communications support
- Upline SSP-ICF support.

Optionally you may also need the following System/36 products to be able to run special applications or to communicate with certain specialized industrial equipment.

- SNA 3270 Device Emulation
- 3278/9 Device Emulation via IBM Personal Computer.

39.2.2 Installation

As with peer communication, the same basic steps must be performed here. Connecting the host system to the network is described in the sections on "9370 Hardware" on page 77 and "3745" on page 75. Here we will discuss the configuration of the line and subsystem members that are created on the System/36 for HOST communication.

1. Enter the command "CNFIGICF" and the "SSP-ICF Configuration Member" definition screen will be displayed. From that screen, the panel flow indicated in Figure 132 on page 321 has to be followed.

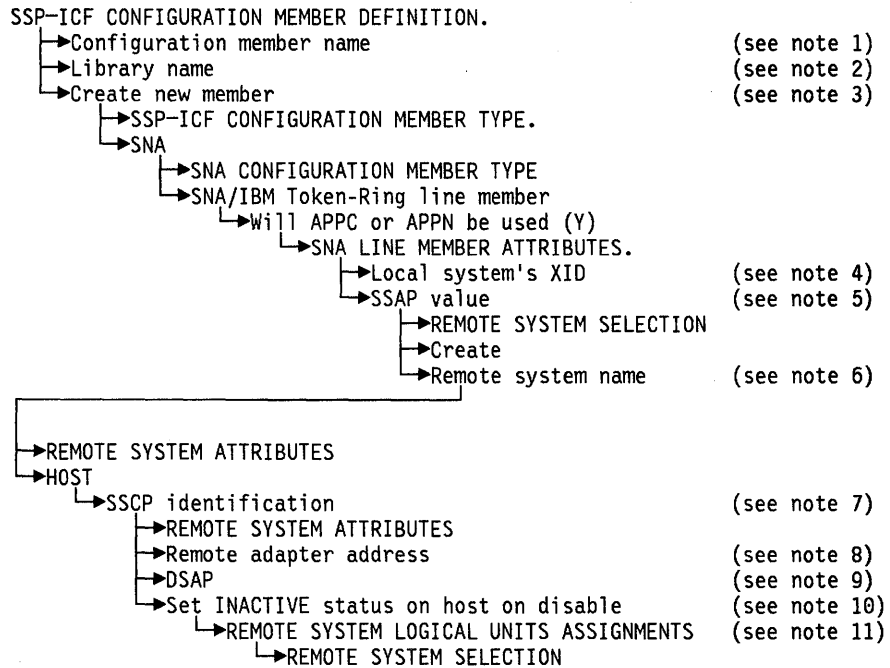


Figure 132. System/36 APPC Host Communication Panel Flow (1 of 2)

Note 1: Configuration member name: The first requirement is to define the type of communications media (line) that will be used. The user should enter the name of the member that the APPC definition will work with.

Note 2: Library name: The name of the library you want to contain this member. A line member and its associated subsystem member **MUST** be in the same library.

Note 3: In this case you will select option 1: "Create a new member".

Note 4: XID. Exchange Identifier is used to identify this System/36. Specify a hexadecimal number between 00000 and FFFFF. For APPC and APPN this number must match the remote system's station XID.

Note 5: SSAP value. For SNA/IBM Token-Ring Network line member, specify the address that allows the remote device to route data to the remote work station support within the system. This value must be non-zero, a multiple of 4 (that is, 04,08,0C,10,1B....FC), and must match the remote system's destination service access point (DSAP).

Note 6: "Remote System Name" is the name of the remote system you are defining. This name will be associated with a remote location name during subsystem configuration. APPC or APPN subsystems.

Note 7: SSCP (System Services Control Point) identifier of the remote host system. Specify five decimal digits from 0 to 65535. This identification must be the same as the value specified for the SSCPID parameter on the VTAM/NCP start procedure. This identification must be different for each remote system that you define in this line member.

If you specify 00000, you can communicate with any host, regardless of the SSCP identification of that host.

Note 8: Remote adapter address is the hexadecimal address of the Token-Ring Network Adapter in the remote system. This is the address of the network bridge or communication controller's adapter.

Note 9: DSAP value. Specify the hexadecimal address that allows the system to route data to the proper support within a remote system. This value must be non-zero, a multiple of 4 (that is, 04,08,0C,10,14....FC) and must match the remote system's SSAP value.

Note 10: Set inactive status at host on disable? Y,N

- Y - On a normal disable of this remote system, a request for re-contact will not be sent to the remote system. This will cause the System/36 status at the host to be in an inactive (INACT) state. To re-establish communications with this remote system will require a vary on at the host, as well as an enable of the location at the System/36.
- N - On a normal disable of this remote system, a request for re-contact will be sent to the remote system. This will cause the System/36 status at the host to be a pending connection (PCTD2) state. This allows the System/36 to resume communications with that remote system without requiring another vary on at the host. (N) is the default.

Note 11: This set of displays allow you to specify which of the possible 255 logical units are to be used by the remote subsystem. These displays are used to assign ALL the logical units to be used with this line member configuration.

- A SNA Upline uses this subsystem for all sessions except HCF and point-of-sale sessions.
- B SNA 3270 uses this LU.
- C SNA MSRJE uses this LU.
- D APPC or APPN uses this LU.
- E SNA Upline uses this LU for all sessions except DSX, ideographic HCF and point-of-sale sessions.
- F SNA Upline uses this LU for all sessions except DSX and point-of-sale sessions. You must select this option for ideographic HCF.
- G SNA Upline uses this LU for point-of-sale sessions.
- BLANK This LU session is not used.

Assign "A" for all the logical units to be used.

2. This completes the line configuration. We now have to configure the subsystem that will use this line to establish host communication.

Press CMD 7.

The first screen will be presented again. Now we are configuring the host subsystem.

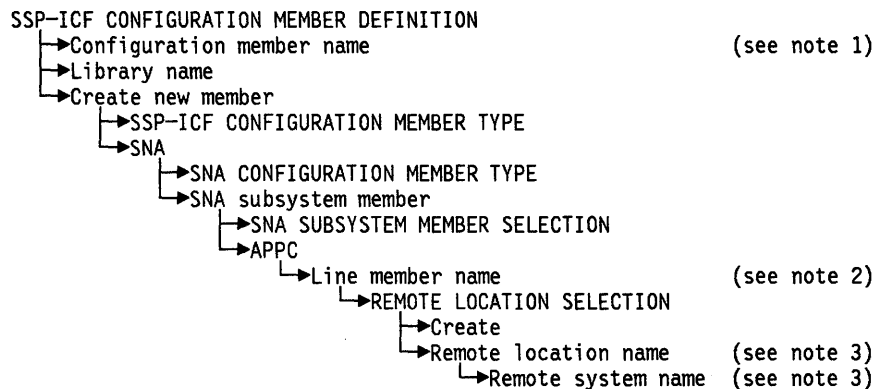


Figure 133. System/36 APPC Host Communication Panel Flow (2 of 2)

Note 1: The member name has to be changed since this is a new member.

Note 2: The line member name to be used is the same one just configured in Figure 132 on page 321.

Note 3: Remote location name and remote system names are names supplied by you and are the names by which the System/36 will identify the remote system in the ENABLE and STRTGRP commands.

Configuration of the member is now complete. **Press CMD 7 twice** to exit the CNFIGICF procedure.

39.2.3 User's Guide

The ENABLE command is used to enable the subsystem at the System/36. The format is "ENABLE "subsystem name","library name","line number"". When the subsystem is enabled, a message will be displayed at the system console telling you so. If you do not have access to the console, you can display subsystem status from your workstation by entering the command "D I" and the SUBSYSTEM STATUS screen will be displayed.

- Notify the system operator at the host that you wish to initiate communications between the two systems.
- Use the STRTGRP command to activate the link with the host.

39.2.4 Migration Issues

A new version of the base communication feature, and of those other features for which you are a registered user, such as APPC, DDM, PC Support/36, etc., is shipped with each upgrade or new release of the SSP. There is usually no concurrent need to either reconfigure the ICF members or to make adjustments to associated application programs. However, if either of these becomes necessary, a corresponding notice will be posted in the set of documentation that accompanies the release upgrade.

39.2.5 Basic Troubleshooting

After the installation and configuration is completed, run Online Problem Determination (OLPD) to ensure that the system is operating properly. Also be sure to document the configuration parameters you used along with the names of the configuration members you created and the library in which they are stored.

Use the network Trace and Performance Program (if installed) to trace the activities as they occur between the two systems.

39.2.6 Where to Go for More Information

There are several IBM publications that deal with communications as a whole. Contact your local IBM branch office for a list of these publications. The following are some manuals that address the subject directly and will prove useful in its installation:

- *SC21-9082 Using System/36 Communications*
- *SC21-9530 System/36 Interactive Communications Feature*
- *GG24-1584 An Introduction To APPC Communication*
- *GG24-1693 System/36 APPC Implementation Guide.*

Chapter 40. System/36 3270 Device Emulation

40.1 Overview

This section describes how the System/36 communicates with a host system over the IBM Token-Ring Network, emulating a 3270-type control unit with attached devices.

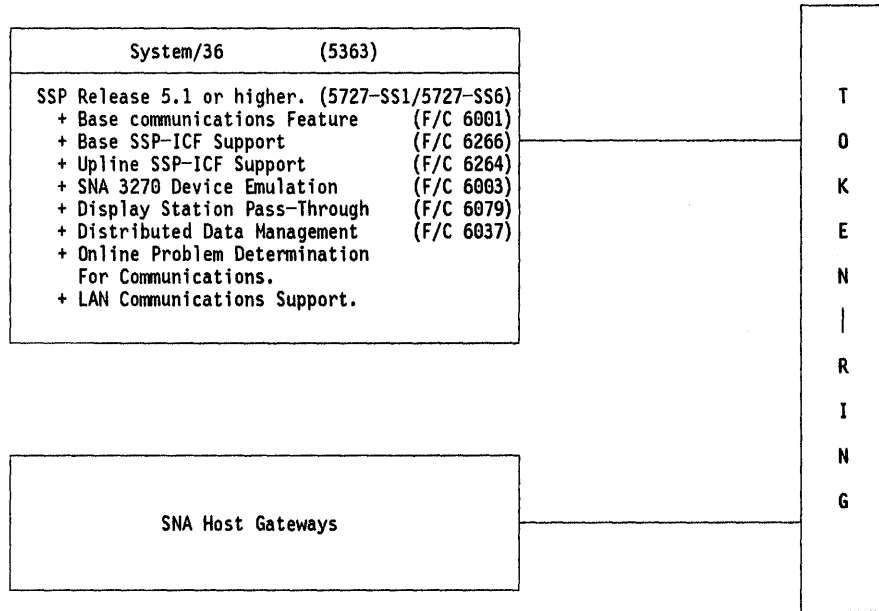


Figure 134. System/36 Communicating With Peer or Host Systems on the IBM Token-Ring Network

40.2 Planning Checklist

- The latest level of the System Support Program must be installed on the System/36 (SSP Rel. 5.1) and must include the following features:
 - Base Communication Feature
 - Base SSP-ICF Support
 - Upline SSP-ICF Support
 - LAN Communications Support
 - Display Station Pass-through Support
 - SNA 3270 Device Emulation
 - 3278/9 Device Emulation via IBM PC (if PCs attached to the System/36 are to be used as workstations in emulation mode).

40.3 Installation

In order to establish communications between the two systems, three basic steps must be performed:

1. Both systems must be actively connected to the network.
2. Active SNA subsystems must be running on both systems.
3. A communications session must be established between the two systems.

STEPS:

1. Connecting the System/36s to the IBM Token-Ring Network.

This was described in "Attaching The System/36 To A Token-Ring Network" on page 31, and in the sections "Hardware Installation" on page 33 and "Software Installation" on page 34.

Connection of the host system to the network is described in sections "9370 Hardware" on page 77, "3745" on page 75, and "37XX Gateway and Downstream PUs" on page 386. Here we will discuss the configuration of the line and subsystem members that are created on the System/36 for host communication.

1. Enter the command "CNFIGICF" and the following screen will be displayed.

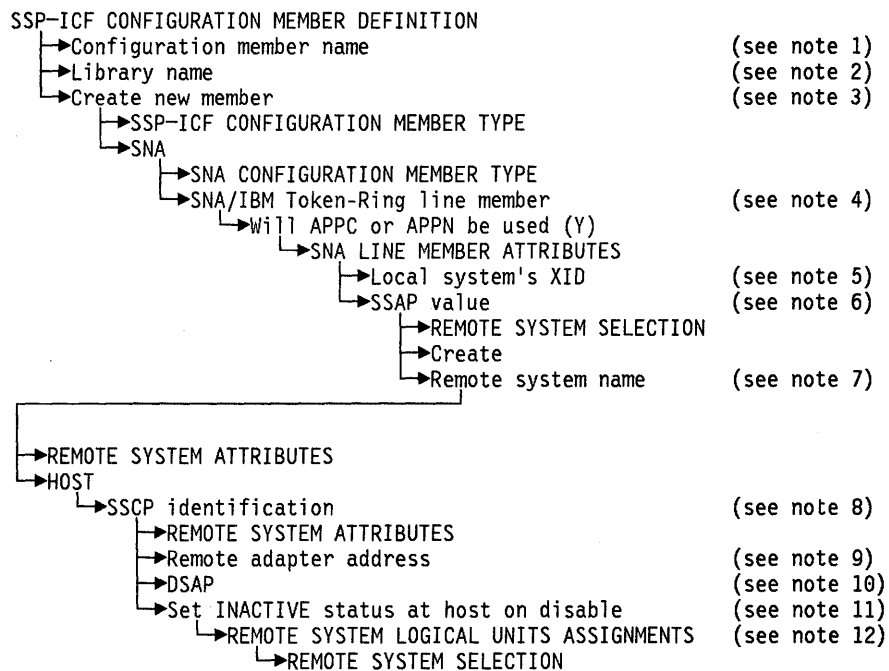


Figure 135. System/36 3270 Device Emulation Panel Flow (1 of 2)

Note 1: Configuration member name: The first requirement is to define the type of communications media (line) that will be used. The user should enter the name of the member that the APPC definition will work with.

Note 2: Library name: The name of the library you want to contain this member. A line member and its associated subsystem member **MUST** be in the same library.

Note 3: In this case you will select option 1: "Create a new member".

Note 4: For host communication on the Token-Ring Network we do not need APPC; however this same line member could be used by other subsystems requiring APPC or APPN.

Note 5: XID Exchange Identifier is used to identify this System/36. Specify a hexadecimal number between 00000 and FFFFF. For APPC and APPN this number must match the remote system's station XID.

Note 6: SSAP value. For SNA/IBM Token-Ring Network line member, specify the address that allows the remote device to route data to the remote workstation support within the system. This value must be non-zero, a multiple of 4 (that is, 04,08,0C,10,1B....FC), and must match the remote system's destination service access point (DSAP).

Note 7: Remote system name is the name of the remote system you are defining. This name will be associated with a remote location name during subsystem configuration in APPC or APPN subsystems.

Note 8: SSCP (System Services Control Point) identifier of the remote host system. Specify five decimal digits from 0 to 65535. This identification must be the same as the value specified for the SSCPID parameter on the VTAM/NCP start procedure. This identification must be different for each remote system that you define in this line member.

If you specify 00000, you can communicate with any host, regardless of the SSCP identification of that host.

Note 9: Remote adapter address is the hexadecimal address of the Token-Ring Network adapter in the remote system. This is the address of the network bridge or communication controller's adapter.

Note 10: DSAP value. Specify the hexadecimal address that allows the system to route data to the proper support within a remote system. This value must be non-zero, a multiple of 4 (that is, 04,08,0C,10,14....FC) and must match the remote system's SSAP value.

Note 11: Set inactive status at host on disable? Y,N

- Y - On a normal disable of this remote system, a request for re-contact will not be sent to the remote system. This will cause the System/36 status at the host to be in an inactive (INACT) state. To re-establish communications with this remote system will require a vary on at the host, as well as an enable of the location at the System/36.
- N - On a normal disable of this remote system, a request for re-contact will be sent to the remote system. This will cause the System/36 status at the host to be a pending connection (PCTD2) state. This allows the System/36 to resume communications with that remote system without requiring another vary on at the host. (N) is the default.

Note 12: This set of displays allow you to specify which of the possible 255 logical units are to be used by the remote subsystem. These displays are used to assign ALL the logical units to be used with this line member configuration.

- A SNA Upline uses this subsystem for all sessions except HCF and point-of-sale sessions.
- B SNA 3270 uses this LU.
- C SNA MSRJE uses this LU.
- D APPC or APPN uses this LU.

- E SNA Upline uses this LU for all sessions except DSX, ideographic HCF and point-of-sale sessions.
- F SNA Upline uses this LU for all sessions except DSX and point-of-sale sessions. You must select this option for ideographic HCF.
- G SNA Upline uses this LU for point-of-sale sessions.
- BLANK This LU session is not used.

2. This completes the line configuration.

This is the same line configuration as was done for host communication using APPC, the only difference being that in selecting the LU sessions, 3270 emulation was specified. We now have to configure the subsystem that will use this line to establish host communication.

Press CMD 7.

The first screen will be presented again. Now we are configuring the the subsystem for 3270 emulation.

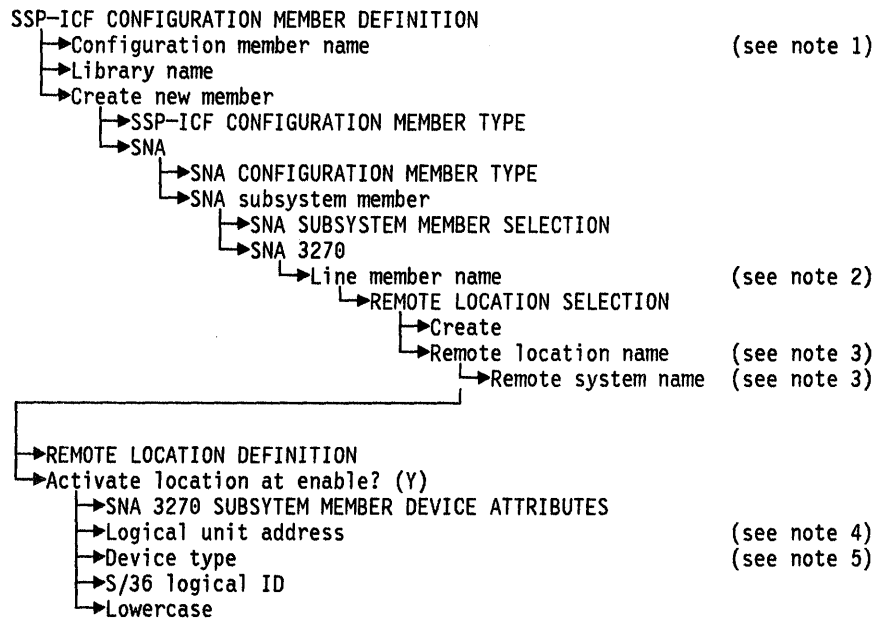


Figure 136. System/36 3270 Device Emulation Panel Flow (2 of 2)

Note 1: The member name has to be changed since this is a new member.

Note 2: The line member name to be used is the same one just configured in Figure 132 on page 321.

Note 3: Remote location name and remote system names are names supplied by you and are the names by which the System/36 will identify the remote system in the ENABLE and STRTGRP commands.

Note 4: Logical unit address: A decimal number from 1 - 255. This address must correspond to one assigned to SNA 3270 Device Emulation during the line member configuration.

Note 5: Device type: Type of device associated with each LU address:

- 2-3270 display. The 5250 emulates a 3277, 3278 or 3279 display.

- 3-3270 with numeric lock. The 5250 is emulating a 3277, 3278 or 3279 with the numeric lock feature.
- 5-328x printer. The System/36 printer, specified in prompt 3 by the System/36 logical ID, emulates a 328x type line printer. Refer to the *3278 Device Emulation Guide* for a list of 328x printers.
- 6-3278/9 Via the IBM PC. An IBM PC attached to the System/36, emulating a 5250, and is now to emulate a 3278/9 display unit.

Configuration of the member is now complete. **Press CMD 7 twice** to exit the CNFIGICF procedure.

40.4 User's Guide

Starting a communications session.

The ENABLE command is used to enable the subsystem at the System/36.

The format is "ENABLE "subsystem name", "library name", "line number"".

When the subsystem is enabled, a message will be displayed at the system console telling you so. If you do not have access to the console, you can display subsystem status from your workstation by entering the command "D I" and the Subsystem Status screen will be displayed.

- Use the STRTGRP command to activate the link with the host.
- Select a workstation that was configured to emulate a 3270 display and type the command "ES3270". The host system's sign-on logo will be displayed.

40.5 Migration Issues

A new version of the base communication feature, and of those other features for which you are a registered user, such as APPC, DDM, PC Support/36, etc. is shipped with each upgrade or new release of the SSP. There is usually no concurrent need to either re-configure the ICF members or to make adjustments to associated application programs. However, if either of these becomes necessary, a corresponding notice will be posted in the set of documentation that accompanies the release upgrade.

40.6 Basic Troubleshooting

After the installation and configuration is completed, run Online Problem Determination (OLPD) to ensure that the system is operating properly. Also be sure to document the configuration parameters you used along with the names of the configuration members you created and the library in which they are stored. (Some of this information will be needed to configure the host to recognize the System/36.)

Use the network Trace and Performance Program (if installed) to trace the activities as they occur between the two systems.

40.7 Where to Go for More Information

There are several IBM publications that deal with communications as a whole. Contact your local IBM Branch Office for a list of these publications. The following are some manuals which address the subject directly and will prove useful in its installation.

- *SC21-9082 Using System/36 Communications*
- *SC21-9530 System/36 Interactive Communications Feature*
- *GG24-1584 An Introduction To APPC Communication*
- *GG24-1693 System/36 APPC Implementation Guide.*

Chapter 41. AS/400 Communicating with Personal Computers

41.1 Overview

This chapter discusses the planning, installation and use of AS/400 PC Support Program on both the AS/400 and the workstation. This workstation can be either a PC or a PS/2. After installation, the PC user will be able to use the following functions:

- Organizer - a single menu interface to both host and PC functions
- Workstation function - Up to five (5) host workstation and printer emulation sessions
- Shared folders - concurrent access and update to folders with byte level locking for applications
- Virtual printer - use of host and personal computer printers
- Transfer function - file transfer and conversion of data between host data base files and the personal computer
- Message function - local, remote, and networking messaging support.

The programs required to run these functions will be stored on the PC's fixed disk or a working diskette.

An example of the planning worksheet is presented in the planning section of this chapter and should be completed prior to attempting to install the product. It is useful for both the AS/400 and the PC, and if completed properly, will greatly ease the installation effort.

Other considerations such as migrating from PC Support/36 will also be included in this chapter.

The following diagram describes the sequence of events as they are presented.

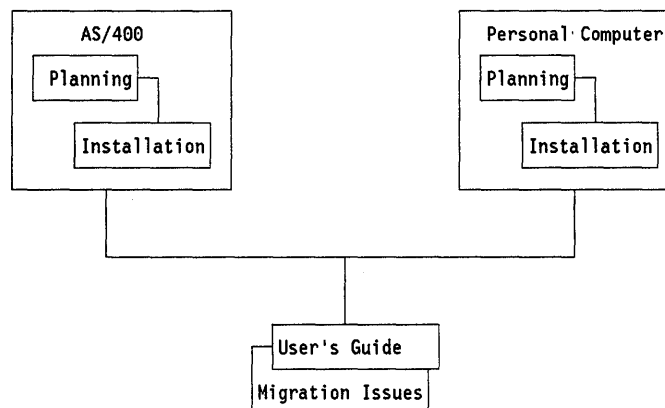


Figure 137. AS/400 to PCs and PS/2s Across the Token-Ring Network

41.2 Planning Checklist

41.2.1 Prerequisites - Hardware

To install and run AS/400 PC Support you will need the following:

- An IBM Personal Computer or Personal System/2⁵² (PS/2⁵²) with at least one diskette drive.
- An 80-column display
- The necessary amount of memory to run PC support. This amount can vary depending on the functions selected.

Ensure that the following activities have been completed before continuing:

- The physical connection of the AS/400 to the Token-Ring Network has been accomplished. (Instructions on how to do this were described in "Attaching The AS/400 To A Token-Ring Network" on page 39.)
- Your PC workstation is also connected to the Token-Ring Network and operational. (This is described in "PC Token-Ring Network Adapter Installation" on page 9 and "PS/2 Token-Ring Adapter/A Installation" on page 17) for each system unit.

41.2.1.1 Disk Storage Requirements

The following list shows the approximate amount of disk storage needed on the AS/400 system to hold the AS/400 PC Support options:

Options	Disk Storage in Megabytes
XIWS (base PC Support code)	4
PC DOS (single-byte version)	7
PC DOS (double-byte version)	10
OS/2 (single-byte version)	5
OS/2 (double-byte version)	6

41.2.2 Prerequisites - Software

You should have installed:

- AS/400 PC Support Program for the AS/400 (supplied on magnetic tape).
- AS/400 PC Support Program PC installation diskettes. The AS/400 SSP must be installed and configured on the AS/400.
- DOS Version 3.3 or later
- Operating System/2⁵³ Extended Edition Version 1.2 or later

Note: If you are using DOS, the IBM LAN Support Program must be installed and configured on the PC before you can use AS/400 PC Support. Refer to "LAN Support Program V1.1" on page 87.

⁵² Personal System/2 and PS/2 are registered trademarks of the International Business Machines Corporation.

⁵³ Operating System/2 is a trademark of the International Business Machines Corporation.

41.2.3 Prerequisites - Other

- Planning Worksheet (see Figure 138 on page 333)

Note: The values shown below are examples only and need not to be used in configuring your system. Enter the appropriate data as it pertains to your specific environment.

COMMAND	Parameter	Value	Parameter Description
CHGNETA	LCLCPNAME	RALYAS4A....	Local Control Point Name.
	LCLLOCNAME	RAOTNNB0....	Local Location Name
	LCLNETID	USIBMRA.....	Local Network ID.
	SYSNAME	RALYAS4A....	System Name
CRTLINTRN	ADAPTER	400010020001	Token-Ring Adapter Address - Host.
	LIND	L41TR.....	Line Description
	MAXCTL	40.....	Maximum Number of Controllers
	RSRCNAME	LIN041.....	Resource Name.
CRTCTLAPP	ADPTADR	400000000045	Token-Ring Adapter Address - PS/2
	CTLD	TRCTLPS.....	Controller Description
	RMTCPNAME	PS2.....	Remote Control Point Name.
	SWTLINLST	L41TR.....	Switched Line List.
	RMTNETID	USIBMRA.....	Remote Network ID.
CRTUSERPRF		RUSSELL.....	User profile
		PASSWORD....	User password
		USER.....	Userclass
	*System Name	RALYAS4A....	AS/400 System Name
	*WS Address	RAOTNNB1....	Work Station Address

Figure 138. AS/400 PC Support Installation Planning Worksheet

41.3 Coexistence and Compatibility

AS/400 PC Support and the IBM PC LAN Program Version 1.3 will both be usable concurrently from a single PC running DOS 3.3 or later release. Any combination of AS/400 PC Support and IBM PC LAN requesters will be valid and IBM PC LAN servers will be able to use services provided by AS/400 PC Support requesters.

Distributed Data Management for the PC (DDM/PC feature code 3653) is compatible with the AS/400 and AS/400 PC Support. It allows concurrent record level access to data files that reside on the AS/400, System/36, System/38 or System/370. General file management is also available.

41.3.1 Using PC Support with System/36s and AS/400 Systems

A programming request for price quotation (PRPQ) called PC Support coexistence is available. This PRPQ allows AS/400 PC Support to be used in an environment consisting of both System/36s and AS/400 systems.

Support Available to S/36 with the PRPQ: All functions currently available with PC Support/36 are available with the PRPQ. All functions currently available with AS/400 PC Support are available with the PRPQ, except the submit remote command function. In addition, all environments currently provided for PC Support are provided with the PRPQ.

Documentation on how to install and use the PC Support coexistence PRPQ is provided with the PRPQ. The PRPQ number is 5799-DAK for the 5360/5362 system units or 5799-DAL for the 5363/5364 system units.

Support Available to S/36 without the PRPQ:

- Workstation function
- DisplayWrite⁵⁴/36 must be the editor of choice. This editor uses the text assist function.
- Session manager.

The above functions are available without the PRPQ with the following restrictions:

1. The workstation function is not supported with the PC Support/36 twinaxial router.
2. The AS/400 PC Support twinaxial router cannot be used on a personal computer attached to a System/36.
3. APPC is required on the System/36.
4. For the organizer and text assist function, PC Support/36 is needed on the System/36.
5. In order for the System/36 to communicate with the AS/400 system, Display Station Pass-Through, Feature 6090, is needed.

⁵⁴ DisplayWrite is a trademark of the International Business Machines Corporation.

41.4 Installation

41.4.1 Installation Overview AS/400 PC Support

Following is a hierarchical list of the tasks that have to be done in different areas to get the AS/400 PC Support installed and operational.

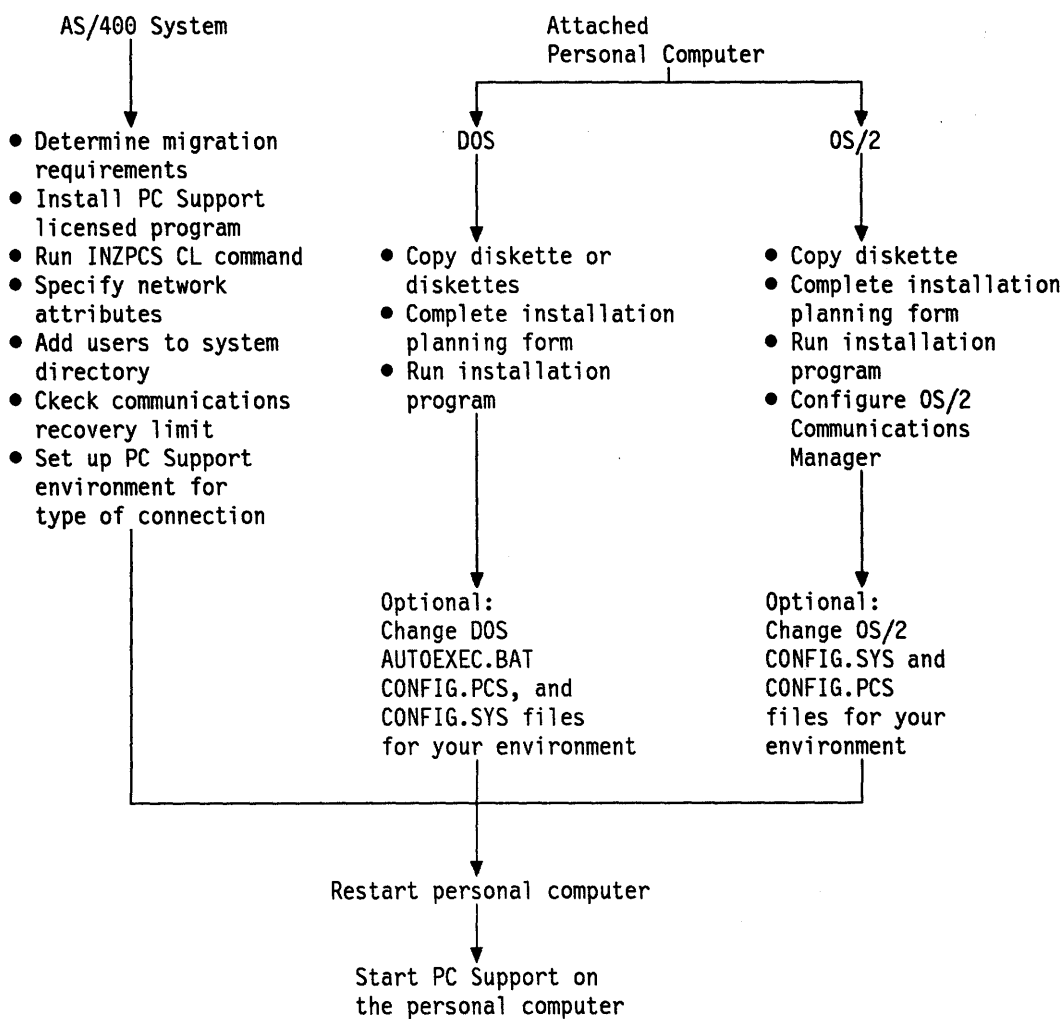


Figure 139. AS/400 PC Support Installation Installation Flow

41.4.2 Software Installation on AS/400

The following steps must be followed in installing workstation support via the IBM Token-Ring Network on the AS/400. PC Support requires the installation of the PC Support licensed program.

1. Ensure that the AS/400 System Support Program is installed. All support for communication across the Token-Ring Network is included in the SSP.
2. Install the AS/400 PC Support Licensed program.
 - Instructions to install the AS/400 PC Support program are included in the *AS/400 Licensed Programs Installation Guide*.
3. Add library QIWS to the user library list. The INZPCS command works with this library, and all users of AS/400 PC Support program facilities need to have it in their library list.
4. Initialize PC Support code.
 - To initialize AS/400 PC Support, run the CL command INZPCS.

Note: All PCs using this product need to have the same keyboard type and code page.

- The format of this command is:

```
INZPCS      KBDTYPE(keyboard type)  ASCII(ASCII code page)
            EBCDIC(EBCDIC code page)
```

- This establishes the tables to be used to translate EBCDIC to ASCII and ASCII to EBCDIC.

41.4.2.1 Definitions on AS/400 for PS/2

When you are going to connect a PS/2 to an AS/400 via a Token-Ring Network you are required to perform the following steps:

- Check the network attributes
- Create a line description from AS/400 to the PS/2
- Create an APPC controller description for the PS/2
- Create a mode entry
- Create a user entry.

41.4.3 Network Attributes

The network attributes contain the AS/400's local system values for APPN. You can display these attributes by using the DSPNETA command on the AS/400 Main Menu screen or by going to "Network" Menu.

Following is the screen for the network attributes.

```

                                Display Network Attributes
                                System:  RALYAS4A
Current system name . . . . . :  RALYAS4A
  Pending system name . . . . . :
Local network ID . . . . . :  USIBMRA
Local control point name . . . . . :  RALYAS4A
Default local location . . . . . :  RALYAS4A
Default mode . . . . . :  MODS361
Maximum number of conversations for a remote
  location . . . . . :  64
APPN node type . . . . . :  *NETNODE
Maximum number of intermediate sessions . . . . . :  200
Route addition resistance . . . . . :  128
Server network ID/control point name . . . . . :
Press Enter to continue.
F3=Exit  F12=Previous
More...

```

Figure 140. Display Network Attributes Screen

Notice that the current system name, the local control point name and the default location name are defined with the same name. You can change these parameters by the CHGNETA command or by taking option 2 from the Network menu.

41.4.4 Create Line Description

The first step in defining the PS/2 to the AS/400 is to create the line description. This can be done by either following the screens documented or by using the CL command CRTLINTRN and press F4.

```

CRTLINTRN          Create Line Desc (Token-Ring)

Type choices, press Enter.

Line description . . . . . ▶ L41TR      Name
Resource name . . . . . LIN041        Name
Online at IPL . . . . . *YES          *YES, *NO
Vary on wait . . . . . *NOWAIT       *NOWAIT, 15-180 (1 second)
Maximum controllers . . . . . 40      1-256
Maximum frame size . . . . . 1994    265, 521, 1033, 1994
Local adapter address . . . . . 400010020001  400000000000-7FFFFFFF...
Exchange identifier . . . . . *SYSGEN  05600000-056FFFFF, *SYSGEN
SSAP list:
  Source Service Access Point . *SYSGEN  *SYSGEN, 04, 08, 0C, 10...
    + for more values
Text 'description' . . . . . Token-Ring Line Description
F3=Exit  F4=List  F5=Refresh  F10=Additional parameters  F11=Keywords
F12=Previous  F13=How to use this display

```

Figure 141. Create Line Description (TRLAN) Screen

The resource name is the name of the physical communications port on the AS/400. It can be found by executing the command WRKHDWPRD and taking the option to work with your rack configuration.

The local Token-Ring Network adapter address of AS/400 is 400010020001.

Press Enter to create the line description. Then it returns to the "Work With Line Descriptions" screen.

41.4.5 Create APPC Controller Description

The next step is to create an APPC controller description which describes the PS/2 you are connecting to. Again, you can follow the screens or enter the CL command CRTCTLAPPC and press F4.

```

CRTCTLAPPC          Create Ctl Desc (APPC)

Type choices, press Enter.

Controller description . . . . . ▶ TRCTLPS          Name
Link type . . . . . ▶ *TRLAN          *SDLC, *TRLAN, *X25
Online at IPL . . . . . *YES          *YES, *NO
APPN capable . . . . . *YES          *YES, *NO
Switched line list . . . . . ▶ L41TR          Name
      + for more values
Maximum frame size . . . . . *LINKTYPE          *LINKTYPE, 265, 521, 1033...
Remote network identifier . . . ▶ USIBMRA          Name, *NETATR, *NONE
Remote control point name . . . ▶ PS2          Name
SSCP identifier . . . . . ▶          050000000000-05FFFFFFFF
Initial connection . . . . . *ANS          *DIAL, *ANS
TRLAN remote adapter address . ▶ 400000000045 000000000001-FFFFFFFF
APPN CP session support . . . *NO          *YES, *NO
APPN node type . . . . . *LENNODE          *ENDNODE, *LENNODE...
APPN transmission grp number . . 1          1-20, *CALC

More...

F3=Exit  F4=List  F5=Refresh  F11=Keywords  F12=Previous
F13=How to use this display
  
```

Figure 142. Create Controller Description (APPC) Screen

In Figure 142 "APPN capable" is defined as *YES. It is recommended to do this already now because of later extensions in the network. If it not needed for the AS/400 to PS/2 connection. The APPC device descriptions will be automatically created, varied on and attached to the right controller using the information defined in the network attributes, the associated mode description, the location list and the application program. It also means that the local system will appear as an end node or network node to the adjacent system.

The switched line list name is used to the Token-Ring Network name we have just created.

The Token-Ring Network adapter address of the PS/2 is 400000000045.

Press Enter to create the APPC controller description.

41.4.6 Configure APPN Remote and Local Location List

Since we defined our APPC controller with APPN(*YES) the device descriptions will be automatically created. After the automatic creation of the devices the AS/400 will vary them on and attach them to the correct controller in the following situations:

- When a session is requested and the route chosen and the controller description doesn't already have a device description with the specified remote location name, remote NETID and local location name defined.
- When a BIND is received for a local location and the controller description doesn't already have a device description with the specified remote location name, remote NETID and local location name defined.

AS/400A, in this scenario, doesn't require the remote location of the PS/2 to be defined, as the PS/2 will always be initiating the sessions.

41.4.7 Create Mode Description

The mode description describes the session characteristics and number of sessions that will be used to negotiate the allowable values between the local and remote locations. A mode with the same name must exist at both end points. This mode description QPCSUPP is created automatically when AS/400 PC Support is installed on AS/400 and must be used with AS/400 PC Support.

In Figure 143 the mode characteristics of QPCSUPP are shown.

```

Display Mode Description

Mode description name . . . . . : MODD          QPCSUPP
Class-of-service . . . . . : COS             #CONNECT
Maximum number of sessions . . . . . : MAXSSN    64
Maximum conversations . . . . . : MAXCNV      64
Locally controlled sessions . . . . . : LCLCTLSSN 0
Pre-established sessions . . . . . : PREESTSSN 0
Inbound pacing value . . . . . : INPACING     7
Outbound pacing value . . . . . : OUTPACING    7
Max length of request unit . . . . . : MAXLENRU 2048
Text . . . . . : TEXT                AS/400 PC Support mode entry

Press Enter to continue.

F3=Exit F12=Previous

```

Figure 143. Display Mode Descriptions Screen

The parameters defined here must match those defined on the remote location (see Figure 144 on page 340).

41.4.8 Creating a User Profile

Use the CL command CRTUSRPRF to create a user profile that will identify the PC Support user to the AS/400. Type the command and press the F4 key. The following screen will be displayed.

```

CRTUSRPRF          Create User Profile

Type choices, press ENTER.

User profile . . . . . RUSSELL      Name
User password . . . . . PASSWORD   Name, *USRPRF, *NONE
User class . . . . . *USER        *USER, *SYSOPR, *PGMR..
Current library . . . . . _____ Name, *CRTDFT
Initial program to call . . . . . _____ Name, *NONE
Library . . . . . _____       Name, *LIBL, *CURLIB
Initial menu . . . . . _____   Name, *SIGNOFF
Library . . . . . _____       Name, *LIBL, *CURLIB
Limit capability . . . . . *NO      *NO, *PARTIAL, *YES
Text 'description' . . . . . Data-Entry PC user

Bottom
F3=Exit F4=List F5=Refresh F10=Additional parameters F11=Keywords
F12=Previous F13=Prompter help

```

Fill in the responses as they pertain to your specific users and press Enter.

41.5 Relationship Between AS/400 and the PS/2 (DOS)

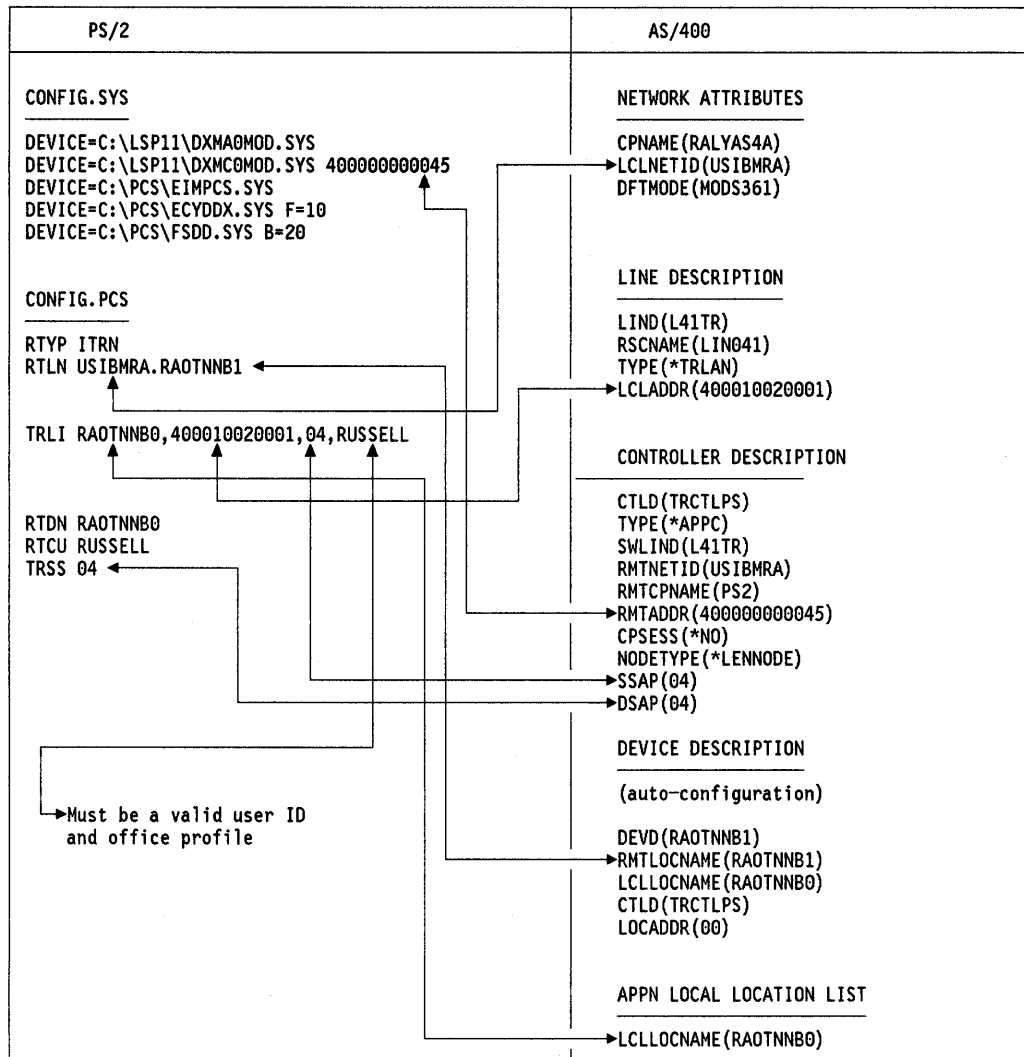


Figure 144. Relationship between AS/400 and PS/2 (DOS)

41.5.1 Installation for DOS on the Personal Computer

In the following installation description we assume that DOS 3.30 has already been installed on the PS/2.

Insert the AS/400 PC Support (PCS) diskette into drive A and type: **A INSTALL**.

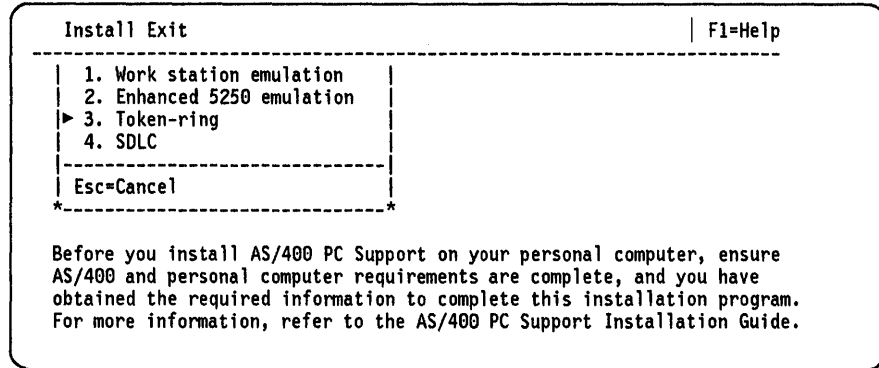


Figure 145. Installation Options Screen

Figure 145 is the screen that is displayed after you enter the **INSTALL** command. You will be installing the Token-Ring Network support, so you will select option 3 on the Installations Options screen.

Then the following screen will be displayed:

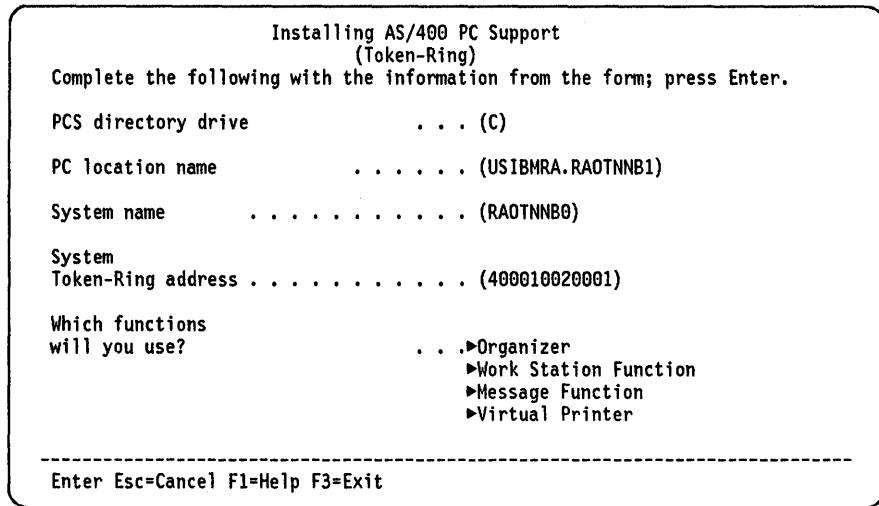


Figure 146. Installing AS/400 PC Support (SDLC) Screen

After entering these values, the PCS directory is created in the disk drive C and the PC Support files are copied from the AS/400 PC Support diskette to this directory. At the same time the **CONFIG.SYS** file is modified and the files **CONFIG.PCS** and **STARTPCS.BAT** are created using the information you have just entered.

41.5.2 Modify the CONFIG.SYS File on the PS/2

The CONFIG.SYS file is the PS/2 configuration file and not a AS/400 PC Support file. If you already have this file on your PS/2, the installation program will automatically add the device drivers to be used by the PC Support memory manager and shared folders. If you are using the workstation function, "files=15" will be added to the CONFIG.SYS file. If you are using a Token-Ring Network attachment, the device drivers for the LAN adapter handler will be included in CONFIG.SYS file if not already there.

We also included F=10 to the ECYDDX driver which allows ten files to be opened at one time and B=20 to the FSDD driver which sets aside twenty blocks (block size is 1880 bytes) of storage for cache buffering on the PS/2.

```
C>Ar.type CONFIG.SYS
files=15
break=on
lastdrive=Z
BUFFERS=20
DEVICE=C:\LSP11\DXMA0MOD.SYS
DEVICE=C:\LSP11\DXMCOMOD.SYS 400000000045
DEVICE=C:\LSP11\DXMTOMOD.SYS S=8 ST=8 C=8 O=N ES=2 EST=2
DEVICE=C:\PCS\EIMP.CS.SYS
DEVICE=C:\PCS\ECYDDX.SYS F=10
DEVICE=C:\PCS\FSDD.SYS B=20
```

Figure 147. CONFIG.SYS File Screen

41.5.3 Modify the CONFIG.PCS File on the PS/2

This file is the PC Support configuration file on the PS/2. It is created with the parameters you defined when you installed PC Support on the PS/2. In Figure 148 you can see the default CONFIG.PCS file that was created.

```
C>cd PCS
C:\PCS>type CONFIG.PCS.
RTYP ITRN
RTLN USIBMRA.RAOTNNB1
TRLI RAOTNNB0,400010020001
```

Figure 148. CONFIG.PCS Default File Screen

We will now tailor this CONFIG.PCS file to add in the parameters for the Token-Ring Network connection to the AS/400.

In Figure 149 on page 343 the following parameters are defined:

- **RTYP ITRN** specifies the router to use when communicating with AS/400.
- **RTLN USIBMRA.RAOTNNB1** uniquely identifies the PS/2 to the network. The network identifier is USIBMRA and the PC location name is RAOTNNB1. This name is sent to the AS/400 whenever the router makes contact.
- **TRLI RAOTNNB0,400010020001,04,RUSSELL** specifies the link identification and must be in the CONFIG.PCS file when the IBM Token-Ring Network router is used. Link identification includes the system name (which must

match the local location name on AS/400, the Token-Ring Network address of AS/400, the destination SAP and user ID (which must be a valid user profile name on AS/400).

- **RTDN RAOTNNB0** specifies the default system name used to start conversations if a name is not used. In this case it is AS/400's local location name.
- **RTCU RUSSELL** specifies the common user-ID to be used.

```

RTYP ITRN
RTLN USIBMRA.RAOTNNB1
TRLI RAOTNNB0,400010020001,04,RUSSELL
RTDN RAOTNNB0
TRSS 04
RTCU RUSSELL

```

Figure 149. Tailored CONFIG.PCS File for the PS/2 Token-Ring Network Link

<pre> C: \PCS\STARTRTR C: PCS\CONFIG.PCS ECHO OFF IF ERRORLEVEL 20 GOTO EXIT </pre>	Start SDLC Router
<pre> ECHO ON C: \PCS\FSPC ASSIGN I: QIWSFLR //RAOTNNB0 ECHO OFF IF ERRORLEVEL 20 GOTO EXIT </pre>	Assign drive I to AS/400 folder QIWSFLR
<pre> ECHO ON C: \PCS\PCSUPDT I: \ C: \PCS ECHO OFF IF ERRORLEVEL 20 GOTO EXIT </pre>	Run PC Support Update Function
<pre> ECHO ON C: \PCS\STARTMSG C: \PCS\CONFIG.PCS ECHO OFF IF ERRORLEVEL 20 GOTO EXIT </pre>	Start Message Function
<pre> ECHO ON C: \PCS\VPRT ECHO OFF IF ERRORLEVEL 20 GOTO EXIT </pre>	Start Virtual Print Function
<pre> ECHO ON C: \PCS\WSF C: \PCS\WSF1.DAT ECHO OFF IF ERRORLEVEL 20 GOTO EXIT </pre>	Start Workstation Function to AS/400
<pre> ECHO ON C: \PCS\STARTWSF 1 ECHO OFF IF ERRORLEVEL 20 GOTO EXIT </pre>	
<pre> ECHO ON C: \PCS\PCO C: \PCS\CONFIG.PCS ECHO OFF : EXIT ECHO ON </pre>	Start AS/400 PC Support Organizer

Figure 150. STARTPCS.BAT File

41.5.4 Change the STARTPCS.BAT File on the PS/2

This file is created when you install PC Support on the PS/2. The contents will depend on the functions you selected in Figure 146 on page 341. This file will contain the necessary commands to start PC Support. You have the option to leave this file as created or to customize it for your specific requirements. Details of this customization can be found in *PC Support Operations Reference Manual*. We recommend that you copy the contents of QIWSFLR to your fixed disk drive. Once that has been done you must change the STARTPCS.BAT file to run from the C drive.

Figure 150 on page 343 shows the contents of the **STARTPCS.BAT** file.

41.6 Starting PC Support

To begin communicating between the AS/400 and the PC, first we must vary on the line at the AS/400.

Next vary on the control unit at the AS/400.

Then run STARTPCS at the PS/2. If this is successful, the PC Support menu will be displayed.

```
AS/400 Support

Select one of the following:

Extend your PC environment:
▶ 1. Run DOS commands
  2. Set up your PC environment
  3. Work with messages
  4. Work with shared folders
  5. Work with virtual printers

Copy files between PC and host system:
  6. Transfer data from host system to PC
  7. Transfer data from PC to host

Access host resources:
  8. Start the organizer

-----
ENTER      Esc=Cancel  F1=Help    F3=Exit
```

You may select any of the functions listed on the menu. Online help information is available and is accessed by pressing F1.

41.7 Common Problems

Personal Computers with DOS

Some common problems that could occur during start-up of AS/400 PC Support are:

- **Access denied**

This is probably due to the user not being enrolled in the system directory. This is necessary if you are using shared folders.

- **Incorrect user ID or password**

Either the user profile has not been created or it has the special authority *ALLOBJ. If you want to use this profile, you must authorize it to the automatically created display device description.

- **Link connection failed**

This could indicate a hardware failure, or it could also mean that either the line, control unit or device description is in varied off status.

41.8 Relationship between AS/400 and the PS/2 (OS/2)

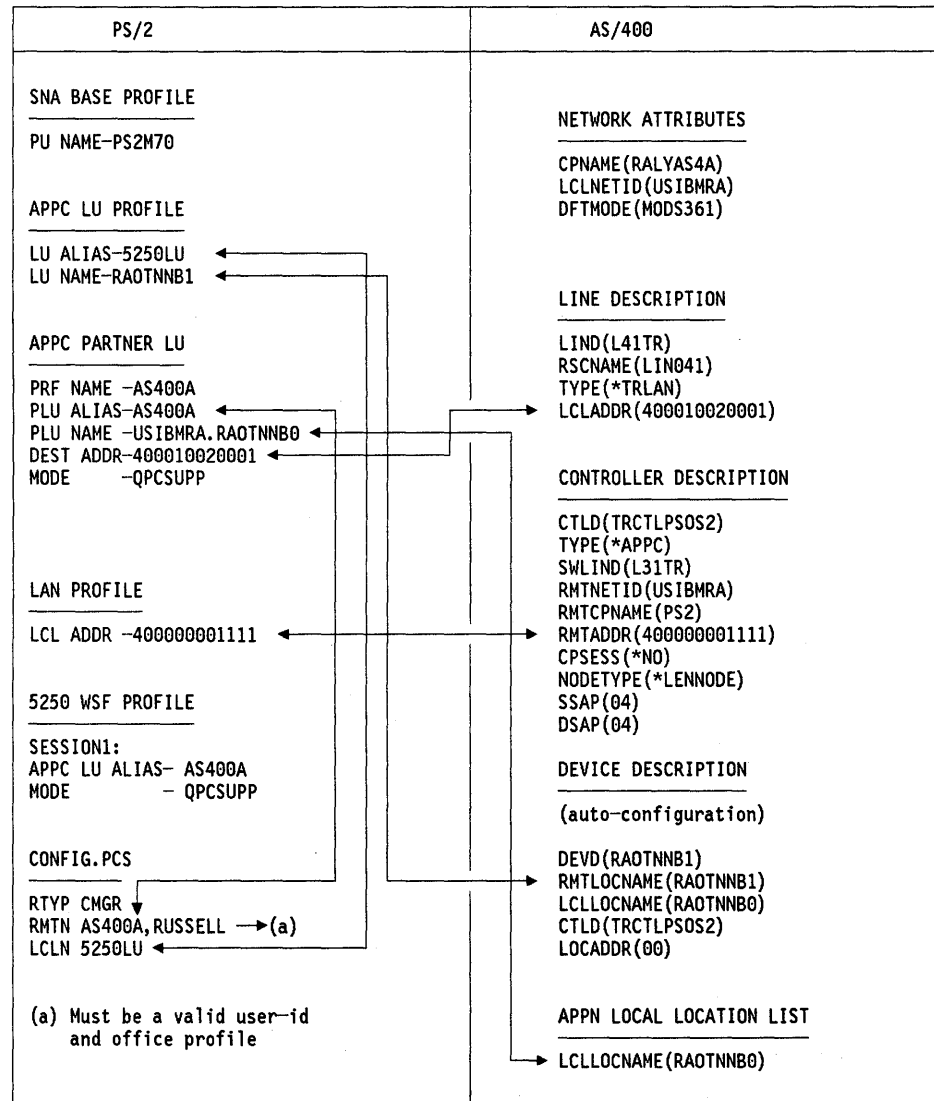


Figure 151. Relationship between AS/400 and PS/2 (OS/2)

41.8.1 Installation for OS/2 on the Personal Computer

Following are the major steps to install AS/400 PC Support on a personal computer using OS/2:

After OS/2 Communications Manager is installed, you should install PC Support.

1. Insert the installation diskette and from the OS/2 Program Manager window select the OS/2 full screen command prompt. Enter the command,

A:INSTALL

Press the Enter key when the IBM logo is displayed.

2. Read the instructions on the next screen and make the selection to install the product. You can select the *Install* option by using the mouse, or press F10 to highlight the action bar and then make a selection with the cursor keys.
3. Press the Enter key to select the Communications Manager.
4. When the install screen appears type a letter (for example, C) for the required PCSOS2 directory drive to install and select the functions you wish to be automatically available when you start PC Support.
5. Press Enter. and the necessary file are copied into the PCSOS2 directory on the selected drive.

Note: If you did not select any functions from the list, a warning message is displayed. If you proceed by pressing the Enter key, the base PC Support programs are installed.

Automatically the CONFIG.SYS is modified to include the update function and a device driver for the Shared Folders feature.

Next you have to re-IPL your PC before the PC Support can be started, since changes in the CONFIG.SYS file are only in effect after a reboot.

Use the following steps to add PC Support to the Group-Main window.

1. Select "Program" from the Group-Main action bar and select "New" from the pull-down menu.

The "New Program" window is displayed.

2. "AS/400 PC Support" as program title and "C:\PCOS2\STARTPCS.CMD" as path and filename must be typed.
3. Do not specify any optional parameters or a working directory.
4. Select "Add" to add the program to the Group-Main window.

The Group-Main window appears again with the new program selections.

You have now completed the installation of PC Support.

41.9 Starting PC Support

Start PC Support by running the STARTPCS.CMD file which was created when you installed PC Support on your personal computer. You can start PC Support from the Group-Main window. Note that your personal computer must be started again following PC Support installation for all the necessary device drivers to be available. This is because the entries were written into the CONFIG.SYS file, which is only referenced when you start your personal computer again. In addition, Communications Manager **must** be started before you try to start PC Support.

Please refer to "OS/2 EE 1.2 Communications Manager - 5250 Workstation Feature" on page 207 for installation and configuration of WSF.

The following sections are steps that describe how to start Communications Manager on the personal computer.

Add Communications Manager to the Group-Main Window (optional)

If Communications Manager does not appear in the Group-Main window, even after enlarging the window, add it as follows:

1. Select "Program" from the Group-Main action bar and select "New" from the pull-down menu.

The New Program window is displayed.

2. Type "Communications Manager" as the program title.
3. Move the cursor to the next input field with the Tab key or the appropriate Arrow key and specify the path and file names as follows:

```
C:\CMLIB\CM.CMD
```

4. Add the name of your Basic Configuration Services file (for example, BCSLAN or BCSTWX) in the optional parameters field. If you cannot remember the name of the file you created, go to an OS/2 full-screen command prompt and run the directory of your C drive as follows:

```
DIR C:\CMLIB\*.CFG
```

5. Select *Add* to add the program to the Group-Main window.

The Group-Main window appears with the new program selections.

41.9.1 Start Communications Manager

Start Communications Manager as follows:

1. From the OS/2 Group-Main window, start Communications Manager.

Communications Manager will be loaded. You are asked to type your user ID and password. Any WSF (Work Station Feature) sessions you configured using BCS (Basic Configuration Services) will be automatically started and your first emulation session will be displayed

2. Use the Hot key (the Alt key plus the Esc key) to return to the Communications Manager Main Menu screen. Use the Hot key again to return to the Group-Main window.
3. Notice a new OS/2 icon for the 5250 Workstation Feature (WSF).

4. Optionally, you could use the Ctl+Esc keys to Hot key to the task list screen. On the Task List is an entry for the 5250 WSF. You can return to your first WSF session at any time by selecting this entry.

To move between your configured WSF sessions, use the Alt key plus the Page Up key. Use the Alt+Esc keys to return to the Group-Main window.

41.9.2 Start PC Support

When you have started Communications Manager, you can start PC Support using the following steps:

1. Select AS/400 PC Support from the Group-Main window.
2. A window appears in which PC Support is being started. A series of messages appear on the screen, and you are prompted to enter a user ID and password to start the PC Support session.
3. When PC Support is successfully started, this window disappears.

Precisely what your STARTPCS.COMD file does is dependent on what options you selected during installation. By default, it starts shared folders and assigns the AS/400 folder QIWSOS2 to drive I. This folder contains all the PC Support programs and the files for the OS/2 program.

Depending on which options you specified during installation, the STARTPCS.COMD file may:

- Start the organizer feature in the first WSF session. When you sign on to this session, the AS/400 PC Support Organizer menu is displayed.
- Start the message function.
- Start the virtual printer function.

You can modify the contents of the STARTPCS.COMD file by using an editor.

Most of the functions of PC Support can be accessed from the AS/400 PC Support product menu. This menu is loaded if you did not select the organizer function. If you selected the organizer function, the menu is an option from the main organizer menu. You may also access the PC Support menu by using the command:

```
I:PCSMENU
```

on an OS/2 full-screen command prompt.

Using the menu is the simplest way to access PC Support functions. However, many users do not need, or have access to, many of the functions. Using the PC Support menu, all the functions can be accessed from one OS/2 icon.

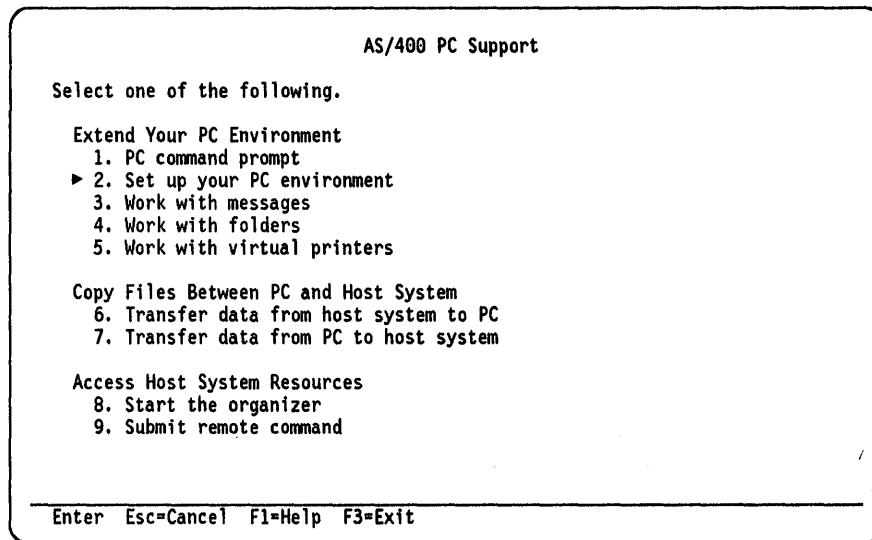
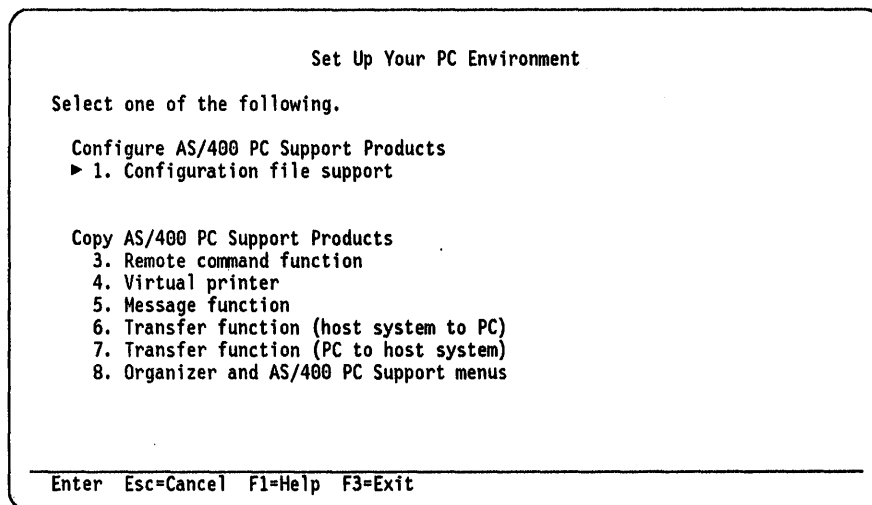


Figure 152. AS/400 PC Support Menu

When using PC Support, I is the default drive for starting any function. Option 2 (set up your PC environment) on the PC Support menu allows you to download PC Support functions to the PC Support disk. Downloading PC Support programs can substantially improve performance and is advised for all commonly used functions.



You can use options 3 to 8 on the Set Up Your PC Environment menu to download the PC Support functions to the personal computer.

41.9.3 Additional Configuration

This section reviews the main files that control the AS/400 PC Support environment: CONFIG.SYS, CONFIG.PCS, and STARTPCS.CMD. It then describes how you use the configuration function to work with the configuration files.

41.9.3.1 Files Used by PC Support

- **CONFIG.SYS**

This file is not created by PC Support. The CONFIG.SYS file contains information that is processed when you reboot your personal computer. The PC Support installation program adds information to the file during installation.

An example of the PC Support entries in CONFIG.SYS follows:

```
IFS=C:\PCSOS2\EHNSF0.DLL           Shared Folder Function
RUN=C:\OS2\CMD.EXE/C C:\PCSOS2\UPDTCFG.CMD ► NUL Update Function
```

- **CONFIG.PCS**

The CONFIG.PCS file is the PC Support configuration file. It is created when you run the installation program. This file contains identifiers that determine how PC Support should be started and run. After installation, the CONFIG.PCS file contains the following entries:

```
RTYP CMGR
RMTN 5250PLU
LCLN 5250LU
```

- **STARTPCS.CMD**

This PC Support file is created during installation. It contains the commands to start PC Support based on the functions selected during installation. Certain commands can be added or changed in this file to run specific PC Support functions. The following is an example of entries in the STARTPCS.CMD file:

C:\PCSOS2\STARTFLR @IF ERRORLEVEL 20 GOTO EXIT	- Load support for Shared Folders
C:\PCSOS2\STARTRTR C:\PCSOS2\CONFIG.PCS @IF ERRORLEVEL 20 GOTO EXIT	- Start OS/2 Router
C:\PCSOS2\FSPC ASSIGN I: QIWSOS2 //5250PLU @IF ERRORLEVEL 20 GOTO DFLT	- Start Shared Folder on your default system
I:PCSUPDT I:\ C:\PCSOS2 @IF ERRORLEVEL 20 GOTO EXIT @IF ERRORLEVEL 10 PAUSE GOTO CONT	- Start Update function
:DFLT C:\PCSOS2\FSPC ASSIGN I: QIWSOS2 @IF ERRORLEVEL 20 GOTO EXIT	- Start Shared Folders on connected system if the default system is not responding
:CONT I:STARTMSG C:\PCSOS2\CONFIG.PCS @IF ERRORLEVEL 20 GOTO EXIT	-Start Message Function
I:CFGVPRT C:\PCSOS2\CONFIG.PCS @IF ERRORLEVEL 20 GOTO EXIT	- Start Virtual Print if there are entries in CONFIG.PCS
I:PCO C:\PCSOS2\CONFIG.PCS :EXIT	- Start PC Organizer

Figure 153. STARTPCS.CMD Entries

41.9.3.2 Using the Configuration Function

The PC Support configuration function provides a program to simplify configuration of your PC environment. Use it to change or create configuration files. The configuration function has its own editor that provides prompted input screens to help you configure the CONFIG.PCS file.

The editor can be started in two ways.

1. Use the command CFGPCS (*file name*) /Z

Parameter /Z bypasses the IBM logo screen.

2. Select option 2 (Set up your PC environment) from the PC Support menu and select option 1 (Configuration file support) for editing the configuration file.

The configuration function has a full-screen editor allowing common edit functions such as:

- Move, delete, insert, and copy lines
- Move, delete, insert, and copy blocks of text.

For a detailed description of the common edit functions, see *PC Support Operations Reference Guide*.

The main purpose of the configuration function is to assist you in adding and updating the identifiers in your configuration files. Some reasons why you might change these identifiers are:

- To access more than one AS/400 system

- To automatically set up a virtual printer
- To change file transfer function attributes
- To change the message function defaults
- To change your organizer session number or menu

41.9.3.3 Editing Identifiers in a Configuration File

An example of the highlight feature:

1. Select *Highlight* on the action bar. The Identifier Group Option list appears.
2. Select one of the options, such as Router. All the identifiers concerning the router are highlighted.
3. Put the cursor on the identifier you want to change.
4. Press F4 (Prompt). A list of valid parameter and/or input fields are displayed.
5. Enter your identifier so the new values replace the old ones.

An example of adding a new identifier:

1. Place the cursor on the line after which you want to insert the new identifier.
2. Select *Identifiers* on the action bar. The Identifier Group Option list appears.
3. Select option 4 (Organizer) from the pull-down window. A list of organizer identifiers is displayed.
4. Select identifier PCOP. Leave the session number default, and type STRPCO on the command line.
5. Press the Enter key. The new entry is added to the file.
6. Select PCOP again, but now you type on the command line the library name and menu name of your customized menu, such as GO PCOLIB/PCONEW.
7. Press the Enter key, and the second PCOP entry is added to the file.

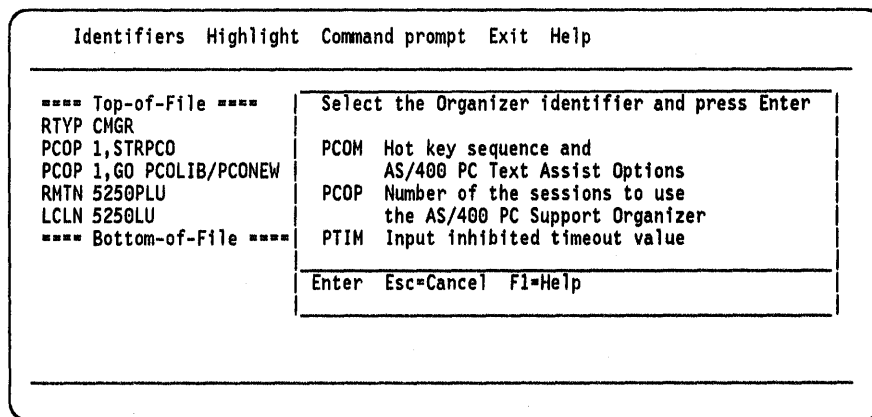


Figure 154. Configuration Function Editor Display

8. Select Escape to leave the identifier list.
9. Select *Exit*, and the Save File display appears, allowing you to change the drive, path, or file name.

Note: The PCOM identifier is not valid for the OS/2 program and will be ignored.

For a detailed description of all the function on the AS/400 PC Support Menu, please refer to: *AS/400 PC Support Under OS/2 Extended Edition Version 1.2*, GG24-3446.

41.10 Common Problems

Personal Computers with OS/2

There are three places you can find messages relating to a PC Support connection to the AS/400 system.

- The AS/400 System Operator Message Queue
 - Use the DSPMSG QSYSOPR command to display these messages.
- The OS/2 Communication Manager message file MESSAGE.DAT
 - On the Communications Manager Main Menu, press F10 and the Enter key to display the messages.
- The PC Support program window.
 - These messages are displayed interactively.

41.11 Migration Issues

There is a migration aid available to move PC Support/36 files to the AS/400. Refer to the *AS/400 Migration Aid User's Guide and Reference* manual for detailed information on how to accomplish this.

AS/400 PC Support does not support the virtual disk function. Any virtual disks that are being moved to the AS/400 will be converted to shared folders by the migration aid.

41.12 Where To Go For More Information

For more detailed information, you may refer to the following publications:

- SC21-8089 *AS/400 PC Support Installation Guide*
- SC21-8092 *AS/400 PC Support User's Guide*
- SC21-8090 *AS/400 PC Support Operation Reference Manual*
- SC21-8091 *AS/400 PC Support Technical Reference Manual*
- SC21-9601 *AS/400 PC Support Communications User's Guide*
- SC09-1166 *AS/400 Migration Aid User's Guide and Reference*
- GG24-3255 *AS/400 PC Support*
- GG24-3255 *AS/400,S/38 and PS/2 AS T2.1 Nodes in a Subarea Network*
- GG24-3446 *AS/400 PC Support Under OS/2 Extended Edition Version 1.2.*

Chapter 42. AS/400 Advanced Program-to-Program Communications

42.1 Overview

The AS/400 operating system, most appropriately and commonly known as OS/400, integrates almost all the communications capabilities currently supported on the AS/400. The "Advanced Program-to-Program Communications" (APPC) is one of the functions included in the OS/400 communications support.

The "Advanced Program-to-Program Communications" allows an application program on one system to communicate with an application program on another system. Basically, it allows the application program on either side to start the application program on the other side in order to interchange data (send and receive). Some complementary services like conversations, synchronization and parallel sessions are included to provide smooth, flexible and efficient communications.

The "Advanced Program-to-Program Communications" is an SNA subset (LU6.2) designed as a general purpose protocol that allows two systems to communicate with each other on a peer-to-peer basis. It works over an SNA PU type 2.1 but if necessary it also works over an SNA PU type 2.0. When working over PU type 2.1, the sessions are established using independent LUs, which means that the role of primary or secondary LU will be negotiated. PU type 2.0 only supports dependent LUs for which a primary-secondary role is established between the host and the LU (this way of operation can be used when one of the systems is an S/370 host; however, the S/370 software also allows you to use independent LUs).

The AS/400 can use the APPC to communicate to other systems that also support the APPC. Examples of systems supporting APPC are:

- IBM PC or PS/2 with DOS-APPC or OS/2
- Another AS/400
- S/36
- S/38
- Series/1
- S/88
- S/370 with CICS.

To use APPC, many different data-link protocols are supported when connecting the AS/400 to another system:

- SDLC for switched or leased communications lines
- HDLC for X.25 PSDNs
- Token-Ring for Local Area Networks.

Please note that in order to use a specific data-link protocol, the other system must also support it.

The Token-Ring Network data-link protocol is used when the AS/400 and another system are connected through a Token-Ring Network. This kind of connection is supported by the AS/400 SNA Support at the AS/400.

AS/400 APPC programs can be written in RPG/400 or COBOL. The user APPC programs use the "Interactive Communication Function" (ICF) file as an interface to the appropriate communications device. The ICF file sends and receives data to and from application programs, and describes how the data is going to be presented.

42.2 Planning

42.2.1 Prerequisites - Hardware

The hardware requirements are those that allow the AS/400 to attach to the Token-Ring Network. For more information, refer to "Attaching The AS/400 To A Token-Ring Network" on page 39.

42.2.2 Prerequisites - Software

- AS/400 System Support Program (5728-SS1), which includes "Advanced Program-to-Program Communications" support.

42.3 AS/400 Configurations

Once the OS/400 is installed, there are three types of communications configurations that must be made in order to define the Token-Ring Network physical connection, the characteristics of the remote system and the type of devices that are going to be used. These communications configurations are:

1. **Line Description** which is performed when the CL command "CRTLINTRN" is executed. You can do it by:
 - Keying the command with all the required parameters in the command line.
 - Keying the command and pressing PF4 to get the full-screen panel which prompts for the parameters.
 - Using the menu facilities with the sequence "Main Menu - Communications - Configure communications - Lines," will also give you the full-screen panel that prompts for the parameters.
2. **Controller Description** which is performed when the CL command "CRTCTLAPPC" is executed. You can do it by:
 - Keying the command with all the required parameters in the command line.
 - Keying the command and pressing PF4 to get the full-screen panel which prompts for the parameters.

- Using the menu facilities with the sequence “Main Menu - Communications - Configure communications - Communications controllers,” will also give you the full-screen panel that prompts for the parameters.
3. **Device Description** which is performed when the CL command “CRTDEVAPPC” is executed. When independent LUs are used, the device descriptions are automatically created. For dependent LUs, you can create the device descriptions by:
- Keying the command with all the required parameters in the command line.
 - Keying the command and pressing PF4 to get the full-screen panel which prompts for the parameters.
 - Using the menu facilities with the sequence “Main Menu - Communications - Configure communications - Communications devices,” will also give you the full-screen panel which prompts for the parameters.

For details on the parameters specified for these configurations, see the scenarios part of this document. The scenarios also show the required definitions on the other side, and they indicate the parameters that must match in both sides.

42.4 Where To Go For More Information

- *AS/400 Communications User's Guide - SC21-9601*
- *AS/400 Communications Programmers Guide - SC21-9590*
- *AS/400 Communications APPC/APPN User's Guide - SC21-9598.*
- *AS/400 Language RPG/400 User's Guide - SC09-1161*
- *AS/400 Language RPG/400 Technical Reference - SC09-1161.*

Chapter 43. AS/400 Connected to an S/370 Host

43.1 Overview

The AS/400 operating system, most appropriately and commonly known as OS/400, integrates almost all the communications capabilities actually supported on the AS/400. The only exceptions are the Remote Job Entry Facility (RJE) and the RSCS/PROFS Bridge, which both come in a separate program product known as AS/400 Communications Utilities (5728-CM1).

Many different data-link protocols are supported when connecting the AS/400 to an S/370 host: BSC, SDLC, HDLC and Token-Ring Network.

The Token-Ring Network data-link protocol is used when the AS/400 and the S/370 host are connected through a Token-Ring Network. This kind of connection is supported by the AS/400 SNA Support at the AS/400 and by the SNA products (VTAM and NCP or VTAM only on a 9370) at the host.

The SNA support in both systems is the base for the following SNA communications facilities which, again, can be used across the Token-Ring Network.

- Host Command Facility (HCF) to Distributed Host Command Facility (DHCF)
- NetView Distribution Manager (NetView DM) to Distributed Node Executive (DSNX)
- Remote Job Entry (RJE) to RES, POWER, JES2 or JES3
- 3270 Device Emulation
- SNA Upline Facility (SNUF) for user program-to-program communications with CICS or IMS
- Advanced Program-to-Program Communications (APPC) for user-written applications communicating with CICS
- SNA Distribution Services with DISOSS/370
- Distributed Data Management (DDM) with CICS/OS/VS or CICS/VSE.

It is not the intention of this document to cover the application aspects but rather to describe the communications definitions involved to support the Token-Ring connectivity. So, the 3270 Device Emulation and the Remote Job Entry Facility will be used as samples of the communications facilities that can operate through the Token-Ring Network connecting the AS/400 and an S/370 host.

3270 Device Emulation This function allows any AS/400 5250-type display or printer to emulate an IBM 3278-2 or 3279-S2B display or IBM 328X printer.

The AS/400 5250-type terminal can be a native terminal, a PC or PS/2 with the appropriate hardware

and software required to emulate a local or remote 5250 terminal, or an ASCII terminal attached via the ASCII workstation controller or via the IBM 5208/ROLM-bridge LPC.

Up to 254 concurrent sessions can be active to the S/370 host per SNA connection.

Remote Job Entry Facility This facility allows the AS/400 to function as a Remote Job Entry workstation. AS/400 readers submit jobs to an S/370 host subsystem (RES, POWER, JES2 or JES3) for processing, and output can be sent back to an AS/400 RJE printer or puncher, directed to another RJE workstation or sent to a host output device.

Remember that RJE is part of a separate product called AS/400 Communications Utilities (5728-CM1).

43.2 Planning

43.2.1 Prerequisites - Hardware

The hardware requirements are those that allow the AS/400 and the S/370 to physically attach to the Token-Ring Network.

43.2.1.1 AS/400

For the AS/400 hardware offerings in the Token-Ring Network environment, refer to "Attaching The AS/400 To A Token-Ring Network" on page 39.

43.2.1.2 S/370 host

To communicate with an S/370 host, there are several possibilities depending on what gateway communications controller will be used to attach the S/370 host to the Token-Ring Network or whether the host will be a 9370 with the integrated Token-Ring Network Subsystem hardware.

Depending on the Token-Ring Network host gateway used to connect the AS/400, the required hardware is as follows:

- A 3720 with the Token-Ring Network features. For more detail, see "3720" on page 69.
- A 3725 with the Token-Ring Network features. For more detail, see "3725" on page 71.
- A 3745 with the Token-Ring Network features. For more detail, see "3745" on page 75.
- A 9370 with the Token-Ring Network features. For more detail, see "9370 Hardware" on page 77.
- A 3174 with the Token-Ring Network features. For more detail, see "3174 Remote Gateway" on page 53.

43.2.2 Prerequisites - Software

43.2.2.1 AS/400

- AS/400 System Support Program (5728-SS1). The Token-Ring Network support and the 3270 Device Emulation are included with the operating system.
- AS/400 Communications Utilities (5728-CM1). This separate product provides the RJE Facilities.

43.2.2.2 S/370 host

Depending on the Token-Ring Network host gateway used to connect the AS/400, the required software at the host can be:

- VTAM and NCP if the Token-Ring Network host gateway is a 3720, 3725 or 3745. For more detailed information, see "37XX Communication Controllers" on page 67.
- VTAM if the Token-Ring Network host gateway is a Token-Ring subsystem on a 9370 host. For more detailed information, see "9370 Hardware" on page 77.
- VTAM if the Token-Ring Network host gateway is a 3174.
- To support the 3270 device emulation, there is no special software requirement.
- Any host subsystem like RES, POWER, JES2 or JES3 depending on the operating system installed.

43.3 AS/400 Configurations

Once the OS/400 and the AS/400 Communications Utilities are installed, there are three types of communications configurations that must be made in order to define the Token-Ring Network physical connection, the characteristics of the remote system and the type of devices that are going to be used. These communications configurations are:

1. **Line Description**, which is performed when the CL command "CRTLINTRN" is executed. You can do it by:
 - Keying the command with all the required parameters in the command line.
 - Keying the command and pressing PF4 to get the full-screen panel which prompts for the parameters.
 - Using the menu facilities with the sequence "Main Menu - Communications - Configure communications - Lines," will also give you the full-screen panel that prompts for the parameters.
2. **Controller Description** which is performed when the CL command "CRTCTHHOST" is executed. You can do it by:
 - Keying the command with all the required parameters in the command line.
 - Keying the command and pressing PF4 to get the full-screen panel that prompts for the parameters.

- Using the menu facilities with the sequence "Main Menu - Communications - Configure communications - Communications controllers," will also give you the full-screen panel that prompts for the parameters.
3. **Device Description** which is performed when the CL command "CRTDEVHOST" is executed. You can do it by:
- Keying the command with all the required parameters in the command line.
 - Keying the command and pressing PF4 to get the full-screen panel that prompts for the parameters.
 - Using the menu facilities with the sequence "Main Menu - Communications - Configure communications - Communications devices," will also give you the full-screen panel that prompts for the parameters.

For details on the parameters specified for these configurations see the scenarios part of this document. The scenarios also show the required definitions on the S/370 host side, and they indicate the parameters that must match on both sides. There is a scenario case for 3270 device emulation and a scenario case for RJE facilities.

43.4 Where To Go For More Information

- *AS/400 3270 Device Emulation User's Guide - SC21-9602*
- *AS/400 Communications User's Guide - SC21-9601*
- *AS/400 Remote Job Entry Facility User's Guide and Reference - SC09-1168.*

Chapter 44. AS/400 Communicating with "3270" Terminal

44.1 Overview

With the new announcements for the IBM 3174 establishment controller, it now supports concurrent communication adapters to multiple applications in more than one host. This means that terminals attached to it may now have up to five concurrent sessions, with the same and/or different hosts.

Therefore it is appropriate to show these new possibilities in the following setup.

The used function is: "Single Link Multi-Host Support", which is a microcode function and does not require a concurrent communication adapter. Figure 155 shows the connection that has been tested.

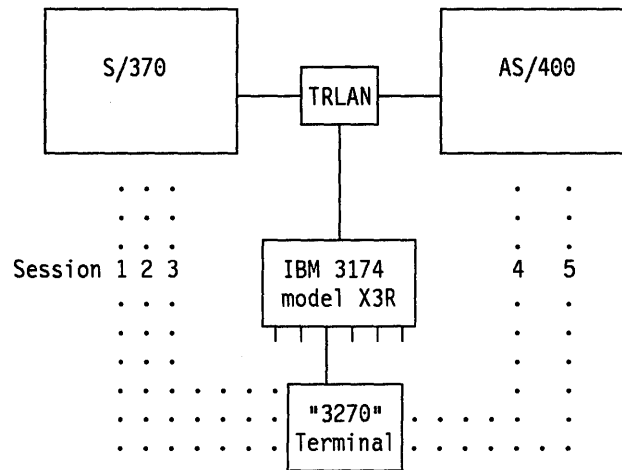


Figure 155. IBM 3174 Multi-Host Session Connection (AS/400 and S/370)

Up to eight IBM hosts can concurrently be accessed via the primary Token-Ring Network adapter. The terminal operator may "Hot key" between five sessions regardless of which host these sessions go to.

44.2 Installation

44.2.1 IBM 3174 Setup

Customizing an IBM 3174 for multi-host support is like customizing multiple IBM 3174s, with the addition that at the end you have to define a logical terminal assignment (LTA) table.

In our test we used an IBM 3174 Model 13R. Connected were one IBM 3179 with a US 122 keypad, and three 3191s with enhanced keyboards, and an IBM 4224 printer.

To customize the IBM 3174-x1R, we used Configuration Support-B. There are some SPEs (Small Program Enhancement) required for the NCP program in the gateway machines, which will be provided via a PTF (Program Temporary Fix) tape. Both Configuration Support-B and PTFs are available worldwide. The IBM 3174 requires also a minimum hardware configuration. See the announcement letters for details.

Information on how to customize your controller, can be found in *IBM 3174 Planning Guide*. We have used the following setup entries:

```

      _____ Model / Attach _____
099 - 3174 13R DSPU SLMH
100 - 13R
101 - M

PF: 3=Quit  4=Default      8=Fwd
  
```

Figure 156. IBM 3174 Setup Screen 1/7

Respond in Figure 156 for Q101 with an "M" to obtain the multihost definition screen as displayed in Figure 157.

```

      _____ Multi-Host Definition _____
Fill in a new host, change a host or select a host for configuring
Host ID  Adapter  Host  Hardware  Include  Host Descriptor
        Type  Attach  Group      in IML
1A      -        7        -          -        S/370 _____
2A      -        -        -          -        _____
3A      -        -        -          -        _____
1B      -        -        -          1        AS400 _____
-       -        -        -          -        _____
-       -        -        -          -        _____
-       -        -        -          -        _____
-       -        -        -          -        _____

      Select ==>1A
PF: 3=Quit      7=Back      12=Done
  
```

Figure 157. IBM 3174 Setup Screen 2/7

Enter the relevant information for all the hosts to be configured and enter the first host ID for getting the attachment definition screen as shown in Figure 158.

NOTES:

The columns in Figure 157 are described in detail below:

- **Host ID**

A two-character identifier for each of the hosts. The first character is numeric and identifies the specific host link. The second character is alphabetic.

1A identifies the primary host, 2A and 3A identify hosts that are accessed via concurrent communication adapters (CCAs). Single Link Multi-Host Support is possible only on the primary host link (if the link is Token-Ring Network). Therefore, hosts on the link are identified as 1A, 1B, 1C, 1D, 1E, 1F, 1G and 1H, when using Single Link Multi-Host Support.

Note:

When planning for Single Link Multi-Host Support, prioritize the hosts by alphabetic order (1A highest priority, 1B next priority).

- **Adapter Type**

This field is for concurrent communication adapters. It identifies the adapter type:

1=Type 1 concurrent communication adapter

2=Type 2 concurrent communication adapter

- **Host Attach**

This identifies the type of host attachment for each link. The primary host (1A) has the following possibilities:

1=BSC

5=Local SNA

2=SDLC and/or X.21 Nonswitched

6=X.21 Switched

3=X.25

7=Token-Ring Network

4=Local Non-SNA

Note:

Respond with 7 for Single Link Multi-Host Support.

Host links through concurrent communication adapters (2A and 3A) have the following possibilities:

Type 1 CCA:

1=BSC

3=X.25

2=SDLC and/or X.21 Nonswitched

Type 2 CCA:

2=SDLC and/or X.21 Nonswitched

6=X.21 Switched

3=X.25

- **Hardware Group**

The possible responses to these fields are hardware groups 51 and 52. You determine your response by identifying how the CCAs are physically plugged into the available card slots. Card slots are numbered; the CCA plugged into the card slot with the lowest number is assigned hardware group 51. If you use two CCAs, the second CCA will be assigned to hardware group 52. If you use only one CCA, it must be assigned to hardware group 51.

- **Include in IML**

This field specifies whether a configuration for a host is to be included in the IML (initial microcode load). Possible responses are:

0=No

1=Yes

Note:

To use secondary hosts through single link multi-host support, the primary (1A) host must be included in the IML.

• **Host Descriptor**

This optional field is used to describe each host. The description can contain up to 20 characters. If filled in, the description will appear in the operator information area (OIA) of displays accessing the host.

Token-Ring Network					
1A = S/370			TOKEN		
106 - 4000 000 3174 04	107 - 4000 0124 0001 04	108 - DSPU3R			
110 - 2	116 - 2_				
121 - 01	123 - 0	125 - 00000000	126 - 00000000	127 - 0 0	
132 - 0 0 0 0	136 - 1 0 0 1	137 - 0 0 0 0	138 - 0		
141 - A	165 - 0	166 - A	168 - 0		
173 - 00000000	175 - 000000				
213 - 0	215 - 20001	220 - 2			
380 - 2042	381 - 1	382 - 0521	383 - 4		
PF: 3=Quit 4=Default 8=Fwd					

Figure 158. IBM 3174 Setup Screen 3/7

This is the port assignment for the first host 1A (S/370).

117: Port Assignment												
LT=	1A = S/370					116=2					00/TOKEN	
Port #IS	Host addresses					Port #IS	Host addresses					
	1	2	3	4	5		1	2	3	4	5	
26-00	002	003	004	___	___	26-01	005	006	007	___	___	
26-02	008	009	010	___	___	26-03	011	012	013	___	___	
26-04	___	___	___	___	___	26-05	___	___	___	___	___	
26-06	___	___	___	___	___	26-07	___	___	___	___	___	
26-08	___	___	___	___	___	26-09	___	___	___	___	___	
.
:	:	:	:	:	:	:	:	:	:	:	:	:
26-30	___	___	___	___	___	26-31	___	___	___	___	___	
PF: 3=Quit 4=Default 7=Back 8=Fwd 9=RtnH												

Figure 159. IBM 3174 Setup Screen 4/7

After pressing PF8 you will return to setup screen 2/7 where the selection of "1B" will be followed by the host PU definition screen for the second host, the AS/400.

```

      _____ Token-Ring Network _____
                1B = AS400
106 - 4000 000 3174 04   107 - 4000 1002 0001 04
                        116 - 2_
                        125 - 00*****0           127 - 0 0
                        165 - 0
                        215 - FFFFF           220 - 0           221 - 0
380 - 2042              381 - 1           382 - 0521           383 - 7

PF: 3=Quit  4=Default      8=Fwd

```

Figure 160. IBM 3174 Setup Screen 5/7

Note:

1. Q107; contains the local administered address of the AS/400.
2. Q125; digit 2,3,4,5,6,7 cannot be configured for a secondary host.
3. Q215; PUID must match the last part of the EXCHID parameter in the controller description on the AS/400.

The port assignment screen for host 1B (AS/400) is as displayed on the following screen.

```

      _____ 117: Port Assignment _____
                1B = AS400
LT=
                116=2           00/TOKN
                Host addresses
Port #IS 1 2 3 4 5           Port #IS 1 2 3 4 5
26-00    002 003 _____   26-01    004 005 _____
26-02    _____         26-03    _____
26-04    010 _____         26-05    _____
26-06    _____         26-07    _____
26-08    _____         26-09    _____
.         . . . . .           .         . . . . .
.         . . . . .           .         . . . . .
.         . . . . .           .         . . . . .
26-30    _____         26-31    _____

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

```

Figure 161. IBM 3174 Setup Screen 6/7

In the logical terminal assignment (LTA) table, you assign which real LU session you want and in which sequence, for the terminals at the physical ports. This is done by putting a selection of host and logical terminal position ids in the corresponding table entries.

Logical Terminal Assignment											
					801=2						
Port	LT1	LT2	LT3	LT4	LT5	Port	LT1	LT2	LT3	LT4	LT5
26-00	1A1	1A2	1A3	1B1	1B2	26-01	1A1	1B2	1A3	1B1	1A2
26-02	1A1	1A2	1A3	_____	_____	26-03	1A2	1A1	_____	_____	_____
26-04	1B1	_____	_____	_____	_____	26-05	_____	_____	_____	_____	_____
26-06	_____	_____	_____	_____	_____	26-07	_____	_____	_____	_____	_____
.
.
26-30	_____	_____	_____	_____	_____	26-31	_____	_____	_____	_____	_____

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

Figure 162. IBM 3174 Setup Screen 7/7

On the previous screen the port entry 1A1 at 26-01 means that the first session of the terminal at physical port 01 has a session with host 1A (the primary host) and the LU as defined in row 26-01, column 1, of the port assignment table for that host.

As result of our setup the sessions per terminal, expressed by "HOST,LOCADR" became:

Phys. port	Term. type	LU sessions per terminal				
		1	2	3	4	5
00	3179	S/370,02	S/370,03	S/370,04	AS400,02	AS400,03
01	3191	S/370,05	AS400,05	S/370,07	AS400,04	S/370,06
02	3191	S/370,08	S/370,09	S/370,10		
03	3191	S/370,12	S/370,11			
04	4224	AS400,10				
05	----					
..	----					
31	----					

Note: A printer can only have a session with one host.

A new IML will be necessary if you attached new devices or made changes to the existing hardware configuration of the IBM 3174.

44.2.2 Definitions on AS/400 for 3174 connection

When you are going to connect a 3174 to an AS/400 via a Token-Ring Network you are required to perform the following steps:

- Create a line description from AS/400 to the 3174
- Create device descriptions for the terminals or printers on the 3174

44.2.2.1 Create Line Description

The first step in defining the 3174 to the AS/400 is to create the line description. This can be done by either following the screens documented or by using the CL command CRTLINTRN and press F4.

```
CRTLINTRN          Create Line Desc (Token-Ring)

Type choices, press Enter.

Line description . . . . . ▶ TRNLINE      Name
Resource name . . . . . LIN041          Name
Online at IPL . . . . . *NO             *YES, *NO
Vary on wait . . . . . *NOWAIT         *NOWAIT, 15-180 (1 second)
Maximum controllers . . . . . 40        1-256
Maximum frame size . . . . . 1994      265, 521, 1033, 1994
Local adapter address . . . . . 400010020001 400000000000-7FFFFFFF...
Exchange identifier . . . . . *SYSGEN   05600000-056FFFFF, *SYSGEN
SSAP list:
  Source Service Access Point . *SYSGEN *SYSGEN, 04, 08, 0C, 10...
    + for more values
Text 'description' . . . . . Token-Ring Line Description
F3=Exit  F4=List  F5=Refresh  F10=Additional parameters  F11=Keywords
F12=Previous  F13=How to use this display
```

Figure 163. Create Line Description (TRLAN) Screen

The resource name is the name of the physical communications port on the AS/400. It can be found by executing the command WRKHDWPRD and taking the option to work with your rack configuration.

The local Token-Ring Network adapter address of AS/400 is 400010020001.

Press Enter to create the line description. Then it returns to the Work with Line Descriptions screen.

44.2.2.2 Create Remote Workstation Controller Description

The next step is to create an RWS controller description that describes the 3174 you are connecting to. Again, you can follow the screens or enter the CL command CRTCTLRWS and press F4.

```
CRTCTLRWS          Create Ctl Desc (Remote WS)

Type choices, press Enter.

Controller description . . . . . ▶ TRN3174      Name
Controller type . . . . . ▶ 3174              3174, 3274, 5251, 5294, 5394
Controller model . . . . . ▶ 0                0, 1, 0001, 2, 0002, 12, 0012
Link type . . . . . ▶ *TRLAN                 *SDLC, *TRLAN, *X25
Online at IPL . . . . . *YES                 *YES, *NO
Switched line list . . . . . ▶ TRNLINE        Name
    + for more values
Exchange identifier . . . . . 017FFFFFFF  00000000-FFFFFFF  FFF
Initial connection . . . . . *ANS           *DIAL, *ANS
TRLAN remote adapter address . . ▶ 400000003174 00000000001-FFFFFFF
Text 'description' . . . . . 3174-13R on Token-Ring

More...

F3=Exit  F4=List  F5=Refresh  F11=Keywords  F12=Previous
F13=How to use this display
```

Figure 164. Create Remote Workstation (RWS) Screen

44.2.2.3 Create a Device Description

The next step is to create a device description the 3174 you are connecting to. Again, you can follow the screens or enter the CL command CRTDEV DSP and press F4.

```
CRTDEV DSP          Create Device Desc (Display)

Type choices, press Enter.

Device description . . . . . > TRN3179A      Name
Device class . . . . . > *RMT                *LCL, *RMT, *VRT
Device type . . . . . > 3278                 3101, 3151, 3161, 3162...
Device model . . . . . > 0                   0, 1, 2, 11, 12, 23, 31...
Local location address . . . . . 02          02-FE
Emulating ASCII device . . . . . *NO        *NO, *YES
Physical attachment . . . . . *DIRECT       *DIRECT, *PTT, *MODEM...
Online at IPL . . . . . *YES                *YES, *NO
Attached controller . . . . . TRN3174       Name
Keyboard language type . . . . . USB        *SYSVAL, AGB, AGI, BLI...
Character identifier:
  Graphic character set . . . . . *SYSVAL    1-32767, *SYSVAL
  Code page . . . . .                      1-32767
Allow blinking cursor . . . . . *YES        *YES, *NO
Text 'description' . . . . . S1 of IBM3179 at 3174-13R

Bottom
F3=Exit  F4=List  F5=Refresh  F10=Additional parameters  F11=Keywords
F12=Previous  F13=How to use this display
```

Figure 165. Create Device Description Screen

More display devices can be created where the device description name has to be different and the local location address can be 03, 04, 05, etc...

Also a printer can be defined using the menu from the main screen or by entering the CL command CRTDEV PRT and then entering the required parameters.

44.3 Relationship between AS/400 and the 3174

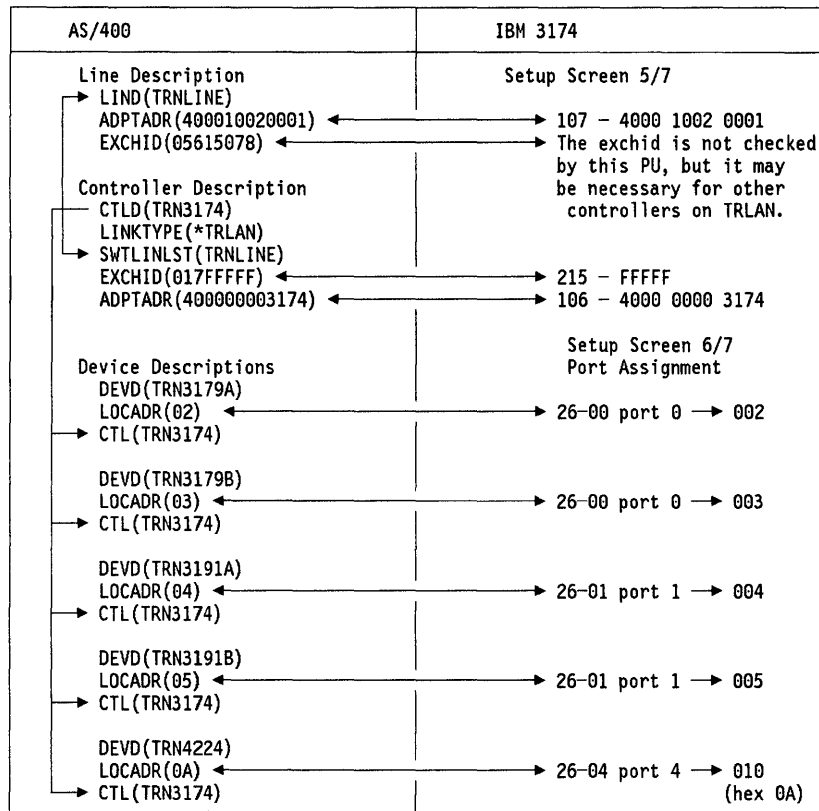


Figure 166. Relationship between AS/400 and Multi-Host 3174

44.4 Operation

1. Ensure that the line you are using to the Token-Ring Network is ACTIVE. If it is not, activate the line by the command `WRKCFGSTS *LIN TRNLINE`, and select option 1.

Note: If you encounter problems with the activation, do a vary on with the reset option set to *YES. This option will reset the communication IOP of the Token-Ring Network adapter in the AS/400.

Normally it takes a few seconds for the line to start. The final status will look like:

Work with Configuration Status			
Opt	Lin/Ctl/Dev/Mod	Status	-----Job-----
	TRNLINE	VARIED ON	

Figure 167. Status of Line TRNLINE

2. Now activate the controller by the command `WRKCFGSTS *CTL TRN3174` and select option 1, as shown. After a few seconds the controller and device status will change to VARIED ON PENDING.

Work with Configuration Status			
Opt	Lin/Ctl/Dev/Mod	Status	-----Job-----
1	TRN3174	VARIED OFF	
	TRN3179A	VARIED OFF	
	TRN3179B	VARIED OFF	
	TRN3191A	VARIED OFF	
	TRN3191B	VARIED OFF	
	TRN4224	VARIED OFF	

Figure 168. Status of Controller TRN3174

3. Using the IBM 3174 controller

- Make sure there is a configuration diskette in the 3174
- Power on display stations, printer and controller.

4. When the controller becomes active, the line status display, called with the command WRKCFGSTS *LIN TRNLINE, will look like the next screen:

Work with Configuration Status			
Opt	Lin/Ctl/Dev/Mod	Status	-----Job-----
	TRNLINE	ACTIVE	
	TRN3174	ACTIVE	
	TRN3179A	SIGNON DISPLAY	
	TRN3179B	SIGNON DISPLAY	
	TRN3191A	SIGNON DISPLAY	
	TRN3191B	SIGNON DISPLAY	
	TRN4224	VARIED ON	

Figure 169. Final Status of Line TRNLINE

From the terminals at the IBM 3174 you may now access the S/370 host, and/or the AS/400 host. By simple Hot Keying, you may switch between the two environments. On the 122 keypad use, ALT + INS (Insert key); on the enhanced keyboard, use Alt + Home.

At the bottom line the session number and host descriptor from setup screen 2/7 are displayed, to guide the user through the available sessions.

44.5 Where To Go For More Information

For more information about the 3270 support in relationship with the AS/400 system, refer to the following publications:

- SC21-9777 *AS/400 CL Reference Manual*
- SC21-9590 *AS/400 Communications Programmer's Guide*
- GA27-3862 *IBM 3174 Planning Guide, Configuration Support-B*
- GA27-3863 *IBM 3174 Utilities Guide, Configuration Support-B*
- GA27-3868 *IBM 3174 Central Site Customizing Guide, Configuration Support-B*
- GG24-3061-2 *IBM 3174 Installation Guide, Configuration Support-B*
- GG24-3061 *IBM 3174 Establishment Control Unit Installation Guide*
- GG24-3420 *AS/400, S/38 and PS/2 as T2.1 Nodes in a Subarea Network*
- GG24-3449 *AS/400 Communication Definitions Examples.*

Chapter 45. System/88 Advanced Program to Program Communications

45.1 Overview

The System/88 is often used in communications environments where there is a need to communicate with a wide variety of IBM as well as non-IBM systems.

To provide a common solution to the communications requirements of the IBM systems working on an SNA environment, the System/88 software provides Advanced Program-to-Program Communications (APPC), which is an IBM Systems Network Architecture standard for program to program communications among interconnected systems.

The Advanced Program-to-Program Communications support is not included in the System/88 operating system. It is provided as a separate licensed program called:

- 5732-025 System/88 Advanced Program-to-Program Communications

APPC provides a high-level programming interface that allows an application program on one system to communicate with an application program on another system. Basically, it allows the application program on either side to start the application program on the other side in order to interchange data (send and receive). Some complementary services like conversations, synchronization and parallel sessions are included to provide smooth, flexible and efficient communications.

The Advanced Program-to-Program Communications is an SNA subset (LU 6.2) designed as a general purpose protocol that allows two systems to communicate with each other on a peer-to-peer basis. It works over an SNA T2.1 node (low entry networking node) but if necessary it also works over an SNA PU type 2.0.

When working over a T2.1 node, the sessions are established using independent LUs which means that the role of primary or secondary LU will be negotiated. PU type 2.0 only supports dependent LUs for which primary-secondary role is established between the host and the LU (this way of operation can be used when one of the systems is an S/370 host; however, the S/370 software also allows you to use independent LUs).

The System/88 can use APPC to communicate to other systems that also support the APPC. Examples of systems supporting APPC are:

- IBM PC or PS/2 with DOS-APPC or OS/2 EE
- Another System/88
- S/36
- S/38
- Series/1
- AS/400
- S/370 running CICS applications
- S/370 running VTAM applications.

To use APPC, two different data-link protocols are supported when connecting the System/88 to another system:

- SDLC for switched or leased communications lines
- Token-Ring for Local Area Networks

Please note that in order to use a specific data-link protocol, the other system must also support it. The Token-Ring Network data-link protocol is used when the System/88 and another system are connected through a Token-Ring Network.

To use APPC and the Token-Ring data-link protocol to communicate the System/88 with another system across the Token-Ring Network, the APPC licensed program has some prerequisite software as shown later in the "Prerequisites - Software" section.

System/88 APPC programs can be written in BASIC, C Language, FORTRAN, COBOL, Pascal or PL/I. The user application program has access to the APPC verbs via calls to a special server routine.

The APPC programming interface provides conversation verbs as well as operator verbs.

Conversation verbs allow the application program to communicate at a conversation level with no session awareness.

Operator verbs allow the application program to perform operator functions in lieu or on behalf of a human operator.

As a conclusion, the System/88 APPC is the SNA subset for peer-to-peer communications that can be used to communicate the System/88 to any other system supporting APPC, through the Token-Ring Network.

45.2 Planning

45.2.1 Prerequisites - Hardware

The hardware requirements are those that allow the System/88 to attach to the Token-Ring Network. For more information, refer to "IBM System/88 Token-Ring Hardware" on page 27.

45.2.2 Prerequisites - Software

The following product is required to support the System/88 Token-Ring Network adapter:

- 5732-001 System/88 Operating System Version 6 or later.

Additionally, the following set of products provide the application programmer with the capability of using the APPC programming interface when communicating the S/88, across the Token-Ring Network, to another system that also supports the APPC.

- 5732-027 System/88 Network Interface Support
- 5732-057 System/88 SNA Token-Ring Link Manager
- 5732-006 System/88 Transaction Processing Services

45.3 Installation and Definitions

There are three major steps that must be done in order to support and operate the System/88 Token-Ring Network adapter in an APPC environment (in addition to the required APPC application development). These steps are:

- Software Installation
- System configuration
- SNA-APPC Definitions.

45.3.1 Software Installation

The System/88 software installation is based on a standard procedure that allows you to extract the required products from a generic release tape, according to the software purchased bits updated on the master disk label by the remote support center.

The `Install_new_release` operating system command provides the required facilities to install a complete new release as well as specific products that are being added to the system. The *Installation Procedure for Generic Release* document is delivered with the generic release tape. This document contains detailed installation descriptions.

45.3.2 System Configuration

Once the software installation is completed, the system must be configured to recognize the physically installed Token-Ring Network adapter. The system configuration consists of a set of tasks that must be performed by the system administrator logged in as a privileged user.

1. Edit the `devices.tin` configuration file to include the Token-Ring Network adapter definition.

This file is located in the `(master_disk)>system>configuration` directory. For details on the Token-Ring Network adapter definition, see the section "System/88 Token-Ring Network adapter Definition" later in this chapter.

2. Use the `create_table` system administrator command to produce the new system devices table.

This command creates a structured record file called a table, from the text in the `devices.tin` file. To simplify this step, it is suggested that you make the `(master_disk)>system>configuration` directory, your current directory. Then, type `create_table devices`. The created table (`devices.table`) is put by default in the current directory: `(master_disk)>system>configuration`.

3. Use the `broadcast_file` system administrator command to **install** the created table in the `(master_disk)>system` directory.

This command does the same function as the `copy_file` command when the system has only one System/88 module. If the system has two or more modules, then the single `broadcast_file` command will automatically copy the file to all the modules in the system against executing the `copy_file` as many times as modules in the system.

4. Use the `configure_devices` system administrator command to tell the operating system to **immediately** recognize the Token-Ring Network adapter added to the devices definition table.

Note that this command takes effect only for **additional** devices but not for changes made to the already existing devices. In the case of a system with multiple modules, you will have to log in to each module as a privileged user to execute the `configure_devices` command in that module.

45.3.2.1 System/88 Token-Ring Network adapter Definition

The System/88 Token-Ring Network adapter definition is achieved by putting a parent device entry and up to 16 subdevice entries in the `device.tin` system configuration file.

The Figure 170 shows a Token-Ring Network sample definition.

```

/      =name           t_ring_1
      =module         m1
      =device_type    mpx_gcomm
      =slot           22
      =adapter_slot_no 12
      =adapter_subchannel_no 0
      =mpx_device     1
      =firmware_type  user2
      =parameters     '-nd_addr 400020010088
+ -grp_addr 0 -fct_addr 0 -rcv_buff 8
+ -rcv_len 2048 -tx_buff 1 -tx_len 2048 -mx_sap 16
+ -mx_sta 64 -mx_gsap 0 -mx_gmem 0
+ -t1_one 5 -t2_one 1 -ti_one 25
+ -t1_two 25 -t2_two 10 -ti_two 125 -end'

/      =name           t_ring_1.sap.0
      =login_slave    0
      =mpx_parent     t_ring_1
      =parameters     '-end x'
      .
      .
      .
/      =name           t_ring_1.sap.15
      =login_slave    0
      =mpx_parent     t_ring_1
      =parameters     '-end x'

```

Figure 170. Sample Definitions for the S/88 Token-Ring Network adapter

From Figure 170, please note that the Token-Ring Network adapter is defined by the general structure used to define a parent device with its related subdevices. Note that the “=parameters” label for the parent device entry is being used to provide a unique definition for a Token-Ring Network device since all of Token-Ring Network Data Link Control (DLC) parameters are included there

The following are the general device definition relevant parameters.

- For the parent device
 - “=name” specifies the name you assign to the Token-Ring Network adapter.
 - “=device_type” defines the type of device being added. For the Token-Ring Network adapter, “mpx_gcomm” must be specified.
 - “=slot” indicates in which CEC slot the IOP card is installed.

- “=**adapter_slot_no**” indicates in which IOA chassis slot the Token-Ring Network adapter is inserted.
- “=**mpx_device**” must be specified as 1 to be able to have subdevices.
- “=**firmware_type**” specifies the type of firmware to be loaded. Specify “user2.”
- For the subdevices
 - “=**name**” specifies the name you assign to the subdevice. For documentation purposes it is recommended that you put the parent device’s name as part of the subdevice name.
 - “=**mpx_parent**” must be the name assigned to the Token-Ring adapter in the parent device definition.

The following are the Token-Ring Network DLC definition relevant parameters.

- “=**nd_addr**” specifies the node address of the adapter, which must be unique on the network. This value is also known as the medium access control (MAC) address. It is specified using 12 hexadecimal digits, going from 000000000000 to FFFFFFFF.
- “=**rcv_len**” specifies the length (in bytes) of the receive buffers. It is a decimal value from 96 to 2048. The value specified must be a multiple of 8. The default is 2048.
- “=**tx_len**” specifies the length (in bytes) of the transmit buffers. It is a decimal value from 96 to 2048. The value specified must be a multiple of 8. The default is 2048.
- “=**mx_sap**” specifies the maximum number of individual SAPs that can be open at one time. It is a decimal value between 2 and 127. The default value is 2. The maximum value is limited by the amount of memory available on the adapter.
- “=**mx_sta**” specifies the maximum number of link stations that can be open at one time. It is a decimal value between 0 and 254. The default value is 6. The maximum value is limited by the amount of memory available on the adapter.

45.3.3 SNA-APPC Definitions

The SNA-APPC definitions can be classified in two groups:

1. SNA resources
2. APPC resources.

The SNA-APPC definitions are done by executing SNA commands which you will have access to after you start the SNA operator interface by executing the `sna_network_admin` operator command. Once the SNA operator interface prompt is displayed, type “login” to finally be able to execute the SNA commands.

45.3.3.1 SNA Resources Definition

There are four types of SNA resources that must be defined:

- **Nodes**, which can be local or adjacent. The `add_node` command allows you to define the nodes.
- **Links**, which are also called "Service Access Points" (SAPs) when they are Token-Ring Network links. Each of these links corresponds to a subdevice in the Token-Ring Network device definition in the `devices.tin` configuration file. Use the `add_link -protocol token_ring` command to define the links.
- **Class of Service**, which allows to specify particular or general classes of service for the links. Use the `set_cos` command to establish the class of service.
- **Stations**, which are logical structures in your local node that are used to establish the communication with a remote node by specifying the remote node MAC and SAP addresses. The station is defined to a Token-Ring Network link or SAP previously defined. Use the "add_station -protocol token_ring" to define the stations.

45.3.3.2 APPC Resources Definition

There are five types of APPC resources that must be defined:

- **Adjacent and local LUs**, which can be defined using the `add_lu` command.
- **LU addresses**, which define an address that a host uses to access the local LU. Use the `add_lu_address` command to define these addresses.
- **Remote LU**, which allows to define an LU in the remote node to a local LU. Use the `add_remote_lu` command to define this type of LUs.
- **Modes**, which allows you to define the characteristics of the sessions between the local and the remote LUs. The remote LU must be previously defined to the local LU. Use the `add_mode` command to define the modes.
- **Transaction Programs**, which allows to define the transaction program to the local LU. Use the `add_tp` command to define the transaction programs.

For details on the parameters specified for these SNA definition commands, see the scenarios part of this document. The scenarios also show the required definitions on the other side, and they indicate the parameters that must match on both sides.

45.4 Where To Go For More Information

For more information related to the system and required SNA-APPC definitions see these publications:

- *Token-Ring DLC Interface Programmer's Guide - SC34-1060*
- *Advanced Program-to-Program Communication: Planning and Operations Guide - SC34-0759*
- *Advanced Program-to-Program Communication: Programming Guide and Reference - SC34-0760*
- *IBM SNA Transaction Programmer's Reference Manual for LU Type 6.2 - GC30-3084*
- *Operating System Commands - SC34-0666*

- *Operating System Commands User's Guide - SC34-0972*
- *System Administrator's Guide - SC34-0067*
- *Device Configuration Guide - SC34-0979*
- *IBM Token-Ring Network Introduction and Planning Guide - GA27-3677*
- *IBM Token-Ring Network Architecture Reference - SC30-3374*
- *System/88 APPC Resource Definition Guidelines, - GG66-3133.*

Chapter 46. VTAM and NCP Definitions

The following sections describe how VTAM and NCP support the different Token-Ring Network host gateways and the Token-Ring Network stations using these gateways.

46.1 3174 Local Gateway and Downstream PUs

This section describes the VTAM definitions needed for a 3174-1L/11L as a local gateway. It also describes how the stations (PUs) on the ring that are communicating through this gateway are defined.

46.1.1 VTAM Major Node Definitions

The 3174 gateway is defined as any SNA channel-attached control unit. Each Token-Ring Network station (for example, a 3174 Model 3R or a PC running 3270 Emulation Program V3, Personal Communications/3270 Program V1.0 or Workstation Program V1.1) is also defined as an SNA channel-attached control unit.

The gateway and the downstream PUs (DSPU) on the Token-Ring Network are defined in a VTAM VBUILD TYPE=LOCAL major node. A subchannel address (corresponding to the one defined in the operating system) must be defined for the gateway and contiguous addresses for the DSPUs. The definitions could be split into several major nodes if desired.

IMPORTANT: All channel addresses defined during the 3174 gateway customization, must have their PU definitions in an active VTAM major node. Otherwise the addresses above the address not defined will not work. If you have defined extra addresses for future use, it is recommended that these are made inactive with an ISTATUS=INACTIVE statement.

This is an example of local major node for a 3174 gateway at channel address 040, and a DSPU at channel address 041:

```
* LOCAL 3174-1L DEFINITIONS FOR GATEWAY
*-----
HSNA040 VBUILD TYPE=LOCAL
H040PU  PU  CUADDR=040, ISTATUS=ACTIVE, PUTYPE=2, MAXBFPU=12,      *
          MODETAB=AMODETAB, DLOGMOD=M2SDLCQ, USSTAB=US327X,      *
          VPACING=0
*
H040T00 LU  LOCADDR=2
H040T01 LU  LOCADDR=3, MODETAB=MTJS328X, DLOGMOD=SCS3262      ] Coax attached
H040T02 LU  LOCADDR=4                                          ] LUs to gateway
          :
*-----
* LOCAL DEFINITIONS FOR DSPU
*-----
H041PU  PU  CUADDR=041, ISTATUS=ACTIVE, PUTYPE=2, MAXBFPU=12,      *
          MODETAB=AMODETAB, DLOGMOD=M2SDLCQ, USSTAB=US327X,      *
          VPACING=0, SECNET=YES
*
H041T00 LU  LOCADDR=2
H041T01 LU  LOCADDR=3, MODETAB=MTJS328X, DLOGMOD=SCS3262      ] LUs on DSPU
H041T02 LU  LOCADDR=4                                          ]
          :
```

Figure 171. VTAM Local Definitions for 3174 1L Gateway

Some parameters on the PU statement that are important for the Token-Ring Network are described below.

- CUADDR =

For the gateway, this is the operating system channel address. The last two digits of the address should be the same as the ones entered in question 104 in the customization of the 3174 gateway.

For a DSPU, this address is based on the values entered in question 104 and 105, and presented in the menu in question 940, in the customization of the 3174 gateway. Depending on the 3174 gateway, its customization is described in: "3174 Local Gateway" on page 43, and "3174 Remote Gateway" on page 53. The two last digits of the address should be the same as the ones presented in the S@ column in question 940 (except the gateways address) in the customization of the 3174 gateway.

- SECNET =

This parameter is only valid for VTAM V3R1.1 and later. For the gateway this parameter must be coded as SECNET=NO (default value). For the PU statements that represent the DSPUs this parameter should be coded SECNET=YES.

- MAXBFRU =

Specifies the number of VTAM IOBUFs that are reserved for receiving data from the 3174. For the 3174 to work, this number multiplied by the VTAM IOBUF size must be equal to or larger than a 256-byte RU plus its headers (LH, TH, RH). For good performance and to match to the most common VTAM IOBUF sizes, code MAXBFRU=12. You may want to tune this value according to your environment.

The scenario on Figure 241 on page 580 shows the most important parameters in the definitions and how they must match.

46.2 3174 Remote Gateway and Downstream PUs

This section describes the VTAM and NCP definitions for the SDLC link-attached 3174 1R/11R, 2R/12R, 51R/61R or 52R/62R acting as gateways in a Token-Ring Network environment. It also describes how the Token-Ring Network stations using this gateway for host communication are defined.

To enable VTAM to communicate with the Token-Ring Network stations, the only thing you have to do in the host is to generate and load a new NCP reflecting the gateway and its supported DSPUs.

The 3174 remote gateway could be described as a protocol converter that takes Token-Ring Network frames off the ring and converts them to SDLC frames and transmits them on to the SDLC link. To VTAM this looks like the gateway and its supported DSPUs are drops on a multidrop leased line. The physical configuration should be a leased point-to-point line.

Define the 3174 remote gateway and its supported Token-Ring Network stations as drops on a SDLC-leased multidrop line. The first drop is the gateway PU and the successive drops are the DSPUs. Each PU has a unique SDLC address.

When using configuration support level B, **remote gateway Group Poll** support is included. The remote Token-Ring Network gateway can be polled with a single poll command on behalf of all its DSPUs. Whenever input is pending from a Token-Ring Network attached device the gateway will respond positively to that poll. In this way long polling lists are avoided within the NCP and the number of unproductive polls is reduced drastically on the line. This in turn will shorten the response times for the DSPUs or will allow more DSPUs to be attached to the remote ring. Up to 16 Token-Ring Network gateways can be attached to one line, communicating in half-duplex flip/flop mode on half or full duplex communication facilities. To support group polling "small program enhancements" (SPE) must be applied to NCP as well as to SSP. They will be available in the form of a PTF for NCP V4-R3.1, NCP V5-R2.1 The GROUP, LINE and SERVICE macros for defining a remote gateway and five DSPUs look like this:

```

*          GROUP MACRO FOR REMOTE 3174 GATEWAY AND DSPUS          *
*****
GRPOLLB  GROUP  LNCTL=SDLC,DIAL=NO,GP3174=A1
*****
*          LINE MACRO FOR REMOTE 3174 GATEWAY AND DSPUS          *
*****
L13008  LINE  ADDRESS=(08,HALF),                                  *
          ATTACH=MODEM,                                           *
          ANS=CONTINUE,                                           *
          CLOCKNG=EXT,                                           *
          DUPLEX=(HALF),                                         *
          MODULO=8,                                             *
          ETRATIO=30,                                           *
          ISTATUS=ACTIVE,                                       *
          LPDATS=LPA2,                                          *
          MAXPU=6,                                             *
          NPACOLL=YES,                                         *
          PAUSE=0.2,                                           *
          SERVLIM=255,                                         *
          SPEED=9600,                                          *
          SRT=(,64),                                           *
          OWNER=M20
*****
*          SERVICE MACRO SPECIFICATION FOR SDLC (LINE 008)      *
*          (NOT FOR GROUP POLL IF ONLY ONE 3174R CONNECTED TO THE LINE) *
*****
          SERVICE MAXLIST=6,
          ORDER=(P13008A,P13008B,P13008C,P13008D,P13008E,P13008F)

```

Figure 172. NCP GROUP, LINE and SERVICE Macros for a 3174 Remote Gateway

The PU and LU macros for defining a remote gateway and five DSPUs look like this:

```

*****
*          PU / LU MACROS                      (LINE 008)          *
*****
P13008A PU  ADDR=C1,          THIS IS THE GATEWAY                *
           DISCNT=(NO),                                           *
           MAXDATA=521,                                           *
           ISTATUS=ACTIVE,                                       *
           MAXOUT=7,                                             *
           PACING=0,                                             *
           PASSLIM=8,                                           *
           PUDR=YES,      MAXLU DEFAULTS TO LUDRPOOL VALUE      *
           PUTYPE=2,                                             *
           RETRIES=(,4,5),                                       *
           SECNET=NO,                                           *
           SSCPFM=USSSCS,                                       *
           USSTAB=US327X,                                       *
           VPACING=0
T13008A1 LU LOCADDR=2,MODETAB=AMODETAB,DLOGMOD=M2SDLCQ,ISTATUS=ACTIVE
T13008A2 LU LOCADDR=3,MODETAB=AMODETAB,DLOGMOD=M2SDLCQ,ISTATUS=ACTIVE
*
P13008B PU  ADDR=C2,          PC 3270 EMULATION GATEWAY          *
           DISCNT=(NO),                                           *
           MAXDATA=265,      PC 3270 EMULATION SUPPORTS 265    *
           ISTATUS=ACTIVE,                                       *
           MAXOUT=7,                                             *
           PACING=0,                                             *
           PASSLIM=8,                                           *
           PUDR=YES,      MAXLU DEFAULTS TO LUDRPOOL VALUE      *
           PUTYPE=2,                                             *
           RETRIES=(,4,5),                                       *
           SECNET=YES,                                           *
           SSCPFM=USSSCS,                                       *
           USSTAB=US327X,                                       *
           VPACING=0
T13008B1 LU LOCADDR=2,MODETAB=AMODETAB,DLOGMOD=M2SDLCQ,ISTATUS=ACTIVE
T13008B2 LU LOCADDR=3,MODETAB=AMODETAB,DLOGMOD=M2SDLCQ,ISTATUS=ACTIVE
:
:
P13008F PU  ADDR=C6,          *
           DISCNT=(NO),                                           *
           MAXDATA=265,      PC 3270 EMULATION SUPPORTS UP TO 265*
           ISTATUS=ACTIVE,                                       *
           MAXOUT=7,                                             *
           PACING=0,                                             *
           PASSLIM=8,                                           *
           PUDR=YES,      MAXLU DEFAULTS TO LUDRPOOL VALUE      *
           PUTYPE=2,                                             *
           RETRIES=(,4,5),                                       *
           SECNET=YES,                                           *
           SSCPFM=USSSCS,                                       *
           USSTAB=US327X,                                       *
           VPACING=0
T13008F1 LU LOCADDR=2,MODETAB=AMODETAB,DLOGMOD=M2SDLCQ,ISTATUS=ACTIVE
T13008F2 LU LOCADDR=3,MODETAB=AMODETAB,DLOGMOD=M2SDLCQ,ISTATUS=ACTIVE

```

Figure 173. NCP PU and LU Macros for a 3174 Remote Gateway

The parameters involved in defining the 3174 remote gateway are described in detail below.

- GROUP macro
 - LNCTL =
 - Must be SDLC when using Group Poll
 - DIAL =
 - Must be NO when using Group Poll
 - GP3174 =

Any two hexadecimal digits except x'00' and x'FF'. When LPDATS=LPDA2 is coded x'FD' is not valid. The default is GP3174=NO (no group polling).

- LINE macro
 - ADDRESS =
Must be (XXX,HALF); DSPUs are half-duplex devices.
 - MODULO =
Required when group poll is used. This parameter should have the value of 8.
 - MAXPU =
Specifies the maximum number of PUs supported; should be the gateway PU plus the number of all DSPUs. If you have five DSPUs, this parameter should have the value 6.
- SERVICE macro (not used for group polling)
 - MAXLIST =
Defines the maximum number of entries listed in the Service Order Table. In our example with five PUs, this parameter should have the value 6.
 - ORDER =
Defines a list of the order in which the gateway PU and its supported PUs should be polled. The list should contain the symbolic names of all the PUs.
- PU macro
 - ADDR =
Defines the SDLC station address. This value should correspond to the values defined in the customization (question 104) of the gateway and the DSPUs.
 - MAXDATA =
Defines the NCP frame size. A value of 521 should be coded for the gateway. The value for a 3174 DSPU should also be 521; for a PC running 3270 Emulation V3 specify 265.
 - PUDR =
Specifies if dynamic reconfiguration is allowed for this PU. For backup purposes it could be useful to code YES on this parameter.
 - SECNET =
This parameter applies only to VTAM V3R1.1 and later. Code SECNET=NO for the gateway PU and SECNET=YES for the DSPUs.

The scenario on Figure 242 on page 582 show the most important parameter in the definitions and how they must match.

46.3 37XX Gateway and Downstream PUs

This section describes the VTAM and NCP definitions needed to allow stations on a Token-Ring Network to communicate to VTAM through the NCP/NTRI function in a 37XX gateway.

The NTRI function is similar in the NCPs for 3720, 3725 and 3745, but the values of some parameters may differ with the hardware. When the differences are significant, examples for the different hardwares are included.

46.3.1 Installation Steps

1. Generate new NCP

To get the NCP Token-Ring Network Interface (NTRI) function of NCP V5 (NCP V4R3 for 3725) to work and support the Token-Ring Network, you have to add and update some macros and parameters in the NCP source code. Following is a short description of the macros and parameters and examples of how they look in the NCP source code.

An OPTIONS macro has to be included. The parameter NEWDEFN=YES has to be specified on this macro. This is how it looks in the NCP generation deck:

```
*****
*      OPTIONS DEFINITION STATEMENT      *
*****
NCPOPT OPTIONS  NEWDEFN=YES      NTRI GENERATION, MUST BE FIRST STMT
```

Figure 174. OPTIONS Definition Statement

The BUILD macro has to be updated with some parameters concerning the Token-Ring Network. This is an example of how it can look in the generation deck:

```
*****
*      BUILD MACRO SPECIFICATIONS      *
*****
NCPBUILD BUILD LOCALTO=1.5,      NTRI.  ACK TIMER FOR LOCAL T-R  X
                MXRLINE=4,      NTRI.  NUMBER PHYSICAL CONNECTIONS X
                MXVLINE=40,     NTRI.  NUMBER LOGICAL CONNECTIONS X
                REMOTTO=1.5,    NTRI.  ACK TIMER FOR REMOTE T-R X
                .
                .
                .
```

Figure 175. NTRI Related Parameters for the BUILD Macro

THE NUMTYP2 parameter in the LUDRPOOL macro has to be increased with the number of LUs that will be active at the same time on the Token-Ring Network. The macro looks like this:

```
*****
*      DYNAMIC RECONFIGURATION POOL SPACE      *
*****
DRPOOLLU LUDRPOOL NUMTYP2=90      RESERVE 90  LUS ON PU.T2 PUS
```

Figure 176. Updated LUDRPOOL Macro

The TIC or TICs should be specified in a GROUP macro with the parameter ECLTYPE=PHYSICAL. This GROUP macro should be followed by a LINE, PU and LU macro to describe a TIC. A definition of two TICs in a 3720 could look as shown below. The definition of TICs in the 3725 looks the same, except for the ADDRESS parameter. This parameter is described for 3725 in the detailed description of the LINE macro that follows after these examples.

```

*****
*          PHYSICAL GROUP FOR NTRI TIC #1
*****
EG22P00  GROUP ECLTYPE=PHYSICAL
*
EL22016  LINE  ADDRESS=(16,FULL),    TIC ADDRESS           X
          PORTADD=0,                FIRST TIC             X
          LOCADD=400001220000,      LOCAL ADMIN. ADDRESS OF TIC X
          RCVBUFC=4095,            NTRI RECEIVE BUFFER   X
          MAXTSL=1108              NTRI TRANSMIT DATA CAPACITY
*
EP22016  PU
*
EU22016  LU    ISTATUS=INACTIVE
*****
*          PHYSICAL GROUP FOR NTRI TIC #2
*****
EG22P01  GROUP ECLTYPE=PHYSICAL
*
EL22017  LINE  ADDRESS=(17,FULL),    TIC ADDRESS           X
          PORTADD=1,                FIRST TIC             X
          LOCADD=400001220001,      LOCAL ADMIN. ADDRESS OF TIC X
          RCVBUFC=4095,            NTRI RECEIVE BUFFER   X
          MAXTSL=1108              NTRI TRANSMIT DATA CAPACITY
*
EP22017  PU
*
EU22017  LU    ISTATUS=INACTIVE

```

Figure 177. Physical GROUP Macro for 3720

A definition of four TICs in a twin-CCU 3745 could look like this:

```

*****
*      PHYSICAL GROUP FOR NTRI TIC #1-CCUA      *
*****
EG06P00 GROUP ECLTYPE=PHYSICAL      PHYSICAL GROUP
*
EL061088 LINE ADDRESS=(1088,FULL),      TICS ADDRESS IN 3745      X
                PORTADD=0,              WHERE EG06L00 POINTS TO  X
                LOCADD=400001060000,     'SOFT' ADDRESS FOR TIC   X
                RCVBUFC=4095,           RECOMMENDED BUFFER CAPACITY X
                MAXTSL=1108,           TRANSMIT FRAME SIZE      X
                ADAPTER=TIC1,          4 Mbps ADAPTER (3745 ONLY) X
                TRSPEED=4              4 Mbps                  (3745 ONLY)

EP061088 PU
EU061088 LU      ISTATUS=INACTIVE
*****
*      PHYSICAL GROUP FOR NTRI TIC #2 - CCUA      *
*****
EG06P01 GROUP ECLTYPE=PHYSICAL      PHYSICAL GROUP
*
EL061089 LINE ADDRESS=(1089,FULL),      TICS ADDRESS IN 3745      X
                PORTADD=1,              WHERE EG06L01 POINTS TO  X
                LOCADD=400002060000,     'SOFT' ADDRESS FOR TIC   X
                RCVBUFC=4095,           RECOMMENDED BUFFER CAPACITY X
                MAXTSL=1108,           TRANSMIT FRAME SIZE      X
                ADAPTER=TIC1,          4 Mbps ADAPTER (3745 ONLY) X
                TRSPEED=4              4 Mbps                  (3745 ONLY)

EP061089 PU
EU061089 LU      ISTATUS=INACTIVE
*****
*      PHYSICAL GROUP FOR NTRI TIC #1 - CCUB      *
*****
EG06P02 GROUP ECLTYPE=PHYSICAL      PHYSICAL GROUP
*
EL061092 LINE ADDRESS=(1092,FULL),      TICS ADDRESS IN 3745      X
                PORTADD=2,              WHERE EG06L02 POINTS TO  X
                LOCADD=400001070000,     'SOFT' ADDRESS FOR TIC   X
                RCVBUFC=4095,           RECOMMENDED BUFFER CAPACITY X
                MAXTSL=1108,           NTRI TRANSMIT DATA CAPACITY X
                ADAPTER=TIC2,          16/4 Mbps ADAPTER (3745 ONLY)X
                TRSPEED=16              16 Mbps

EP061092 PU
EU061092 LU      ISTATUS=INACTIVE
*****
*      PHYSICAL GROUP FOR NTRI TIC #2 - CCUB      *
*****
EG06P03 GROUP ECLTYPE=PHYSICAL      PHYSICAL GROUP
*
EL061093 LINE ADDRESS=(1093,FULL),      TICS ADDRESS IN 3745      X
                PORTADD=3,              WHERE EG06L03 POINTS TO  X
                LOCADD=400002070000,     'SOFT' ADDRESS FOR TIC   X
                RCVBUFC=4095,           RECOMMENDED BUFFER CAPACITY X
                MAXTSL=1108,           NTRI TRANSMIT DATA CAPACITY X
                ADAPTER=TIC2,          16/4 Mbps ADAPTER (3745 ONLY)X
                TRSPEED=16              16 Mbps

EP061093 PU
EU061093 LU      ISTATUS=INACTIVE

```

Figure 178. Physical GROUP Definitions for Twin-CCU 3745

Each station on the ring having a session through the NCP/NTRI will use a LINE and a PU macro defined under a GROUP macro with ECLTYPE=LOGICAL. That is, one LINE and one PU macro must be coded for each simultaneously active PU. This support is very similar to the support for PUs on traditional SDLC switched lines. In this macro you could use the AUTOGEN facility to get PUs and LINES generated for the logical lines that will support the Token-Ring Network stations. The macro could look like this for the 3720 and 3725:

```

*****
*      LOGICAL GROUP FOR NTRI TIC 1      *
*****
EG06L00 GROUP ECLTYPE=LOGICAL,          LOGICAL GROUP          X
          AUTOGEN=10,                   AUTOGEN 10 LOGICAL LINES/PUS X
          CALL=INOUT,                   ALLOW DIAL IN AND DIAL OUT X
          PHYPRT=0                       POINTS TO TIC (PORTADD)
*****
*      LOGICAL GROUP FOR NTRI TIC 2      *
*****
EG06L01 GROUP ECLTYPE=LOGICAL,          LOGICAL GROUP          X
          AUTOGEN=10,                   AUTOGEN 10 LOGICAL LINES/PUS X
          CALL=INOUT,                   ALLOW DIAL IN AND DIAL OUT X
          PHYPRT=1                       POINTS TO TIC (PORTADD)

```

Figure 179. Logical GROUP Definitions for 3720 and 3725

And for the 3745 with four TICs it looks like this:

```

*****
*      LOGICAL GROUP FOR NTRI TIC 1 - CCUA      *
*****
EG06L00 GROUP ECLTYPE=LOGICAL,          LOGICAL GROUP          X
          AUTOGEN=10,                   AUTOGEN 10 LOGICAL LINES/PUS X
          CALL=INOUT,                   ALLOW DIAL IN AND DIAL OUT X
          PHYPRT=0                       POINTS TO TIC (PORTADD)
*****
*      LOGICAL GROUP FOR NTRI TIC 2 - CCUA      *
*****
EG06L01 GROUP ECLTYPE=LOGICAL,          LOGICAL GROUP          X
          AUTOGEN=10,                   AUTOGEN 10 LOGICAL LINES/PUS X
          CALL=INOUT,                   ALLOW DIAL IN AND DIAL OUT X
          PHYPRT=1                       POINTS TO TIC (PORTADD)
*****
*      LOGICAL GROUP FOR NTRI TIC 1 - CCUB      *
*****
EG06L02 GROUP ECLTYPE=LOGICAL,          LOGICAL GROUP          X
          AUTOGEN=10,                   AUTOGEN 10 LOGICAL LINES/PUS X
          CALL=INOUT,                   ALLOW DIAL IN AND DIAL OUT X
          PHYPRT=2                       POINTS TO TIC (PORTADD)
*****
*      LOGICAL GROUP FOR NTRI TIC 2 - CCUB      *
*****
EG06L03 GROUP ECLTYPE=LOGICAL,          LOGICAL GROUP          X
          AUTOGEN=10,                   AUTOGEN 10 LOGICAL LINES/PUS X
          CALL=INOUT,                   ALLOW DIAL IN AND DIAL OUT X
          PHYPRT=3                       POINTS TO TIC (PORTADD)

```

Figure 180. Logical GROUP Definitions for 3745

Following is a detailed description of the parameters involved in defining the Token-Ring Network connection.

- **OPTIONS macro**

- NEWDEFN=YES

Required for NTRI. Must be the first statement in source.

- **BUILD macro:**

- MXRLINE = n (1 to 2), 37X5: 1 to 8

Specifies the number of TICs installed. Must also equal the number of physical line definitions.

- MXVLINE = n

Specifies the number of PUs that can connect to the 37xx. This value must equal the number of logical line definitions plus the number of

lines generated by the AUTOGEN facility. For the 3720, the value of n ranges from 1 to 520; for the 37X5, the value of n ranges from 1 to 1500 (or 9999 depending on the 37XX used).

- LOCALTO = n (0.6 to 20.0)

Defines the timeout value for a link on the attached (local) ring. The default value of 1.5 is satisfactory.

- REMOTTO = n (0.6 to 20)

Defines the timeout value for a link on a remote (across a bridge) ring. The value 1.5 is satisfactory to start with.

- **LUDRPOOL macro**

- NUMTYP2

Not a specific parameter for NTRI, but has to be increased for SDLC switched links to reflect the maximum number of LUs that will be ACTIVE at one time.

- **GROUP macro:**

- ECLTYPE = PHYSICAL/LOGICAL

Specifies if the GROUP definition is for LOGICAL or PHYSICAL connection to the ring. All PHYSICAL GROUP macros must be specified before the LOGICAL GROUP macros.

- AUTOGEN = n

Only for logical connections. Specifies the number of logical LINE and PU statement pairs that will be automatically generated by NDF. This is an optional parameter; the statements could also be coded manually. For the 3720, the value of n ranges from 1 to 520; for the 37X5, the value of n ranges from 1 to 1500 (or 9999 depending on the 37XX used).

- PHYPORT = NONE | 0 to 99

Only for logical connections. Specifies the physical port address that will be used by the lines in a logical GROUP to communicate, that is, which TIC will support the logical line. The value here must correspond to the PORTADD parameter on the LINE statement in the PHYSICAL GROUP.

If you specify PHYPORT = NONE (default), the lines and PUs in this logical group can be used with any port (TIC) and will be allocated first.

- **LINE macro:**

If you have specified AUTOGEN = x⁵⁵ in the LOGICAL GROUP macro, there is no need to specify LINE macros in this GROUP. The NTRI generation process will generate LINE and PU definitions. Under the PHYSICAL GROUP macro the LINE macro must be coded and specifies the TIC and how it will function.

⁵⁵ If you do not use the AUTOGEN facility you have to code a LINE and PU statement on the LOGICAL GROUP for each simultaneously active Token-Ring Network station.

- ADDRESS=(XX,FULL),

Specifies the physical position of a TIC.

For 3720 the value can be 16 or 17.

For the 3725 it can be a value in the following ranges: 80-83, 112-115, 144-147, 176-179, 208-211 or 240-243.

For the 3745 it can be in the range of 1088-1095.

- PORTADD=n (0 to 99)

Assigns a number to the physical port. This number is used as reference for dial out. It is required to code it.

- LOCADD=4000abbbbbbb

Specifies the TIC's unique address in the Token-Ring Network.

The "a" can be any number from 0 to 7.

The "b" can be any number from 0 to 9.

- RCVBUFC=n (6 x buffer size to 4095)

Specifies the buffer capacity allocated to receive data from the ring. The value should be at least the largest frame + 45. The maximum value of 4095 is recommended.

- MAXTSL=n (265 to 16732)

Specifies the largest PIU (in bytes) that NTRI can transmit. For best performance the value of 1108 is recommended for the TRA1 and the value 4 Kb is recommended for the TRA2.

- ADAPTER= This parameter is 3745 only. Specify TIC1 for the type 1 adapter (4 Mbps). Specify TIC2 for the type 2 adapter (16/4 Mbps)

- TRSPEED= Indicates the speed and the way the token is released. Specify 4 if 4 Mbps or 16 if 16 Mbps with early token release is required.

2. Load and activate NCP

Before loading the NCP the NDF output must be copied to VTAMLST library as usual.

3. Define a VTAM switched major node

The NTRI defines the downstream PUs as switched; it is therefore necessary to code a VTAM switched major node that contains definitions for the DSPUs that are going to communicate with VTAM. There are no new parameters in this major node. In fact, it's very similar to the one used by traditional SDLC-switched PUs. This is an example of a VTAM switched major node defining two PCs (each emulating a PU T2). The definitions are exactly the same for a 3174-3R.

```

*****
*
*          VTAM SWITCHED MAJOR NODE FOR NTRI
*
*****
E13SW  VBUILD MAXGRP=5,          REQUIRED * X
          MAXNO=12,             REQUIRED * X
          TYPE=SWNET            REQUIRED
**
**
**
E13PS01 PU  ADDR=13,           COULD BE ANYTHING (NOT USED) * X
          IDBLK=017,           PC 3274 EMULATOR * X
          IDNUM=E0001,         PC 3274 EMULATOR * X
          DISCNT=NO,          * X
          MAXOUT=1,           * X
          MAXDATA=265,        * X
          MODETAB=AMODETAB,   * X
          MAXPATH=2,          * X
          VPACING=0,          * X
          PUTYPE=2,           * X
          DLOGMOD=M2SDLCQ,    * X
          USSTAB=US327X      *
**
E13D0101 PATH DIALNO=0004400000313000, TO 3270 PC EMULATOR * X
          GRPNM=EG06L00,     FROM TIC 1 * X
          GID=1,             * X
          PID=1
**
E13D0102 PATH DIALNO=0104400000313000, TO 3274 EMUL.PC * X
          GRPNM=EG06L01,     FROM TIC 2 * X
          GID=1,             * X
          PID=2,             * X
          USE=NO              X
          INITIALY INACTIV
**
E13L0102 LU  LOCADDR=2        FOR THE PC EMULATOR
**
**
E13PS02 PU  ADDR=13,           COULD BE ANYTHING (NOT USED) * X
          IDBLK=05E,          PC WITH 3270 WORKSTATION PGM * X
          IDNUM=A0001,        PC APPC * X
          DISCNT=NO,          * X
          MODETAB=MTAPPC,     * X
          MAXPATH=2,          * X
          VPACING=0,          * X
          PUTYPE=2,           * X
          SSCPFM=USSSCS,     * X
          DLOGMOD=APPCNEGB
          USSTAB=US327X
**
**
E13D0201 PATH DIALNO=0008400000313001, TO PC WSP * X
          GRPNM=EG06L00,     FROM TIC 1 * X
          GID=1,             * X
          PID=1
**
E13D0202 PATH DIALNO=0108400000313001, TO PC WSP * X
          GRPNM=EG06L01,     FROM TIC 2 * X
          GID=1,             * X
          PID=2,             * X
          USE=NO              X
          INITIALY INACTIV
**
E13L0203 LU  LOCADDR=2        FOR THE PC APPC
**
E13L0204 LU  LOCADDR=3        FOR THE PC APPC
**

```

Figure 181. VTAM Switched Major Node for DSPUs Using NCP/NTRI

Following is a description of parameters that are important for the Token-Ring Network:

The PU statement:

- ADDR =

This parameter is not used in Token-Ring Network environment, but it must be coded anyhow.

- **MAXDATA =**

This parameter must be 265 for the PC 3270 Emulation Program V3.

The PATH statement:

- **DIALNO =**

Code 16 digits in the format.

DIALNO = xxyy4000abbccddd

where:

xx = the port number (TIC) to which this station is connected; it is the number defined in NCP by PORTADD = .

yy = the service access point of this station. This is normally 04 in SNA environment. One important exception is Workstation Program 1.1, which uses 08.

The rest of the digits must be a locally administrated (soft) address. The address must be unique in the Token-Ring Network and it is recommended that you use the address with the following format:

4000 a bb cc ddd

where 4000 is fixed,

a is a station type:

- 1 = 37xx gateway addr
- 2 = 3174 local gateway
- 3 = PC-type DSPU
- 4 = 3174 remote DSPU
- 5 = etc.

bb Subarea number of NCP or VTAM

cc Ring number

ddd Serial number

- **GRPNM =**

This parameter points to the name of the GROUP ECLTYPE = LOGICAL statement in the NCP definition.

As in a traditional SDLC-switched environment, the Token-Ring Network stations (that call into, and are called out from the NCP) identify themselves with the XID command containing the IDBLK and IDNUM values specified at customization. These values are mapped to the corresponding values in the VTAM switched major node to obtain the correct definitions for the station.

The scenario on Figure 243 on page 584 shows the most important parameter in the definitions and how they must match. In this case the DSPU is a 3174-3R.

46.4 MODETAB Considerations

In general there are no special MODETAB considerations; the MODETABs you use in your network should work also in the Token-Ring Network. Some restrictions exist:

Using a 3174-1L/11L with the gateway feature limits the MAXRU size outbound to less than or equal to 4K bytes, and the inbound MAXRU size to be greater than 64 bytes.

For file transfer using VTAM the query bit in the PSERVIC= parameter must be ON like this: PSERVIC=X'xx80xx....xxx'

46.5 INN Sessions over Token-Ring Network

NCP V4R3.1 (for 3725 and 3720), NCP V5R2.1 and NCP V5R3 (for 3745 and 3720) support INN sessions over the Token-Ring Network. The sessions could be PU T4-to-PU T4 or they could be PU T4-to-PU T5 (if the other subarea is a 9370).

The subarea-to-subarea connection over the Token-Ring Network is viewed by VTAM as taking place over a leased point-to-point half-duplex SDLC line.

INN sessions and PU T2 sessions (BNN sessions) can be mixed on the same TIC with adapter type 2 (16/4 Mbps). In that situation NCP V5R3 is required.

46.5.1 Configuration Parameters

To support these INN connections some parameters have been changed in the NCP releases mentioned above. These are:

- ECLTYPE
- LOCADD
- ADDR.

46.5.2 Planning Checklist

- It is not possible to load and dump an NCP over the Token-Ring Network.
- Only one NTRI INN link is allowed per TG.
- A mixture of BNN and INN links is possible on the same TIC with adapter type 2 and NCP V5R3 only.

46.5.3 Installation Steps

This section only describes how to define a TIC for INN sessions. For information about installing Token-Ring Network and NTRI support, refer to the sections concerning the hardware in question.

For information on how the 9370 is defined for INN sessions to another 9370 or an NCP with Token-Ring Network INN session support, see "9370 Software" on page 399.

1. Code a separate GROUP macro with ECLTYPE=(PHYSICAL,INN) and a separate GROUP macro with ECLTYPE=(LOGICAL,INN) for each TIC or 9370 Token-Ring Network Adapter that is to have the support.

The (PHYSICAL,INN) GROUP defines the TIC that this NCP uses to communicate.

The (LOGICAL,INN) GROUP defines the TIC in the other NCP to which this NCP communicates.

If two NCPs, subarea 1 and subarea 2, are to be connected over a Token-Ring Network, the definitions would look like this for the subareas.

For subarea 1:

```
*****
*          PHYSICAL GROUP FOR NTRI INN TIC IN SUBAREA 1          *
*****
IN1GP00 GROUP ECLTYPE=(PHYSICAL,INN) PHYSICAL GROUP FOR OWN TIC
*
IN1L1088 LINE ADDRESS=(1088,FULL),   TICS ADDRESS IN 3745           X
              PORTADD=0,             WHERE PHYPORT POINTS TO      X
              LOCADD=400001060001,    RING ADDRESS FOR OWN TIC    X
              RCVBUFC=4095,           RECOMMENDED BUFFER CAPACITY X
              MAXTSL=1108             TRANSMIT FRAME SIZE
*
IN1P1088 PU
*
IN1U1088 LU   ISTATUS=INACTIVE
*****
*          LOGICAL GROUP FOR NTRI INN TIC IN SUBAREA 1          *
*****
IN1GL00 GROUP ECLTYPE=(LOGICAL,INN)  LOGICAL GROUP DESCR. OTHER TIC
              PHYPORT=0,             POINTS TO PORTADD           X
              ADDR=04400010701002,   RING ADDR. FOR TIC IN SA 2  X
              SDLCST=(SDL06PRI,SDL06SEC),
              ANS=CONTINUE,           X
              TGN=8
*
IN1LL00 LINE
*
IN1PL00 PU
```

Figure 182. PHYSICAL and LOGICAL GROUP Macros for INN Sessions (Subarea 1)

For subarea 2:

```

*****
*      PHYSICAL GROUP FOR NTRI INN TIC IN SUBAREA 2      *
*****
IN2GP00 GROUP ECLTYPE=(PHYSICAL,INN) PHYSICAL GROUP FOR OWN TIC
*
IN2L1089 LINE ADDRESS=(1089,FULL),      TICS ADDRESS IN 3745      X
                PORTADD=0,              WHERE PHYPORT POINTS TO  X
                LOCADD=400010701002,    RING ADDRESS FOR OWN TIC X
                RCVBUFC=4095,          RECOMMENDED BUFFER CAPACITY X
                MAXTSL=1108            TRANSMIT FRAME SIZE
*
IN2P1089 PU
*
IN2U1089 LU      ISTATUS=INACTIVE
*****
*      LOGICAL GROUP FOR INN TIC IN SUBAREA 2      *
*****
IN2GL00 GROUP ECLTYPE=(LOGICAL,INN) LOGICAL GROUP DESCR. OTHER TIC
                PHYPORT=0,              POINTS TO PORTADD      X
                ADDR=04400001060001,    RING ADDR. FOR TIC IN SA 1 X
                SDLCST=(SDL06PRI,SDL06SEC),
                ANS=CONTINUE,          X
                TGN=8
*
IN2LL00 LINE
*
IN2PL00 PU

```

Figure 183. PHYSICAL and LOGICAL GROUP Macros for INN Sessions (Subarea 2)

New and changed parameters for defining the Token-Ring Network connection are described in detail below.

The ECLTYPE=(PHYSICAL,INN) GROUP

- LOCADD =

The LOCADD parameter specifies the locally administered address of the TIC in this 37XX. It has the following format:

LOCADD = aaaaaaaaaa

where aa...a = 6 byte hexadecimal string representing this TIC's Token-Ring Network address.

The ECLTYPE=(LOGICAL,INN) GROUP

- ADDR =

Since NTRI INN logical lines will be defined as leased, the address of the other subarea node's TIC must now be specified on the PU macro (or GROUP macro, using the VTAM "sift down" effect) with the ADDR operand. The address should be specified as follows:

ADDR = aabbbbbbbbbbbb

where:

aa = the service access point (SAP) address of the station on the ring. For another NCP the SAP should always be X'04'. For a 9370 the SAP must be a multiple of 4 (the 9370 VTAM default is X'04') and

bbbbbbbbbbbb = the 6-byte Token-Ring Network address for the TIC. The last byte should be unique for each PU associated with any physical INN line (for performance reason).

- IPL =

IPL=YES is not allowed to specify. (An NCP cannot be loaded over the Token-Ring Network.)

- MAXTSL =

Specifies the largest PIU (in bytes) that NTRI can transmit. For best performance a value of 1108 on the TRA1 or 4 Kb on the TRA2 should be specified.

- PHYPORT =

The PHYPORT keyword is required, and must point to the PORTADD of the INN TIC in this subarea. The specification PHYPORT=NONE is not allowed.

- PUTYPE =

Only PUTYPE=4 is allowed to code (this is also the default).

- SDLCST =

This operand is now allowed to be coded. It is used the same way as for traditional INN links.

2. You must also code the PATH macros to describe to VTAM and NCP how the subareas are connected. The PATH macro doesn't differ from the traditional ones used when SDLC links connect the subareas.

The scenarios on Figure 244 on page 586, Figure 245 on page 588, and Figure 246 on page 590 show the most important parameter relationship in the definitions for the INN session.

46.6 Where To Go For More Information

For more information on VTAM and NCP definitions for a 3720 in a Token-Ring Network environment refer to these publications:

- SC30-3447 *NCP V5 Resource Definition Guide*
- SC30-3448 *NCP V5 Resource Definition Reference*
- GG24-1557 *Advanced Communications Function, Product Installation Guide*
- SC23-0111 *VTAM Installation and Resource Definition*.

The following publication refers to the IBM 3725 Communications Controller, but can be useful to understand and implement NTRI functions on 3720:

- GG24-3110 *IBM 3725 Network Control Program, Token-Ring Network Interface, Planning and Implementation*.

For more information on VTAM and NCP definitions for a 3725 in a Token-Ring Network environment refer to these publications:

- SC30-3349 *NCP V4 Resource Definition Guide*
- SC30-3254 *NCP V4 Resource Definition Reference*

- *GG24-3110 IBM 3725 Network Control Program, Token-Ring Interface, Planning and Implementation*
- *GG24-1557 Advanced Communications Function, Product Installation Guide*
- *SC23-0111 VTAM Installation and Resource Definition.*

For more information on VTAM and NCP definitions for a 3745 in a Token-Ring Network environment refer to these publications:

- *SC30-3447 NCP V5 Resource Definition Guide*
- *SC30-3448 NCP V5 Resource Definition Reference*
- *GG24-1562 IBM 3745 Communication Controller Guide*
- *SC23-0111 VTAM Installation and Resource Definition.*

The following publications refer to the IBM 3725 Communications Controller, but can be useful to understand and implement NTRI functions on 3745.

- *GG24-3110 IBM 3725 Network Control Program, Token-Ring Interface, Planning and Implementation*
- *GG24-1557 Advanced Communications Function, Product Installation Guide.*

Chapter 47. 9370 Software

47.1 VTAM Support for 9370 LAN

47.1.1 Overview

SNA communication between 9370s, and between a 9370 and a workstation through a Token-Ring Network, is supported by VM/VTAM V3R1.2 or later. This support is transparent for application subsystems using VTAM. A similar support is available in VSE/VTAM V3R2.

VM/VTAM can communicate either to a PU T2 (with one or more workstations), a PU T4/5 (another 9370's VM/VTAM or an NCP with Token-Ring Network support) or an SNA type 2.1 connected to the Token-Ring Network (V3.3 available in June 1990).

The PU T2 sessions are supported by VTAM as if they were connected via switched lines. The PU T4/5 sessions are supported by VTAM as if they were connected over leased, point-to-point lines. To define workstations on a ring to VTAM you therefore have to code a VTAM switched major node (VBUILD TYPE=SWNET). To define the Token-Ring Network and the connection to it, there is a new VTAM major node called the Local Area Network major node (LAN major node), which you have to code. In the LAN major node you also define the connections to the Token-Ring Network stations as PU T4/5 or PU T2.

47.1.2 Local Area Network Major Node Definitions

This is a new major node (VBUILD TYPE=LAN) including one or more PORT, GROUP, LINE and PU statements. The PORT statement defines the 9370's physical attachment to the Token-Ring Network, the GROUP, LINE and PU statements could either define another PU T4/5 on the Ring, or the connections for the workstations (defined in a switched major node) on the ring. This is how a LAN major node for a PU T5 (a 9370) and some LINE and PU definition for connecting workstations look:

```

VBUILD TYPE=LAN
*
* ////////////////////////////////////////////////////////////////////
* /
* /
* / — LAN MAJOR NODE FOR 9370-90 SUBAREA 14
* /
* ////////////////////////////////////////////////////////////////////
*
PORT1  PORT  CUADDR=100,          SAME AS IN SWNET PU'S      X
          LANCON=(5,2),
          MACADDR=400000114014,
          MAXSTN=32,          LIMITED BY ADAPTER (MAX 64) X
          MAXDATA=2000,      LIMITED BY ADAPTER        X
          SAPADDR=4
GD114T01 GROUP DIAL=NO,          GROUP FOR PU TYPE 5      X
              ISTATUS=ACTIVE,
              LANACK=(0,0),
              LANCON=(5,2),
              LANINACT=3,
              LANRESP=(5,2),
              LANSWDW=(7,1),
              LNCTL=SDLC,
              PUTYPE=5
*
LD114T01 LINE ISTATUS=ACTIVE,   LINE ON TOKEN RING      X
              PUTYPE=5
*
CD114H15 PU  STATOPT='LAN TO SA15 '
              MACADDR=400000115015, RING NO.1 SA15 PU15 9370-60 X
              PUTYPE=5,
              SAPADDR=4,
              ISTATUS=ACTIVE
*
              STATOPT='PU FOR SA15'
*
GD114T10 GROUP DIAL=YES,          GROUP FOR SWITCHED PU'S (PU T2) X
              ISTATUS=ACTIVE,
              LNCTL=SDLC
LN0001  LINE  CALL=INOUT
PU0001  PU    MAXLU=16
LN0002  LINE  CALL=INOUT
PU0002  PU    MAXLU=16
LN0003  LINE  CALL=INOUT
PU0003  PU    MAXLU=16
LN0004  LINE  CALL=INOUT
PU0004  PU    MAXLU=16
LN0005  LINE  CALL=INOUT
PU0005  PU    MAXLU=16
LN0006  LINE  CALL=INOUT
PU0006  PU    MAXLU=16
LN0007  LINE  CALL=INOUT
PU0007  PU    MAXLU=16
LN0008  LINE  CALL=INOUT
PU0008  PU    MAXLU=16
LN0009  LINE  CALL=INOUT
PU0009  PU    MAXLU=16
LN0010  LINE  CALL=INOUT
PU0010  PU    MAXLU=16

```

Figure 184. VTAM LAN Major Node for 9370 Token-Ring Network Support

This is a detailed description of new parameters and parameters of specific interest in the LAN major node:

The VBUILD statement:

- TYPE = LAN

To specify that this major node defines a Token-Ring Network attachment, code TYPE = LAN.

The PORT statement:

- **CUADDR=**

Defines the channel unit address for the Token-Ring Network subsystem in the 9370. This should be the first subchannel address in the range of addresses that you have assigned to the CETI group. Each PORT statement defines one CETI group consisting of four subchannel addresses. For an explanation of a CETI group see "9370 Hardware" on page 77. Only one PORT statement can be coded for each VBUILD TYPE=LAN. You can code up to a maximum of three PORT statements per Token-Ring Network adapter (using different SAP addresses). See SAPADDR below. For an explanation of how subchannel addresses are assigned to the Token-Ring Network Subsystem of the 9370, see "9370 Hardware" on page 77.

- **LANCON=**

Timer for the Token-Ring Network. The value in the example (5,2) will be OK for a start.

- **MACADDR=**

Specifies the address of the Token-Ring Network adapter that is opened by this VTAM system. If you omit this parameter, the address specified to the 9370 Token-Ring Network subsystem during the customization will be used, unless it was left to 000000000000, in which case the universal (burned-in) address of the adapter will be used.

- **MAXDATA=**

Specifies the largest frame size that can be transmitted to the ring. The value can range from 64 to 2012. The upper limit is set by the capability of the 9370's Token-Ring Network adapter. The default of 2000 will be OK for a start.

- **MAXSTN=**

Specifies the maximum number of Token-Ring Network stations (PUs) that can communicate to the 9370 through this port (adapter). The value can range from 1 to 64. The upper limit is set by the capability of the 9370 Token-Ring Network adapter.

- **SAPADDR=**

Specifies the service access point for the 9370's connection to the Token-Ring Network defined. This could be a value between 4 and 252 in multiples of 4. Normally the value 4 is used in VTAM environments. If you have a 3174 on the ring, you **must** use the value 4, because the 3174 has this value hardcoded for remote SAP.

The GROUP statement:

- **DIAL=**

If the GROUP statement defines another 9370 (PU T4/5) attached to the ring, code DIAL=NO.

If the GROUP statement defines a workstation (PU T2) attached to the ring, code DIAL=YES.

- **LNCTL=**

You should always code LNCTL=SDLC.

You could use the GROUP statement for easier coding, utilizing the VTAM "shift-down" effect; however the parameters are described under the LINE and PU statements.

The LINE statement:

- CALL =

This applies only to switched lines (for PU T2). You should code CALL=INOUT to allow for both host and workstations to establish contact.

The PU statement:

- MACADDR =

Applies only if you are defining a GROUP or LINE macro for another 9370 on the Token-Ring Network, and specifies its Token-Ring Network address. This could be the Token-Ring Network address (universal or locally administered address).

- PUTYPE =

If you are defining a GROUP or LINE for another 9370 on the Token-Ring Network, code PUTYPE=5; otherwise don't code this parameter.

If you are defining a workstation on the ring code PUTYPE=2. This is the default value, so it's not necessary to code it for a workstation.

- SAPADDR =

Applies only to PU T4/5. Specifies the service access point of the PU being defined. This value is normally 4 in a VTAM environment.

- MAXLU =

Specifies the maximum number of LUs associated with this PU that can communicate with VTAM. Code a value corresponding to your needs. The default value is 2; this is often too small when you are defining a PU T2.

The LANACK, LANCON, LANINACT, LANRESP and LANSDDW are different timers for the Token-Ring Network. They are not described here; you can use the values in the example above. If you want to adapt these timers to your own environment, refer to a detailed description in *VTAM Installation and Resource Definition*.

47.1.3 Switched Major Node Definition

The switched major node for Token-Ring Network stations is very similar to the traditional SDLC switched major node. However there are some new parameters and some of them are very important to the Token-Ring Network. This is how a switched major node for a Token-Ring Network looks:

```

*****
*
*          VTAM SWITCHED MAJOR NODE FOR TRLAN/9370
*
*****
E14SW3  VBUILD TYPE=SWNET,          REQUIRED          * X
          MAXNO=12,                 REQUIRED          * X
          MAXGRP=5

**
**
**
E14TRP32 PU  ADDR=13,              COULD BE ANYTHING (NOT USED) * X
          IDBLK=017,                PC 3274 EMULATOR            * X
          IDNUM=E0032,              PC 3274 EMULATOR            * X
          DISCNT=NO,                * X
          IRETRY=NO,                NOT USED                     X
          ISTATUS=ACTIVE,           X
          LANACK=(0,0),             X
          LANCON=(5,2),             X
          LANINACT=4.8,             X
          LANRESP=(5,2),            X
          LANSDDW=(7,1),            X
          LANSW=YES,                X
          MACADDR=00314001,         VTAM APPLIES PREFIX 4000     X
          MAXDATA=265,              X
          MAXOUT=7,                 NOT USED FOR 9370/LAN       * X
          MAXPATH=4,                * X
          PACING=0,                 * X
          PUTYPE=2,                 * X
          SAPADDR=4,                SNA SAP ADDR                 * X
          SSCPFM=USSSCS,            * X
          USSTAB=USSSNA,            * X
          VPACING=0

**
E14D0203 PATH  GRPNM=GD114T10,      * X
          GID=3,                    * X
          PID=3,                     X
          USE=YES

**
E14P2L32 LU  LOCADDR=2              FOR THE PC EMULATOR
E14P2L33 LU  LOCADDR=3              FOR THE PC EMULATOR
E14P2L34 LU  LOCADDR=4              FOR THE PC EMULATOR
E14P2L35 LU  LOCADDR=5,             FOR THE PC EMULATOR          X
          LOGAPPL=ND1142

**
**

```

Figure 185. VTAM Switched Major Node for 9370 Token-Ring Network Support

The important parameters are described here:

The PU statement:

— IDBLK =

The IDBLK should be 017 for a PC running 3270 Emulation V3 or a 3174. It should be 050 for a PC running APPC/PC and 05E for a PC running Workstation Program V1.1.

— IDNUM =

A five-character identification of the PU. Must correspond to the characters specified in the customization of the defined PU.

— LANSW =

specifies whether the PU can be used as a station on a Token-Ring Network connected to the 9370. Should be coded LANSW=YES.

— MACADDR =

Specifies the Token-Ring Network address of the PU being defined. It could be a universal address or locally administered address. You

could specify either eight digits or twelve. If you specify only eight digits, VTAM will add the prefix 4000. If you want to execute a dial-out operation from the 9370, the MAC ADDRESS of the station represented by the PU statement should be defined here.

– PUTYPE=2

Specifies that this PU will be type 2. This is the only PU supported by the switched definitions.

– SAPADDR=

Specifies the service access point in the Token-Ring Network station of the PU that is being defined. This could be a value between 4 and 252 in multiples of 4. Normally the value 4 is used in VTAM environments.

The LANACK, LANCON, LANINACT, LANRESP and LANSDDWDW are different timers for the Token-Ring Network. They are not described here; you can use the values in the example above. If you want to adapt these timers to demands in your own environment, refer to a detailed description in *VTAM Installation and Resource Definition*.

The PATH statement:

– DIALNO=

Unlike other LAN environments, this number is **not** used in the 9370. If you do not code this parameter on any PATH statement, you must code MAXNO=1 on the VBUILD statement.

– GRPNM=

This parameter points back to the name of a GROUP statement defined in a LAN major node. This allows you to decide which PORT in the 9370 that will be used for this PU.

All the other statements and parameters are the same as for a traditional SDLC-attached, switched PU.

The scenario on the next page shows the most important parameters in the definitions (and how they must match) for a 9370 supporting a 3174 over a Token-Ring Network.

A scenario describing 9370 to 9370 communication could be found in "Workstations Accessing a 9370 SNA Host Scenario" on page 593.

47.1.4 Where To Go For More Information

- SC23-0111 *VTAM Installation and Resource Definition*
- GG24-3240 *IBM 9370 LAN, Volume 1: Token-Ring Support*.

PART C. Management of Token-Ring Networks

Chapter 48. NetView/PC

48.1 Overview

The NetView/PC Program is an IBM network management tool. For NetView/PC applications it provides common system services, monitoring and problem determination services, and a means to send network management information (such as alerts) to the host. It also provides services to enable user-written application programs to extend communication network management to non-IBM communication devices.

The following diagram shows the relationship between NetView/PC facilities and LAN Manager Version 1.0, which is an application run under NetView/PC.

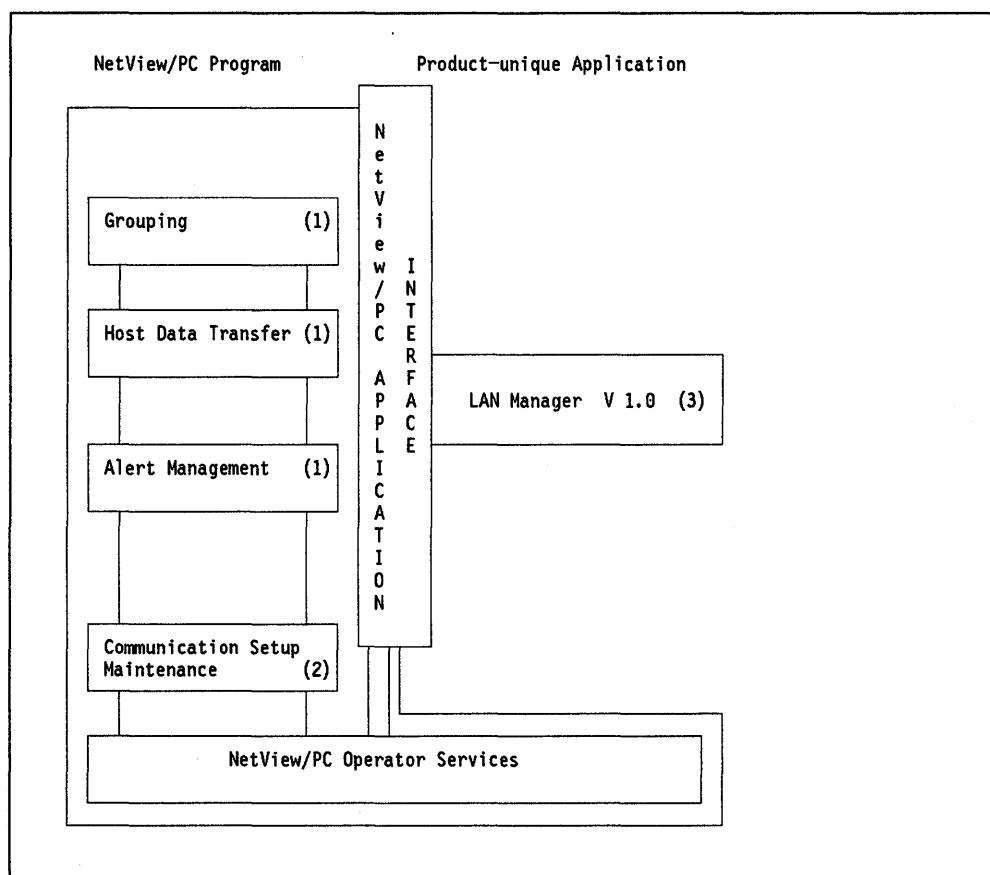


Figure 186. NetView/PC and Its Relation to Applications

Reference:

1. Figure 187 on page 412 through Figure 189 on page 413.
2. Figure 190 on page 414 through Figure 194 on page 416.
3. In the LAN Manager chapter, see the section "Installation (Under NetView/PC)" on page 426.

48.2 Planning Checklist

48.2.1 Prerequisites - Hardware

The basic hardware requirements for running NetView/PC are listed below. However you may need to install special hardware in order for your system to operate properly in the particular environment you intend to use it. For example, you may need special hardware for host communication or to function with some user-written applications.

You will need to have a:

- PC-XT Model 286, PC-AT or a PS/2 Model 50, Model 60 or Model 80 with:
 - With minimum of 640 Kb of memory
 - A color monitor
 - A fixed disk

Note: Approximately 3.5 megabytes of disk is required for NetView/PC.

- An IBM Token-Ring Network PC Adapter or Adapter II, or an IBM Token-Ring PC Adapter/A.
- If you are communicating with a host, depending on the workstation you intent to run NetView, you must order the following:

For the PC:

- An IBM Realtime Interface Co-Processor (512KB) (feature #6160) with:
 - One RS-232-C Interface Boards (feature #6051)
 - One RS-232-C Modem Attach Interface cables (feature #6057). This cable has a 15-pin female connector for attaching to a Realtime Interface Co-Processor port and a 25-pin male connector at the other end for connecting to a modem.

For the Personal System/2:

- An IBM Realtime Interface Co-Processor Multiport/2 with 3.5" media (feature #6263) with:
 - One port RS-232-C Interface Board (feature #6267)
 - One Multiport Interface Cable (feature #6246).

48.2.2 Prerequisites - Software

- DOS 3.3 or higher.
- NetView/PC V1.1
- In order to manage multiple Token-Ring Networks, you will also need the IBM LAN Manager Program Version 1.0.

48.3 Installation

It is recommended that you check to ensure that all the requirements to complete the installation of this product, including the applications you intend to run under NetView/PC, are in your possession.

Also check that your PC or PS/2 is properly configured to be able to run this product, that is:

- The current level of DOS (3.3 or higher) must be installed.
- If your configuration required that the RTIC card be installed, then the associated DOS support software must also be installed.
- At least one RS232 interface is required.
- The minimum memory (640 Kb) is available.
- Either the IBM Token-Ring Network PC Adapter, Adapter II or Adapter/A is installed. (Instructions on how to do this are given on "PC Token-Ring Network Adapter Installation" on page 9 and "PS/2 Token-Ring Adapter/A Installation" on page 17.)
- The RTIC card (if required) is installed. (Instructions to do this are contained in the *RTIC Guide to Operations* manual and switch settings specific to using NetView/PC with your particular configuration are explained in the *NetView/PC Installation Guide*.)
- Make a backup copy of the NetView/PC master diskettes and use these to perform the installation. File the master diskettes in a safe place.

Note: NetView/PC, as well as other applications, has "READ.ME" files, and if they are all to be loaded into the NetView directory, it is recommended that you rename them prior to starting the installation so that they will not overwrite each other during loading. Consider using a naming convention that identifies the file with its origin, for example, NVPCREAD.ME for the NetView/PC file, LANMREAD.ME for the LAN Manager file and so on.

The first diskette of the set of NetView/PC diskettes has on it a batch file, 'INSTALL.BAT', which will perform all the steps to install the product, including the building of the subdirectory to hold the NetView/PC programs and files. Ensure that you are in the root directory of the fixed disk on which the product will be installed.

- Insert the first diskette in drive "A" and type:

```
C>A:INSTALL c:
```

Where c is the fixed disk drive on which the product is to be installed.

- While the INSTALL.BAT file is executing, you will be prompted to load the remaining diskettes. Follow the prompts.
- When the installation is complete, the message
"INSTALLATION IS NOW COMPLETE"
will be displayed.
- Remove the last diskette and store in a safe place.
- If any RTIC card is installed, you will need to install the IBM Realtime Control Program DOS Support in the NetView directory.
- Copy the following files from the Realtime Control Program DOS Support diskette to the NetView directory:

- ICALOAD.COM
 - ICAINTH.COM
 - ICALOAD.MSG
 - ICAINTH.MSG
 - ICAINTH.SYS
- Copy the following file from the RTIC diagnostic diskette to the NetView directory.
 - ICAAIM.COM
 - If you have any NetView/PC applications to install, do it now. Refer to the specific application installation guide for instructions on how to do this. (For memory constraints, it is recommended that you run only one application under NetView/PC.)

Installation of NetView/PC is now complete. Check that your current AUTOEXEC.BAT file is not auto-loading any other memory resident programs that may prevent a successful load of NetView/PC. Refer to the *NetView/PC Planning and Operation Guide* for information regarding any such restrictions. Re-IPL your computer.

After installing NetView/PC, you need to select applications you wish to run in a single group. This is done by selecting the grouping function. This is usually the first task to be performed after the installation.

There are two groups already provided in the product. They are:

- START** This group does not contain a DOS partition.
- STARTDP** This group has the DOS partition included.

To start NetView/PC, first change to the NetView directory:

```
C> cd \netview
```

Then enter the command

```
C> netview startdp
```

After several seconds the NetView/PC logo and copyright screen will be displayed. Press the Enter key. The NetView Session Selection menu will then be displayed.

NetView/PC Session Selection Menu

Press the number of the session you want:

- _ 1 SERVICES NetView/PC Operator Services
- 2 COMMSET NetView/PC Communications Set Maintenance
- 3 DOS Command Session

To return to DOS, select SERVICES, then SHUTDOWN.

Select Option 1: SERVICES, from this menu and the "Operator Services" main menu will be displayed.

DCJSSPA1 NETVIEW/PC OPERATOR SERVICES
MAIN MENU

Select one of the following:

- 1 INTERVENTION Display operator intervention messages
- 2 GROUPING Select applications to run as a NetView/PC group
- 3 OPERATOR RECORDS Define operator identification records
- 4 LOG-OFF / LOG-ON Log off current operator and log-on new operator
- 5 REGION MANAGER Load one of the following facilities:
 - Remote Console Facility
 - Local Alert Facility
 - Host Data Facility
- 6 HOST FILE TRANSFER Transfer a file to or from host computer
- H HELP MENU How to use NetView/PC
- S SHUTDOWN Perform NetView/PC system shutdown

Type the number of your selection and press Enter; otherwise press F2

Enter F1=Help F2=Quit

Selection ==> 2

On this display, select Option 2: Grouping, and the panels that will allow you to configure the grouping you want will be displayed.

```

DCJSSPB1          NETVIEW/PC OPERATOR SERVICES          Panel 1 of 3
                   APPLICATION SELECTION

Use the Tab key to position the cursor next to an application name and then press
F9 (Select) to select that application for a Netview/PC group.
1 INTERVENTION      Display operator intervention messages
  SPCF MGR          NETVIEW/PC SERVICE PT. COMMAND FACILITY
  H-DATA            NETVIEW/PC HOST DATA FACILITY
  L-ALERT           NETVIEW/PC LOCAL ALERT FACILITY
  H-ALERT           NETVIEW/PC HOST ALERT FACILITY
  * HL-ALERT        NETVIEW/PC HOST/LOCAL ALERT FACILITY
  G-ALERT           NETVIEW/PC HOST GENERIC ALERT
  * LAN MGR         IBM LOCAL AREA NETWORK MANAGER

To restart selections, press F5 (Redisplay).
When all selections have been made, press PgDn; otherwise press F2(Quit)

PgDn   F1=Help   F2=Quit   F5=Redisplay   F9=Select

```

Figure 187. NetView/PC Application Selection Panel

Any optional applications that you had loaded as applications to be run under NetView/PC would also show on this panel and could therefore be included in the group.

The applications marked by the asterisk will enable NetView/PC to send alerts and files to the host and display alerts locally. If only those two applications were selected, when you press PgDn, the following panel will be displayed.

```

DCJSSPC1          NETVIEW/PC OPERATOR SERVICES          Panel 2 of 3
                   GROUP NAME SELECTION

Your group selection consists of the following:

  HL-ALERT          NETVIEW/PC HOST/LOCAL ALERT FACILITY
  LAN MGR           IBM LOCAL AREA NETWORK MANAGER

Type a name for this Group selection and press PgDn; otherwise
press PgUp to re-start the selection.

  GROUP NAME. MYGROUP DOS filename of 1 to 8 characters

PgDn   PgUp   F1=Help   F2=Quit

```

Figure 188. NetView/PC Group Name Selection Panel

After assigning the name "MYGROUP" to the group, press the PgDn key and this panel will be displayed.

```

DCJSSPG1                NETVIEW/PC OPERATOR SERVICES
Group name: MYGROUP     GROUP ENVIRONMENT SPECIFICATIONS      Panel 3 of 3
-----
Type the required specifications for your group selection, if different from
system defaults.

DOS PARTITION SIZE (K bytes) .. 000  A value of zero indicates a DOS
partition is not required for this
Group selection. If a DOS
partition is required, type a value
between 075 and 300.

REMOTE CONSOLE FACILITY REQUIRED?. N  Y=yes, N=no

RUN ALERT FACILITY WHERE?. . . . . 1  1=DOS Partition, 2=Region
Manager, 3=Session Selection
Menu

To save this selection, press Enter; otherwise press F2 (Quit). PgUp can be
pressed to re-specify group name.

PgDn  Enter  F1=Help  F2=Quit  F4=Main Menu  F5=Redisplay

```

Figure 189. NetView/PC Group Environment Specifications

Key the required responses and press Enter.

Re-IPL your computer and re-start NetView/PC with the session group you just configured.

The next step is to describe the type of communications protocol used to communicate with the host system. NetView/PC supports two types of communication protocols, but only one will be described here as it is the protocol used in communicating between the host and an IBM Token-Ring Network. It is the Synchronous Data Link Control (SDLC) protocol.

The host communication setup is divided into four major steps which are selected from the NetView/PC Communication Set Maintenance main menu.

These major steps are:

- System Maintenance Setup
- Protocol Maintenance Setup
- Port Maintenance Setup
- Application Maintenance Setup. (This is not required for LAN Manager therefore, it won't be covered).

You always have to define the protocol set record before you define the port record because the information depends on the protocol and line type. The other two selections can be made in any order afterwards.

By selecting Option 2: "COMMSET" on the NetView/PC Session Selection menu, you will be presented with the following display:


```

DCJSFA00          NETVIEW/PC COMMUNICATION SET MAINTENANCE
                  MAIN MENU
-----
Select ONE of the following:

  1 SYSTEM MAINTENANCE MENU      Display or change record
  2 PROTOCOL MAINTENANCE MENU    Display, add, change, or delete record
  3 PORT MAINTENANCE MENU        Display, add, change, or delete record
  4 APPLICATION MAINTENANCE MENU Select application type
  H HELP MENU                    How to use NetView/PC
  S SHUTDOWN                     Remove Communication Set Maintenance
                                  from NetView/PC

Type your selection number or letter and press Enter; otherwise press F2 (Quit).

Enter  F1=Help  F2=Quit
Selection ==> 2

```

Figure 190. NetView/PC Communication Set Maintenance Main Menu

From this menu, select Option 2 and the Protocol Set Record Maintenance menu will be displayed.

```

DCJSFD00          NETVIEW/PC COMMUNICATION SET MAINTENANCE
                  PROTOCOL SET RECORD MAINTENANCE MENU
-----
Type the name and type of the Protocol Set Record to be accessed:

PROTOCOL SET NAME. . RTICSDLC   For a list of all protocol sets press F7
PROTOCOL TYPE. . . . S         A=Asynchronous, S=SDLC (ignored for DELETE)

Select ONE of the following:

  1 DISPLAY  Display an existing record
  2 ADD      Add a new record
  3 CHANGE   Change an existing record
  4 DELETE   Delete an existing record

Type your selection and press ENTER; otherwise press F2 (Quit).

Enter  F1=Help  F2=Quit  F7=List
Selection ==> 2

```

Figure 191. Protocol Set Record Maintenance Menu Display

This panel is used for the selection of the communication protocol. A default setup is given by the customization utility which can be overwritten with your definitions.

In this example we will use our own definitions. We will change the defaults and add the new record to the existing ones.

However, the default values cannot be deleted from NetView/PC.

The protocol set was given the name "RTICSDLC," and the protocol type remains unchanged as "S" for SDLC.

Select Option 2 to add the protocol set record and this screen will be displayed.

```
DCJSFD40          NETVIEW/PC COMMUNICATION SET MAINTENANCE
                  ADD/CHANGE SDLC PROTOCOL SET RECORD
-----
PROTOCOL SET NAME: RTICSDLC

Type the requested information for the Protocol Set Record named above:

Secondary Link Station Address. . C1  2 hex digits (01-FE)
Line Type . . . . . 2  1=Switched, 2=Leased,
Electrical Interface. . . . . 1  1=RS232-C,2=V.24 and RS232-C
NRZI. . . . . Y  Y=YES, N=NO

When finished, press Enter; otherwise press F2 (Quit).

Enter  F1=Help  F2=Quit  F3=End  F4=Main Menu  F5=Redisplay
```

Figure 192. Add/Change SDLC Protocol Set Record Display

Note: The secondary link station address is an arbitrary address that must match the PU address defined in the NCP/VTAM definition.

We have now defined the protocol set record. Quit the "Protocol Set Record Maintenance" menu by pressing the F2 key and you will be returned to the "COMMSET" main menu.

The next step is to define the port set record. Select Option 3 and the Port Set Record Maintenance menu will be displayed.

```

DCJSFE00          NETVIEW/PC COMMUNICATION SET MAINTENANCE
                  PORT SET RECORD MAINTENANCE MENU
-----
Please type the following information:
PORT SET NAME. . . . RTIC#B          For a list of all port sets, press F7
PROTOCOL SET NAME. . RTICSDLC

Select ONE of the following:

 1 DISPLAY  Display an existing record
 2 ADD      Add a new record
 3 CHANGE   Change an existing record
 4 DELETE   Delete an existing record

Type your selection and press Enter; otherwise press F2 (Quit).

Enter  F1=Help  F2=Quit  F7=List
Selection ==> 2

```

Figure 193. Port Set Record Maintenance Menu Display

Again you will see default values presented by this utility. You cannot delete the protocol set defaults from the file.

We chose a port set name of "RTIC#A" and the protocol set name as defined before. Select Option 2 to add the record. The following screen will be displayed.

```

DCJSFE20          NETVIEW/PC COMMUNICATION SET MAINTENANCE
                  ADD/CHANGE SDLC-LEASED PORT SET RECORD
-----
PORT SET NAME:    RTIC#B
PROTOCOL SET NAME: RTICSDLC

Type the requested information for the Port Set Record named above:

Communications Card I/O Address. . 02A0  4 hex characters
Port ID. . . . . . . . . . . . . . . B   A or B

When finished, press Enter; otherwise press F2 (Quit).

Enter  F1=Help  F2=Quit  F3=End  F4=Main Menu  F5=Redisplay

```

Figure 194. NetView/PC Add/Change Port Set Record

Depending on which RTIC adapter is installed in your workstation, you may have two or more ports available on it for communications. On this panel you have to enter the address of the port you want to use for host communications.

Define the I/O address and port ID on the RTiC card to which the cable is to be connected and press Enter.

You have now defined the port address. Now press the F2 key and you will be returned to the 'COMMSET' main menu.

Select option 4 will result in the display of the Application Record Maintenance Menu that will not be here.

Quit the "System Record Maintenance" menu and return to the "Communication Set Maintenance" menu.

48.4 Migration Issues

The procedure for upgrading to a new release of NetView/PC is described in detail in the *NetView/PC Installation Guide*.

The most important activity is to save the existing definitions and history files for further use. Installation of a new version of NetView/PC is the same as for the first installation. NetView/PC Version 1.1 provides a special utility for upgrading from Version 1.0. It allows for the conversion of the communication data files used with Version 1.0 to the format required for Version 1.1.

Follow these steps for upgrading to a new release:

1. Backup all the files you wish to keep. They can all be saved in a subdirectory on your fixed disk created for the purpose or copied to diskettes.
2. Remove the NVPCPANL and NETVIEW directories.
3. Install the Communication Utility Program for the conversion of the communication data files, if applicable.
4. Install the new version of NetView/PC and all your NetView/PC applications.
5. Re-install the RTIC DOS support.
6. Restore the files you saved in step 1 to the NetView subdirectory.
7. Convert the communication data files. To do this:
 - Type CONVERSN and press Enter.
 - Follow the prompts displayed on your screen until the conversion is complete. A message will be displayed informing you of this.
8. Use the COMMSET option of the "Session Selection" menu of NetView/PC to verify your communications data specifications.

This concludes the installation of your new release of the NetView/PC program product.

48.5 Basic Troubleshooting

Problems in the operation of NetView/PC will cause system messages to be issued to the operator. A full explanation of the meaning of these messages and possible recovery options is given in the publication *NetView Messages*. Further assistance in diagnosing NetView errors can be found in the *NetView Diagnosis* manual.

48.6 Where To Go For More Information

Other publications containing information about NetView are:

- SC30-3476 *NetView Installation and Administration Guide*
- GG24-3115 *NetView/PC Primer*
- SC30-3482 *NetView/PC Installation Guide*
- SC30-3408 *NetView/PC Planning and Operation Guide*
- SC30-3313 *NetView/PC Application Programming Interface /Communication Service Reference*
- GC30-9600 *NetView/PC Program Specification*
- SC30-3462 *NetView Customization*
- SC30-3363 *NetView Operation Primer*
- SC30-3364 *NetView Operation*
- SC30-3365 *NetView Messages*
- LY30-5587 *NetView Diagnostics*.

Chapter 49. LAN Manager Version 1.0

49.1 Overview

The LAN Manager Version 1.0 runs only under **DOS** and is a network management and problem determination aid for the IBM Token-Ring and PC (Broadband) Networks. It can run as a stand-alone program, or as an application under the NetView/PC program, when attached to an IBM Token-Ring Network.

The LAN Manager Version 1.0 is a replacement product for the IBM Token-Ring Network Manager.

The LAN Manager V1.0 allows for the monitoring of network status, determining the source of problems on the network, and the maintaining of network records. On an IBM Token-Ring Network, the LAN Manager monitors the activities on the ring to which its adapter is attached, and on remote rings connected to that ring by IBM Token-Ring Network bridges. On a PC (Broadband) Network, the LAN Manager monitors the activity on the PC Network bus to which its adapter is attached.

A LAN Manager will monitor either PC Network or Token-Ring Network but not both at the same time.

In this chapter we are concerned with the LAN Manager running on the IBM Token-Ring Network. As the status of the ring changes, the LAN Manager will issue messages which will be displayed on your screen and stored in an event log. Some typical messages are:

- **Normal.** The ring is operating normally.
- **Soft Error.** The ring is experiencing intermittent errors but these are being handled by the re-transmission of data until it is passed correctly.
- **Beaconing.** This condition occurs when there is a broken line, or there is no token being circulated within the pre-defined time limits. This is an indication that the ring is inoperative.
- **Adapter Closed.** The LAN Manager's IBM Token-Ring Network adapter is not actively attached to the network.
- **Fault.** The LAN Manager has detected a problem between its attaching device and the access unit.
- **Lost.** Sometimes errors occur so fast that the LAN Manager cannot log all of them. Some error information is lost.

The parameter relationship that LAN Manager has with other programs is shown in the following figure:

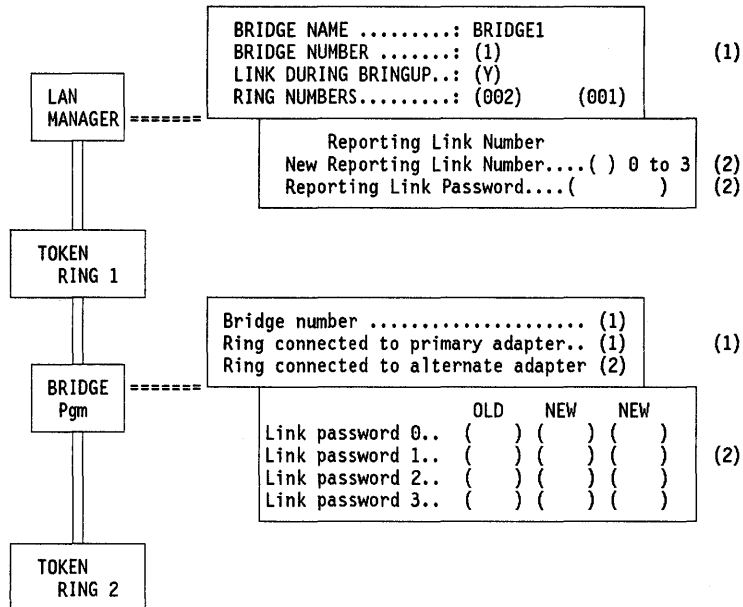


Figure 195. LAN Manager to Bridge Program Parameter Relationship

NOTES

1. The bridge number and link password must be the same for both the LAN Manager and the Bridge Programs. See "Token-Ring Network Bridge Program V2.0" on page 243.
2. The Bridge Program can be controlled on a limited basis by the LAN Manager Version 1.0. It can be observed by up to three LAN Managers simultaneously. To accomplish that, the reporting link passwords in the LAN Manager have to match the link passwords of the Bridge Program.

49.2 Planning Checklist

NOTE: While the LAN Manager is running, no other application can be running on that same PC (except in the case where it is running under the NetView/PC program; then NetView is the only other application).

49.2.1 Prerequisites - Hardware

Minimum requirements are:

- IBM Personal Computer or Personal System/2, with at least 640 Kb of (RAM) memory
 - A PC XT with standard keyboard
 - Or a PC XT Model 286
 - Or a PC AT
 - Or a PS/2 Model 50, 60 or 80.

- A fixed disk with a minimum of 4 Mb of space available
- At least one diskette drive.
- A display monitor (80-column color or monochrome).
- A printer (if you wish to print the network information).
- An IBM Token-Ring Network PC Adapter or Adapter II, or an IBM Token-Ring Network Adapter/A, plus the cable to attach it to the MAU in the network.

49.2.2 Prerequisites - Software

- DOS Version 3.3 or higher.
- IBM Token-Ring Network Bridge Program Version 1.1 (to monitor multi-ring networks from a single station).

49.3 Installation (Stand-Alone)

The PC or PS/2 in which the LAN Manager is to be installed must already have been connected to the IBM Token-Ring Network. Instructions on how to do this are presented in "PC Token-Ring Network Adapter Installation" on page 9 and "PS/2 Token-Ring Adapter/A Installation" on page 17.

The LAN Manager program is supplied on five 5.25" or three 3.5" diskettes.

In this case, we will discuss installing the LAN Manager as a stand-alone product for the first time. The machine being used is a PC AT.

1. Boot the PC up in DOS 3.3 or higher. Verify that you have the correct DOS version and that there is a minimum of 4 Mb of disk space available.
2. Place the first diskette of the LAN Manager program in drive A:
3. Type
A:INSTALL and press Enter.

- Note: During the install, a new CONFIG.SYS file will replace the old one and contain these statements:

```
FILES = 60
BUFFERS = 20
DEVICE = C:\LANMGR\DFIA0MOD.SYS
DEVICE = C:\LANMGR\DFIC0MOD.SYS
```

The old CONFIG.SYS file is saved as CONFIG.SAV.

These commands are required for the proper operation of the LAN Manager. Because of memory constraints, it is recommended that you do not increase the size of BUFFERS or FILES, nor make other changes to the contents of CONFIG.SYS as this could result in unreliable operation of the LAN Manager.

4. Follow the instructions on the display until all the diskettes are loaded. During the load procedure, a subdirectory named LANMGR is created and several files transferred into it. When the last (fifth) diskette is loaded, the installation is complete.

We now have to customize the program to address our specific network needs (identifying the network nodes to the LAN Manager).

Enter the commands:

```
C>cd \LANMGR
```

```
C>LANMGR
```

1. After a few seconds panel DFIPSS10 will be presented.
2. Select Option 3: "IBM Local Area Network Manager".

The IBM LAN Manager Main Menu will be displayed (panel DFIPCP10).

ID	FUNCTION	DESCRIPTION
1	EVENT LOG	Generate event log report or erase event log.
2	SYSTEM DEFINITION	Display/set system options and definitions.
3	ADAPTER FUNCTIONS	Query and remove adapters.
4	NETWORK FUNCTIONS	Network status, path test, ring test.
5	RING CONFIGURATION	Display order of adapters on ring.
6	SOFT ERROR OPTIONS	Display/set soft error logging and conditions.
7	BRIDGE FUNCTIONS	Link, unlink, query; set single-route broadcast
R	RESET	Reinitialize system and reopen adapter.
S	SHUTDOWN	Shutdown the LAN Manager.

Select one of these functions:

Type the ID of the function and press Enter ==> (2)

F1 = Help F2 = Quit

Only those options listed that are necessary for the customizing of the IBM LAN Manager to monitor the IBM Token-Ring Network will be discussed at this time. Refer to the *IBM LAN Manager User's Guide* for more information if needed.

3. Select Option 2: "System Definition", in order to set the system definitions.

The functions to be performed are listed on the "System Definition" panel (DFIPSD10).

You will be returning to this menu after performing each task. Although a description of many of the tasks is presented here, it may not be necessary for you to perform all of them. You should understand their function and select those that are appropriate for your network.

- Option 1 on the System Definition Menu: "Adapter Number".

If you select this option, panel DFIPSD75 will be presented.

The adapter number indicates whether the LAN Manager is to monitor the ring to which the primary or alternate Token-Ring Network adapter is attached. The primary/alternate indication was set by switches or software, depending on the type of adapter that was installed. The

adapter you choose here will become active the next time the LAN Manager is initialized or reset, and will remain so until it is changed again.

- Option 2 on the System Definition menu: "Manager Profile".

If you select this option, you will be presented with this display:

```

DFIPSD70                                IBM LAN MANAGER
Normal                                  MANAGER PROFILE
-----
ADAPTER ADDRESS/SYMBOLIC NAME.....: 10005A003787/LANMANAGER01
RING NUMBER.....: 001
NAUN ADDRESS/SYMBOLIC NAME.....: 400000314001/TIC1@SA13
MICROCODE LEVEL OF ADAPTER.....: 000000A33831C
LEVEL OF LAN MANAGER.....: 1.00
PRODUCT ID.....:
GROUP ADDRESS.....:
FUNCTIONAL ADDRESSES.....: 00002018
                               LAN Manager
                               Configuration Report Server
                               Ring Error Monitor

F1=Help      F2=Quit      F4=Main Menu

```

- **Adapter address/name.** The adapter's hexadecimal address and symbolic name (if one is assigned).
 - **Ring number.** The number the LAN Manager uses to indicate the ring on which it is running.
 - **NAUN address/name.** The adapter address of the Nearest Active Upstream Neighbor (NAUN) and its symbolic name (if one is assigned).
 - **Microcode level of adapter.** The version of microcode on the LAN Manager's adapter.
 - **Level of LAN Manager.** The version of the LAN Manager.
 - **Product ID.** The serial number and the machine type of the device that contains the LAN Manager's adapter. If this field is blank, then the information is not available to the LAN Manager.
 - **Group address.** An adapter may be assigned a group address. Logically related adapters may be assigned the same group address. An application could send a message to all the adapters with the same group address.
 - **Functional address.** The address that indicates the adapter's function, for example, "Active Monitor" or "Ring Error Monitor".
- Option 3 on the System Definition menu: "Symbolic Names".

If you select this option, you will be presented with panel DFIPSN10.

The list shows the names already defined. The list will be blank if this is the first time you are installing the LAN Manager. By pressing F6 to add a symbolic name, you will see panel DFIPSN20.

The adapter address and symbolic name are to be defined on this screen. It is the same information that is displayed on the "IBM LAN Manager Profile" panel (DFIPSD70).

- Option 4 on the System Definition menu (DFIPSD10): "Security".

If you select this option, you will be presented panel DFIPSE20.

To set or change your operator password, you must:

- Type your old password (If you are setting a password for the first time, leave this field blank) and press Enter.
- Type your new password and press Enter. Type your new password a second time and press Enter again. (This is to verify that the new password is correct.) The passwords will not be displayed on the panel.

- Option 6 on the System Definition menu (DFIPSD10): "Bridges".

If you selected this option, then panel DFIPBD10 will be presented:

If you selected Option 1, then this display will be presented.

DFIPSN10 Normal	IBM LAN MANAGER BRIDGE DEFINITION	Page 1 of n			
To add a bridge definition, press F6 (Add). To find a bridge definition, press F7 (Find). To change/examine the definition, tab cursor to line and press F8 To delete a bridge definition, tab cursor to line and press F9 (Delete).					
BRIDGE NAME	LINKED	RING	BRIDGE	RING	COMMENTS
_ BRIDGE1	NO	003	1	001	Ring '3' to Ring '1'
-					

By using the indicated F keys, you will be presented with the displays to add, find, change, view or delete a bridge definition. Your responses to the prompts are explained by the F1 help function.

Press F6 to add a bridge definition. The next panel will be presented.

DFIPBD30
Normal

IBM LAN MANAGER
ADD BRIDGE DEFINITION

Type the bridge name and associated data below.
Press the TAB key to move between fields.
To add a bridge definition, press Enter.
To clear the data entry fields, press F5 (Redisplay).

BRIDGE NAME: BRIDGE1
BRIDGE NUMBER: (1) 1 hexadecimal digit.
LINK DURING BRINGUP.....: (Y) Y=Yes, N=No
RING NUMBER: (002) (001)
(3 hexadecimal digits)
ADAPTER: (ADAPTER0@BRIDGE1) (ADAPTER1@BRIDGE1)
(Adapter address or symbolic name)
ERROR REPORTS: (Y) (Y)
(Y=Yes, N=No)
COMMENTS: ()
0 to 40 characters.

F1=Help

F2=Quit

F4=Main Menu
F9=Delete

F5=Redisplay

All fields, except the comments field must have a response in them.

The default for the "Error Report" and "Link During Bringup" fields is N (No).

- **Bridge Name.** The name by which you want the bridge to be identified on the network (one to eight characters).
- **Bridge Number.** One hexadecimal digit that identifies this bridge uniquely from all other bridges connecting the same two rings.
- **Link During Bringup.** Y (Yes), if the LAN Manager is to establish a link with this bridge each time it is initialized or reset.
- **Ring Number.** The three-digit numbers of the rings connected by this bridge. They must match the ring number specified in the bridge program configuration.
- **Adapter.** The address or symbolic name of the two bridge adapters. The adapter listed first must be the one connected to the ring listed first in 'Ring Number' above.
- Option 7 on the System Definition menu (DFIPSD10) : "Reporting Link"
If you selected this option, then panel DFIPSD50 will be presented.
 - On this panel the reporting link number and password refers to the corresponding parameters in the bridge program configuration.
- Option 9 on the System Definition Menu (DFIPSD10) : "Trace Option".
If you selected this option, then panel DFIPSD90 will be presented. The Trace Option specifies whether or not the IBM Token-Ring Network Trace and Performance program is allowed to operate on the network.

We have discussed only those panels of the system definition that are important for installing the IBM LAN Manager. Information on how to complete all the panels can be found in the *IBM LAN Manager's User's Guide*.

On completion of the system definition, press the F4 key to return to the IBM LAN Manager Main Menu (DFIPSD10).

4. From the IBM LAN Manager Main Menu, select option 7: "Bridge Functions".

The following screen will be presented.

```
DFIPBF10                                IBM LAN MANAGER
Normal                                  BRIDGE DEFINITION
-----
Please select one of these functions:

  ID  FUNCTION                            DESCRIPTION
  ---  -
  1   BRIDGE PROFILE                      Display bridge status and parameters.
  2   LINK BRIDGE                         Establish reporting link with bridge.
  3   UNLINK BRIDGE                       Terminate reporting link with bridge.
  4   SINGLE-ROUTE BROADCAST              Set single-route broadcast in bridge.

Type in the ID of the function and press Enter ==> ( )

F1=Help      F2=Quit      F4=Main Menu
```

- **Bridge Profile.** Choose this option to display the bridge number, version information, routing information, ring numbers, adapter addresses, adapter names, single-route broadcast setting, hop count, largest frame size and percent frames lost threshold for a specified bridge.
- **Link Bridge.** Select this option to request the LAN Manager to establish communications with a specified bridge in order to get information from a remote ring.
- **Unlink Bridge.** Select this option to request the LAN Manager to drop communication with a specified bridge.
- **Single-Route Broadcast.** Choose this option to request the LAN Manager to turn single-route broadcast on or off for a specified direction across a bridge. Single-route broadcast limits the kind of frames that can be sent across the bridge.

49.4 Installation (Under NetView/PC)

NetView/PC is another IBM network management tool. It provides services for its applications, such as monitoring and problem determination, and provides a means to send network management information (such as alerts) to a host.

To run the LAN Manager Version 1.0 as an application under the NetView/PC program, all the hardware required by NetView/PC, such as the IBM Realtime

Interface Co-Processor (RTIC card), must be installed. Other hardware requirements remain the same.

Information on the installation and use of NetView/PC is contained in this document in the sections on "NetView/PC" on page 407. For additional information, refer to the *IBM NetView/PC Planning and Operation Guide* and the *IBM NetView/PC Installation Guide*.

LAN Manager and NetView/PC together take up approximately 585 Kb of memory; therefore at least this much must be available after DOS is loaded in order for the LAN Manager to run.

1. Boot the PC up in DOS 3.3 or higher. Verify that you have the correct DOS version and that there is a minimum of 4 Mb of disk space available.
2. Ensure that NetView/PC is installed on your fixed disk.

LAN Manager is installed in the NetView/PC directory, so this directory must already exist before you begin the installation.

3. Place the first diskette of the LAN Manager program in drive A:
4. Type

```
A:INSTALL  
and press the Enter key.
```

- Note: During the installation, a new CONFIG.SYS file will replace the old one and contain these statements:

```
FILES=60  
BUFFERS=20  
DEVICE=C:\LANMGR\DFIA0MOD.SYS  
DEVICE=C:\LANMGR\DFIC0MOD.SYS
```

The old CONFIG.SYS file is saved as CONFIG.SAV.

These commands are required for the proper operation of the LAN Manager. Because of memory constraints, it is recommended that you do not increase the size of BUFFERS or FILES, nor make other changes to the contents of CONFIG.SYS, as this could result in unreliable operation of the LAN Manager.

5. Follow the instructions on the display until all the diskettes are loaded. During the load procedure, a subdirectory named LANMGR is created and several files transferred into it. When the last (fifth) diskette is loaded, the installation is complete. We now have to customize the program to address our specific network needs (identifying the network nodes to the LAN Manager).

Remove the LAN Manager diskettes and store them. DO NOT copy anything else to the NetView/PC directory at this time.

Your DOS path must NOT include the RINGMGR or LANMGR directories.

6. You must now define a LAN Manager grouping to NetView/PC, or you can use the default NetView/PC grouping (LANMGR) which is included with the LAN Manager.

LANMGR groups the LAN Manager with:

- Host alerts
- Remote console

- Local alerts (run in the Region Manager).

Note: This grouping requires that the Real Time Interface Coprocessor RTIC card be installed.

7. If you need to create your own grouping, you can do it from the NetView/PC services menu. Proceed as follows:

- Be sure you are in the NetView directory and type:

```
netview startdp
```

- After several seconds the NetView/PC logo and copyright screen will be displayed. Press Enter.
- The NetView Session Selection Menu will then be displayed.

```

NetView/PC Session Selection Menu

Press the number of the session you want:

_ 1 SERVICES   NetView/PC Operator Services
  2 COMMSET   NetView/PC Communications Set Maintenance
  3 DOS Command Session

To return to DOS, select SERVICES, then SHUTDOWN.
```

- Select "Services" from this menu and the "Operator Services" main menu (DCJSSPA1) will be displayed.
 - On this screen, select Option 2: "Grouping", and fill in the required information on the succeeding panels.
 - After you have completed the definition of the LAN Manager group to the NetView/PC program, return to the NetView/PC Session Selection menu and shut down NetView/PC.
8. Re-boot your PC by holding down the "Alt" and "Ctrl" keys and press the Enter key. This ensures that the new CONFIG.SYS file is used.
9. Start NetView/PC with the LAN Manager grouping by typing:
- ```
C> NETVIEW "groupname"
```
- Where "groupname" is the name of the group you just defined, or the default group (LANMGR).
10. When the copyright screen is displayed, press the Enter key. The NetView/PC Session Selection menu will be presented.
11. Select "LAN MGR" to start the LAN Manager.

NOTE: The LAN Manager will have to be customized to address your specific network needs (identifying the network nodes to the LAN Manager). To do this, follow the steps described earlier in this chapter.

## 49.5 User's Guide

The LAN Manager is designed to be started and left to run continuously.

### Starting the LAN Manager Version 1.0 Stand-alone

If the LAN Manager Version 1.0 Program has been installed as a standalone application, you need to follow these steps:

1. Boot the PC in DOS (Version 3.3 or higher)
2. Change the directory to the LANMGR directory

```
C> cd \LANMGR
```

3. Type the command "LANMGR"

```
C:\LANMGR> LANMGR
```

4. Press the Enter key when the copyright screen is presented and after a few seconds the LAN Manager Main Selection menu will be displayed.

```
DFIPSS10 IBM LAN MANAGER
 MAIN SELECTION

Please type the number of a function:

 1 SERVICES Operator Intervention, Shutdown
 2 ALERTS View Alert file or request details
 3 LAN MGR IBM Local Area Network Manager

For help, select SERVICES then press F1 (Help)
```

5. Select Option 3: "IBM Local Area Network Manager".

IBM LAN Manager Main Menu (DFIPCP10) will be displayed. (an explanation of the commonly used functions will follow after the NetView/PC menu).

### Starting the LAN Manager Version 1.0 Under NetView/PC

If the LAN Manager Version 1.0 has been installed as a *NetView/PC application*, you need to follow the following steps:

1. Boot up the PC in DOS (Version 3.3 or higher).

Make absolutely sure that the date and time are correct in your computer. Use the DOS "DATE" and "TIME" commands to set these parameters if necessary. It is absolutely essential that these be correct as the LAN Manager uses them as the date and time stamp for network events that are logged.

2. Change to the NetView directory by typing:

```
C> cd \NETVIEW
```

3. Type the command:

```
C:\NETVIEW> NETVIEW "groupname"
```



Where "groupname" is the name of the session group you created, or the default name "LANMGR".

4. When the copyright screen is presented, press the Enter key. After a short delay, the NetView/PC Session Selection menu will be displayed.

```
NetView/PC Session Selection Menu

Press the number of the session you want:

_ 1 SERVICES NetView/PC Operator Services
 2 LAN MGR IBM Local Area Network Manager

To return to DOS, select SERVICES, then SHUTDOWN.
```

5. Select the LAN MGR option and the IBM LAN Manager Main Menu (DFIPCP10) will be displayed.

It is not within the scope of this document to give a detailed explanation of all the functions of the LAN Manager, but we will highlight some of the more commonly used ones, bearing in mind that these discussions apply to the LAN Manager's operation on the IBM Token-Ring Network.

- **Ring Status.** In the top left-hand corner of each display, immediately below the frame ID (such as DFIPCP10), you will see displayed the ring status. The condition displayed here refers to the ring to which the LAN Manager is attached. Status information is required when troubleshooting the network and when performing the problem determination procedures described in the *IBM Token-Ring Network Problem Determination Guide*. On a multi-ring Token-Ring Network, you can display the status of other rings by using the Network Status function. This status information, however, changes only when the automatic error recovery has failed to resolve the problem on the network, and should not be used when following the procedures in the Problem Determination Guide.

Some typical status messages are shown in the overview of this chapter.

When the status changes, you will receive messages in the form of alerts, or error messages will be displayed at the bottom of your screen, or they will be placed in the event log. These messages and alerts give you more information about what may have caused the status to change.

- **Alerts Under NetView/PC.** An alert is a notification of an interruption or potential interruption in the movement of data around the Token-Ring Network.

In order to receive the alerts, you must group the NetView/PC alerts management facility with the LAN Manager application in the NetView/PC LAN Manager grouping you defined. This is already done in the default group "LANMGR".

- **Intervention.** If you get an "Intervention Requested" message, you are required to perform some action before the LAN Manager can continue. In order to see what the operator intervention is, return to the NetView/PC

Session Selection screen and select "Services". Then take the option to view "Intervention" and follow the instructions on the succeeding panels.

- **Event Log.** The event log is a history of the operations occurring on the LAN and is useful when tracing intermittent faults in the network.

To view or print the information from the log, select the option "Event Log" from the IBM LAN Manager main menu and PANEL DIFPRP10 will be displayed.

The screen below gives you an idea of what the log looks like and the type of entries recorded in it.

```
DFIPRP20 IBM LAN MANAGER PAGE 1 of nn
Normal EVENT LOG REPORT

START DATE: - - START TIME: : : RING ..: MESSAGE:
STOP DATE : - - STOP TIME : : : ADAPTER:

05-19-88 11:55:32 LAN Manager started DFIPD001I
 ADDR: 10005A003787 NAME: LANMANAGER1 RING: 001 MISC:
 ADDITIONAL DATA: 000000A33831C 000000A33832F 1.00
05-19-88 12:09:17 NAUN change DFIPD220I
 ADDR: 10005A001FD2 NAME: ADAPTER0@BRIDGE2 RING: 001 MISC: 00000000
 ADDR: 10005A003787 NAME: LANMANAGER1 MISC:

F1=Help F2=Quit F4=Main Menu F10=Print PgUp
 PgDn
```

- **Shutdown** To shutdown the LAN Manager, return to the LAN Manager Main Menu and select 'S' (shutdown). When the pop-up frame is displayed, respond with a 'Y' (yes) and press the Enter key.

## 49.6 Migration Issues

If you are upgrading from the IBM Token-Ring Network Manager Version 1.0 or 1.1, then the following will apply:

- Installing the LAN Manager does not affect the Token-Ring Network Manager files; however for recovery purposes you may wish to back up the Network Manager event log file (DFIEVENT.LOG), the alert detail file (DFIALDET.DAT), and the symbolic names file (DFISYMN.M.DAT or DFISNAME.DAT) before beginning the installation of LAN Manager Version 1.0.
- The IBM Token-Ring Network Manager Version 1.0 and 1.1 files cannot be used by the LAN Manager. However, the symbolic names file can be converted to a form that the LAN Manager can use.

The first diskette of the LAN Manager Version 1.0 contains a utility program (MIGRATE) which will convert the names from your Network Manager symbolic names file (DFISYMN.M.DAT or DFISNAME.DAT) into the LAN Manager 1.0 symbolic names file (DFINAMES.DAT).

NOTE: MIGRATE erases any existing DFINAMES.DAT files so be sure to do this before adding symbolic names using LAN Manager 1.0.

- To convert the files, do the following:
  - Install LAN Manager Version 1.0.
  - Copy the old symbolic names file (DFISYMNM.DAT or DFISNAME.DAT) to the LANMGR directory.

**Note:** If both DFISYMNM.DAT and DFISNAME.DAT are copied to the LANMGR directory, only the DFISNAME.DAT file will be converted.
  - Place the LAN Manager diskette "1" in drive "A".
  - Type  
A:MIGRATE  
and press the Enter key.
  - Follow the instructions displayed on your screen.
- When the migration utility is complete, both the new LAN Manager symbolic names file (DFINAMES.DAT) and the old symbolic names file will be in the LANMGR directory. Delete the old file (DFISYMNM.DAT or DFISNAME.DAT).

---

## 49.7 Basic Troubleshooting

If, while starting the LAN Manager, your computer seems to hang up at the main selection menu, then there is probably not enough free memory to load the program. Re-IPL the system and check that there are at least 520 Kb of free memory before attempting to load the LAN Manager. Check also to ensure that there are no other memory resident programs being loaded from batch files (AUTOEXEC.BAT or AUTOUSER.BAT) or the CONFIG.SYS file. Verify that you are using the correct version of DOS. Restart the LAN Manager.

---

## 49.8 Where To Go For More Information

You will find it helpful to be familiar with the IBM Token-Ring Network and how it works. There is a lot of useful information in the following publications:

- *IBM LAN Manager User's Guide, Version 1.0, shipped with the product.*
- *GA27-3367 IBM Token-Ring Network Introduction and Planning Guide*
- *GA27-3748 IBM Local Area Network Administrator's Guide*
- *GA27-3678 IBM Token-Ring Network Installation Guide*
- *SX27-3710 IBM Token-Ring Network Problem Determination Guide*
- *SC30-3408 IBM NetView/PC Planning and Operation Guide*
- *SC30-3482 IBM NetView/PC Installation Guide*

# Chapter 50. LAN Manager Entry Version 1.0

## 50.1 Overview

IBM LAN Manager Entry Version 1.0 provides the network management function as a service point in conjunction with NetView R3 as the focal point. It does not provide a local operator interface at the LAN segment level. Network management function is available only at the central site network operator console using NetView Release 3.

The LAN management capabilities of IBM LAN Manager Entry Version 1.0 are limited to a single IBM Token-Ring Network segment, 4 Mbps or 16 Mbps, or a single IBM PC Network segment or a single PC Network (Baseband) segment.

IBM LAN Manager Entry Version 1.0 operates under control of Operating System/2 Extended Edition Ver 1.1 thereby removing the memory constraints of PC/DOS and the requirement for a dedicated machine. IBM LAN Manager Entry Version 1.0 cannot operate as a NetView/PC Version 1.2 application.

IBM LAN Manager Entry Version 1.0 uses the OS/2 Communications Manager to communicate with a host NetView. IBM LAN Manager Entry Version 1.0 acts as a NetView agent, communicating with NetView via a LAN-attached host gateway device (for example 3174, 372x or 3745) or a dedicated SDLC link using the OS/2 Communications Manager (see Figure 196).

An SDLC link is currently the only possible communications environment when using IBM LAN Manager Entry Version 1.0 on a single-segment IBM PC Network (Broadband).

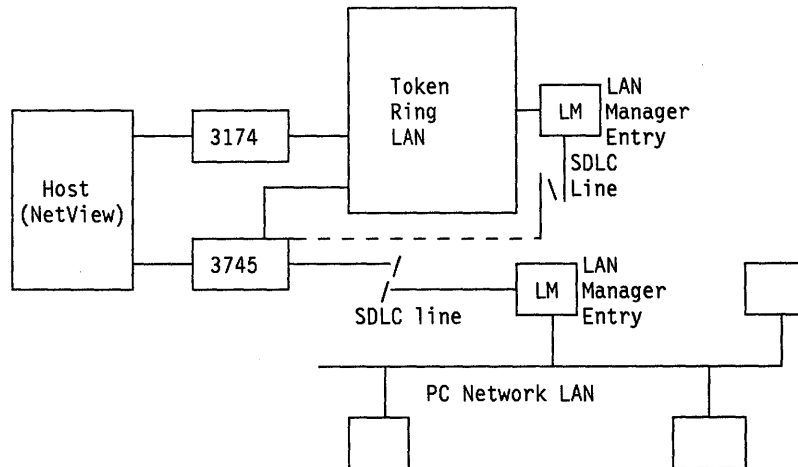


Figure 196. Sample IBM LAN Manager Entry Version 1.0 Configurations

## 50.1.1 Alerts

The IBM LAN Manager Entry Version 1.0 monitors the LAN segment for error conditions. As problems occur, the program generates alerts and sends them to the host NetView system.

Alerts transferred to the host indicate the nature of the problem plus additional details by means of the architected code points and alert major vector frames published by IBM. The LAN Manager implements all the code points of the new LAN alerts documented in *SNA Format and Protocol Reference Manual: Management Services*.

The IBM LAN Manager Entry Version 1.0 only supports alerts that pertain to local segment issues since it does not support bridges.

## 50.1.2 Application Alert Transport Facility

This feature of IBM LAN Manager Entry Version 1.0 allows applications to generate and send their own alerts to a focal point. In this context, the application is referred to as a *reporting entity*. This feature increases the ease with which automated operations from a host NetView can be implemented down to a LAN environment. This feature coupled with the Service Point Command Services (SPCS) allows information to flow up to NetView and commands from NetView to be executed on the LAN.

This capability relies on the *alert transport service* architecture, by which a reporting entity uses the services of the LAN Manager to allow it to send alerts to NetView.

Application alerts are sent to the LAN Manager's functional address. The LAN Manager Version 1.0 acknowledges receipt of the alert to the sending station, builds an NMVT frame (which imbeds the alert) and sends it off to the host focal point.

## 50.1.3 NetView R3 Support

IBM LAN Manager Entry Version 1.0 provides a subset of the Service Point Command Services (SPCS) support offered by IBM LAN Manager Version 2.0. Since IBM LAN Manager Entry Version 1.0 only offers single-segment network management with no bridge related commands, only the following six commands are supported:

|                        |                       |
|------------------------|-----------------------|
| <b>ADAPTER PROFILE</b> | Query Adapter Profile |
| <b>QNETWORK STATUS</b> | Query Network Status  |
| <b>ADAPTER LIST</b>    | Query Topology        |
| <b>SEGMENT TEST</b>    | LAN Segment Test      |
| <b>ADAPTER REMOVAL</b> | Remove Adapter        |
| <b>RESETLAN</b>        | Reset LAN Manager.    |

The commands to be executed on the LAN are entered by the NetView operator in the form of precoded CLISTs which are incorporated in NetView Release 3. The commands are processed in the same way as discussed with IBM LAN Manager Version 2.0.

### 50.1.4 Adapter Monitoring

Adapter monitoring can be implemented during customization by specifying in the *symbolic adapter names file* that an adapter address should be monitored. Then if the adapter address is found not to be on the network an alert is generated and sent up to NetView at the host.

Adapter monitoring is especially useful to monitor essential resources in an operational LAN environment such as print servers, upstream 8220 Optical Fiber Converter, large file servers and gateway devices.

The 8220 Optical Fiber Converter system provides to the LAN Manager a means for an additional level of ring problem determination. The downstream 8220 periodically sends a *downstream converter present* frame on the backup path, so that when the LAN begins to operate on the backup path the LAN Manager will receive this frame and generate an alert notifying that the LAN is now operating on the backup path.

### 50.1.5 Trace Control

Trace adapter control can be set to allow or prevent tracing activities. Tracing control is defined with an IBM LAN Manager Entry Version 1.0 startup parameter specification.

---

## 50.2 Hardware Requirements

IBM LAN Manager Entry Version 1.0 can run on any IBM PC or PS/2 that can support Operating System/2 Extended Edition Ver 1.1 and is equipped with any of the current IBM Token-Ring Network Adapters (including the 16/4 Mbps adapters), IBM PC Network (Broadband) adapters or IBM PC Network (Baseband) adapters. Please refer to the announcement letter or product reference guides for details.

Additional hardware requirements:

- An SDLC adapter, or IBM PS/2 Multiprotocol Adapter depending on the workstation being used for the gateway.
- 500 Kb of memory (for IBM LAN Manager Entry Version 1.0 only).
- Monitor
- Printer (optional).

---

## 50.3 Software Requirements for Centralized Management

IBM LAN Manager Entry Version 1.0 requires in the LAN management workstation:

Operating System/2 Extended Edition Ver 1.1

Host software requirements:

NetView Release 3 with host alert forwarding and SPCS

NetView Release 2 with only host alert forwarding

Earlier NetView releases will not support the SPCS capability for LAN management.

---

## 50.4 Host Gateway Requirements

The IBM LAN Manager Entry Version 1.0 requires a host communications link through which to communicate with the host.

Host communications link requirements:

SNA S/370 host

Appropriate SNA Host Gateway

- 3174-01L and 3174-01R Workstation Controller
- 3745, 3725, 3720 Communications Controller
- 9370 Processor
- OS/2 EE V1.2

or a direct SDLC link from the IBM LAN Manager Entry Version 1.0 OS/2 station.

---

## 50.5 Installation and Setup

This section is provided as a quick reference and is intended to complement rather than replace the *IBM LAN Manager Entry User's Guide*.

### 50.5.1 Preparation and Installation of IBM LAN Manager Entry Version 1.0

The following steps will allow you to install IBM LAN Manager Entry Version 1.0:

1. Configure a 3270 and/or APPC session with the host to communicate with NetView through a host gateway such as a 3745, 3174 (if on a Token-Ring Network segment) or through an SDLC link.

**Note:** A 3270 session alone or with APPC will provide a type 2.0 node for the SSCP-PU session for the alert reporting function. APPC alone will provide a type 2.1 node. For more information on using the type 2.1 communication please refer to *OS/2 EE Communication Manager Cookbook*.

When the *3270 terminal emulation* is started it will automatically activate the PU required for the SSCP-PU link. You may wish to specify that the *3270 terminal emulation* is automatically started up when the Communications Manager is started.

2. Use the existing Communications Manager profile and in the LAN feature profile add another Service Access Point (SAP) for IBM LAN Manager Entry Version 1.0.
3. Add the \LANMGRE directory to the LIBPATH statement in the CONFIG.SYS file.
4. Use the OS/2 Installation Utility **INSTAID** to install the program from a backup diskette.

For more details on the Installation Procedure refer to the installation section in *LAN Manager Entry User's Guide*.

## 50.5.2 Host Definitions

The host communication links are defined in different places, depending on the kind of link used.

Several steps are needed to enable host communications:

1. Define an OS/2 Extended Edition Communications Manager profile for host communications.
2. Depending on the host gateway selected, define an entry in a host *major node* for the PU and LU definitions to be used by the OS/2 Communications Manager.
3. Define the resources (line and/or PU) in the selected host gateway to be used (NCP<sup>56</sup> or 3174 customization).
4. Make sure the above three resources are correctly defined and activated.

## 50.5.3 Customization of IBM LAN Manager Entry Version 1.0

The customization of IBM LAN Manager Entry Version 1.0 basically consists of defining the *symbolic adapter names* file. This file allows the user to associate meaningful symbolic names to adapter addresses. When an alert is received at the host it will contain the symbolic name as well as the adapter universally administered address or the locally administered address. This increases the usefulness of the information included in the alerts sent up to the host NetView by IBM LAN Manager Entry Version 1.0.

The symbolic adapter names file also allows the user to designate a resource as an *adapter to be monitored* so that if it is not found on the network, an alert is generated and sent up to the host.

Thus to maximize the effectiveness of the IBM LAN Manager Entry Version 1.0 it is important to define all the adapters in the network in the symbolic adapter names file.

For more information on the definition of the symbolic adapter names file refer to the definition procedure outlined in *LAN Manager Entry User's Guide*.

## 50.5.4 Startup

After the OS/2 Communications Manager is started, make \LANMGRE the current directory and enter the following command:

```
lanmgre adapter_number trace_option service_point_name
LAN_name
```

**Note:** Where.

1. *adapter\_number* is **0** if the primary adapter is used or **1** if the alternate adapter is to be used (default is **0**).
2. *trace\_option* is **0** to prevent tracing on the LAN or **1** to allow tracing (default is **1**).

---

<sup>56</sup> NCP is a trademark of the International Business Machines Corporation.



3. *service\_point\_name* is actually the name of the VTAM PU associated with the resource represented by the OS/2 Communications Manager and assigned to the LAN Manager. It is advisable to enter it here as it will appear in alerts and identify the location of the sending LAN Manager.
4. *LAN\_name* is the name given to the LAN segment. This will also appear in the alerts and so it is advisable to give it a meaningful name to assist in problem determination and resolution.

After entering this command, if nothing goes wrong, then an acknowledgement message of a successful startup is presented. IBM LAN Manager Entry Version 1.0 then runs in the background thus freeing up the session. The user can now go and do other processing while the LAN Manager is running in the background. Since the IBM LAN Manager Entry Version 1.0 has no user interface there is nothing more that can be done from the workstation while the LAN Manager is in operation.

An error log named DFIERROR.LOG is created if IBM LAN Manager Entry Version 1.0 terminates abnormally.

For more information on the startup refer to the procedure outlined in *LAN Manager Entry User's Guide*.

### 50.5.5 Shutdown

To shutdown IBM LAN Manager Entry Version 1.0 make sure the current directory is \LANMGRE and then enter the command:

```
lanmgre /t
```

This will exit the IBM LAN Manager Entry Version 1.0 with a message stating the product's release level, a copyright notice, and a final termination notice that LAN Manager Entry has terminated successfully.

---

## 50.6 Where To Go For More Information

You will find it helpful to be familiar with the IBM Token-Ring Network and how it works. There is a lot of useful information in the following publications:

- *IBM LAN Manager Entry User's Guide, Version 1.0, shipped with the product.*
- *GA27-3367 IBM Token-Ring Network Introduction and Planning Guide*
- *GA27-3748 IBM Local Area Network Administrator's Guide*
- *GA27-3678 IBM Token-Ring Network Installation Guide*
- *SX27-3710 IBM Token-Ring Network Problem Determination Guide*
- *SC30-3408 IBM NetView/PC Planning and Operation Guide*
- *SC30-3482 IBM NetView/PC Installation Guide*
- *GG24-3388-00 LAN Manager V 2.0 and LAN Manager Entry V 1.0 Installation Guidelines*
- *GG24-3398 Local and Remote Bridges in a Multi-Segment LAN Design Guidelines*

# Chapter 51. LAN Manager Version 2.0

## 51.1 Overview

IBM LAN Manager Version 2.0 enhances IBM LAN Manager Version 1.0 both in its stand-alone network management capabilities as well as in its host-connected operation (either as a NetView agent or as a NetView/PC application).

IBM LAN Manager Version 2.0 operates under Operating System/2 Extended Edition Ver 1.1, allowing multiple tasks to run in parallel and removing the 640 Kb memory constraint of PC/DOS. This implies that no dedicated workstation is required and that other applications can share the same machine.

IBM LAN Manager Version 2.0 can operate in three different environments as shown in Figure 197. Parts of this figure will be referred to by the alphabetic reference numbers throughout this section.

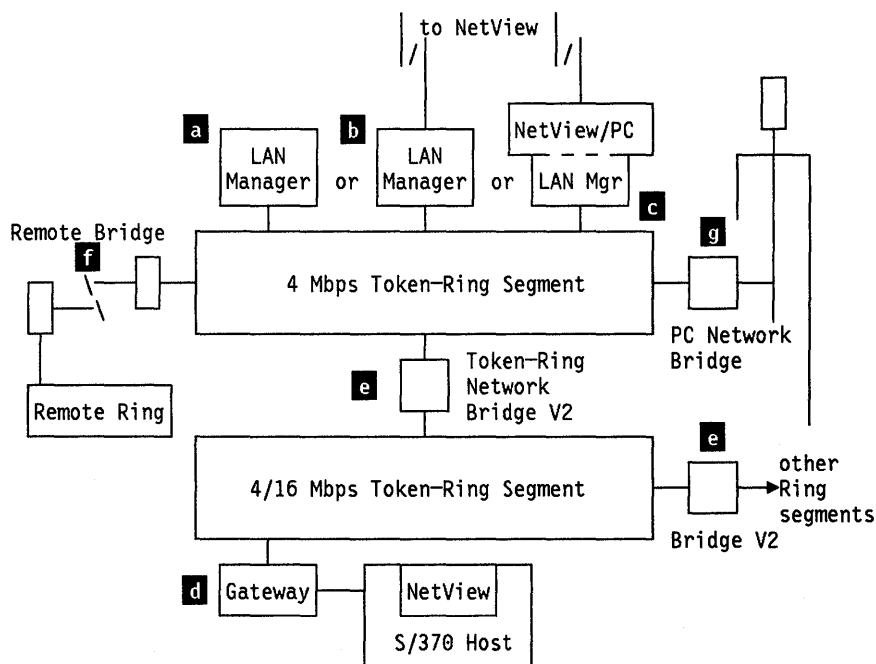


Figure 197. IBM LAN Manager Version 2.0 Overview

### 51.1.1 Stand-Alone LAN Manager

A stand-alone LAN Manager refers to a LAN Manager **a** for which no host communication is used. All the management of the network is done locally at the LAN Manager workstation and the local full-screen operator interface is used. This LAN Manager can control and manage single and multi-segments via communication links maintained with the bridges interconnecting different LAN segments.

### 51.1.2 LAN Management Agent for NetView

As a LAN management agent **b** for NetView running in the host, IBM LAN Manager Version 2.0 uses the OS/2 Communications Manager or the NetView/PC Version 1.2 Communications Manager to access the NetView host via:

- Existing LAN gateways **d** attached directly to a Token-Ring segment. In this case, an exclusive communications link to the host for LAN management is not needed. Such a host gateway device, for example a 3174-01L/11L or a 3745, can only be attached to an IBM Token-Ring Network segment.
- An SDLC adapter or a PS/2 Multiprotocol adapter using the an SDLC protocol provided by the OS/2 Communication Manager as shown by LAN Manager **b**.
- A host link using a choice of communications adapters (such as the RTIC adapter) managed by NetView/PC Version 1.2 as shown by LAN Manager **c**.

NetView Release 3 is recommended in the host system to provide maximum functional capability, mainly with respect to the Service Point Command Services (SPCS).

### 51.1.3 Using NetView/PC Version 1.2 SPCS and Host Alert Facilities

NetView/PC Version 1.2 can be used to provide service point functions (such as SPCS) for multiple applications or subsystems. In this case you will need to configure the LAN Manager to utilize the host alert and SPCS support of NetView/PC Version 1.2 rather than using the OS/2 Communications Manager. The LAN Manager, when utilizing the OS/2 Communications Manager directly, is not able to share the SSCP-PU session with other applications. NetView/PC Version 1.2 can support up to 128 concurrent applications using one host reporting interface only.

IBM LAN Manager Version 2.0 runs as an independent application to NetView/PC Version 1.2 **c** but utilizes the host alert and SPCS facilities of NetView/PC Version 1.2.

The NetView/PC Version 1.2 remote console facility is not yet available but the LAN Manager application subtask can be remotely operated via the SPCI-based LAN Manager command support offered in NetView Release 3.

## 51.1.4 Mixed LAN Management

IBM LAN Manager Version 2.0 is capable of managing 65 LAN segments.

Each time a LAN Manager establishes a communications link with a bridge it will update its segment list to incorporate the new segment. If a segment already exists in the table, the LAN Manager reviews the links and selects its primary communications link for that segment depending on which one offers the most efficient communications path. A maximum of 65 segments can be managed, including the LAN Manager's local segment. When this limit of 65 segments is reached, the next link request that requires another entry to be made would fail with an error message ("DFIPD300 - RC 009: The segment table is full").

It is possible though to link up to 64 bridges provided the number of unique segments (65) controlled by the LAN Manager is not exceeded. A link request to the 65th bridge would fail with an error message ("DFIPD300 - RC 008: The bridge table is full").

For each bridge communications link a unique LLC session is maintained. To provide for this maximum number of 64 LLC reporting link sessions, enough *link stations* should be defined in the OS/2 Communications Manager's LAN profile to ensure that the LAN Manager application can use up to 64 (see also the LAN Manager startup requirements discussed in "Startup" on page 445).

These links may be dynamically updated by the network management operator.

The bridges may be implemented by either IBM Token-Ring Network Bridge Program Version 2.0 **e**, IBM Token-Ring Network Bridge Program Version 2.1 **f** or IBM PC Network Bridge Program Version 1.0 **g**. Bridges running IBM Token-Ring Network Bridge Program Version 1.1 may coexist on the LAN environment and will operate properly as far as the basic bridge forwarding protocol is concerned. The IBM Token-Ring Network Bridge Program Version 1.1 however cannot be configured fully from IBM LAN Manager Version 2.0. Such coexistence would therefore limit some of function provided by IBM LAN Manager Version 2.0 and the newer bridges. Migration considerations are discussed in "Migration and Coexistence" on page 447.

In this way, IBM LAN Manager Version 2.0 offers LAN management of almost any LAN environment consisting of 16 Mbps or 4 Mbps IBM Token-Ring Network segments, and PC Network (broadband) segments, as shown in Figure 197 on page 439.

In the mixed multi-segment LAN environment, each LAN segment has a segment number (assigned by the bridges) which consists of a three-digit hexadecimal number (range 001 - FFF). This three-digit number is used in the operator interface to refer to specific segments, as well as in the routing information field of frames traveling over multiple segments.

---

## 51.2 Planning Checklist

IBM LAN Manager Version 2.0 is an Operating System/2 Extended Edition Ver 1.1 application and therefore it can run concurrently with other applications. A dedicated machine for the management task is no longer required as was the case with IBM LAN Manager Version 1.0.

OS/2 offers memory protection for the application tasks and therefore offers a very consistent and reliable environment for concurrent applications.

### 51.2.1 Prerequisites - Hardware

A suitably configured IBM PC or PS/2 capable of running Operating System/2 Extended Edition Ver 1.1 with at least 800 Kb of virtual memory and 2.6 Mb of fixed disk space is required for LAN Manager. More disk space is required under normal operations, to provide for large event logs (up to 4 Mb). Additional space is also required for logging bridge performance counters (if recording is invoked - 145 Kb per bridge).

A suitable printer is an optional extra, but highly recommended for hardcopy output of Event Logs, Status information and System Definitions.

Any currently available IBM Token-Ring Network adapter or IBM PC Network (Broadband) adapter.

If using the Operating System/2 Extended Edition Ver 1.1 SDLC communications support to establish the host NetView session, the following additional hardware is required:

- IBM SDLC Adapter on a Family 1 device, or
- IBM PS/2 Multiprotocol Adapter on a Family 2 device.

If running IBM LAN Manager Version 2.0 as a NetView/PC Version 1.2 application, the following additional hardware is required:

- Either the appropriate IBM Realtime Interface Co-Processor (RTIC) Adapter or
- The IBM SDLC Adapter on a Family 1 device, IBM PS/2 Multiprotocol Adapter on a Family 2 device.

Suitable cables for LAN attachment and host communications should be ordered depending on the host and LAN attachment interface adapters to be used.

For full detail on hardware prerequisites, see the relevant IBM product announcement letter or the section on hardware and software requirements in the *IBM LAN Manager Version 2.0's User's Guide*.

---

## 51.3 Prerequisites-Software

IBM LAN Manager Version 2.0 has the following software requirements on the machine that it will operate from:

- Operating System/2 Extended Edition Ver 1.1 with the communications manager feature
- If NetView/PC is also required:
  - NetView/PC Version 1.2
  - The IBM Realtime Interface Co-Processor Control Program for PS/2 (if applicable, to drive the RTIC adapter).

In supporting the services of IBM LAN Manager Version 2.0 the following software on other inter-connected systems would be required:

- For multi-segment LANs on bridge machines:
  - IBM Token-Ring Network Bridge Program Version 2.1.
  - IBM Token-Ring Network Bridge Program Version 2.0.
  - IBM Token-Ring Network Bridge Program Version 1.1.
  - IBM PC Network Bridge Program Version 1.0.
- For network management focal point services on an SNA host:
  - NetView Release 3 - to enable sending alerts to the host and receipt of SPCS commands from the host or
  - NetView R2 to enable sending alerts only to the host without the support for SPCS.

---

## 51.4 Installation and Setup

Installation and setup procedures are documented in the *IBM LAN Manager Version 2.0 User's Guide*. Some additional information is provided here to clarify resource definitions and requirements.

### 51.4.1 Preparation and Installation of IBM LAN Manager Version 2.0

The following steps will assist you in installing IBM LAN Manager Version 2.0 on a system with Operating System/2 Extended Edition Ver 1.1 installed and running:

1. If host communications is needed, configure a 3270 and/or APPC session with the host to communicate with NetView through a gateway such as a 3745, 3174 or through an SDLC link.

**Note:** A 3270 session alone or with APPC will provide a Type 2.0 node for the SSCP-PU session for the alert reporting function. APPC alone will provide a Type 2.1 node. For more information on using the Type 2.1 communication please refer to *OS/2 EE Communications Manager Cookbook* and *Network Program Products: Planning*.

When the *3270 terminal emulation* service is started it will automatically activate the PU required for the SSCP-PU link. You may wish to specify that the *3270 terminal emulation* service is automatically started when the Communications Manager is started.

2. Use the existing Communications Manager profile and in the LAN feature profile section, change the IEEE 802.2 definitions by adding:

- One extra *SAP*
- As many *link stations* as links to bridges are required (maximum 64)
- One extra *user*

for IBM LAN Manager Version 2.0's use.

3. If you are migrating from a previous IBM LAN Manager Version 1.0 environment, make sure to make backup copies of the system definition files, described in the user's guide. The installation process will overwrite the old files, since it installs on top of the old system in the same directory that was used by IBM LAN Manager Version 1.0 under PC/DOS.
4. Add the `\LANMGR` directory to the LIBPATH statement in the CONFIG.SYS file to allow LAN Manager to locate its panels and other runtime libraries at execution time.
5. Make sure that you are providing enough disk space for your LAN Manager installation and for daily operational requirements (see "Prerequisites - Hardware" on page 442).
6. Use the OS/2 Installation Utility **INSTAID** to install the program from your backup copy of the installation diskettes. To reset your LAN Manager's password when required use also the backup copy of the installation diskettes. You should keep the original installation diskettes in a safe place, for backup.

For more details on the installation procedure refer to the installation section in *IBM LAN Manager Version 2.0 User's Guide*.

## 51.4.2 Host Definitions

The host communications link is defined in different places, depending on the kind of link used. Detailed definitions and different environments for these host connections fall outside the scope of this document.

Several steps are needed to enable host communications:

1. Define an Operating System/2 Extended Edition Ver 1.1 Communications Manager profile or NetView/PC Version 1.2 for host communications as described in the previous section.
2. Define an entry in a host *major node* (local or switched) for the OS/2 or NetView/PC PU and LU definitions.
3. Define the resources (lines and/or PU) in the relevant gateway to be used (NCP or 3174 customization).
4. Make sure the above three resources are correctly defined and activated.
5. Define the means of communications to be used by the LAN Manager. This can be done only after LAN Manager has been installed and started, by selecting from LAN Manager main menu: *System Definitions* and then *Host Connection*. Now select whether you are using OS/2 or NetView/PC defined above to talk to the host. Selecting the OS/2 option will prompt you for a *Service Point Name*. This is the *PU name* assigned in the VTAM major node for this OS/2 station to communicate with the host. This name is used to uniquely identify this LAN Manager in all alerts forwarded to the host. It is also used by NetView Release 3 to identify to which LAN Manager to send SPCS commands.

### 51.4.3 Customization and Setup of IBM LAN Manager Version 2.0

Once the installation process is completed, you should first do a complete migration from older versions of LAN Manager before attempting to start it up. Migration procedures are very well documented in the *IBM LAN Manager Version 2.0 User's Guide*. If you have a new installation and do not have to consider migration you can prepare for startup discussed in the next section.

#### 51.4.3.1 Startup

The IBM LAN Manager Version 2.0 is designed to be started and run continuously.

Make sure the system date and time is set correctly, since events are time stamped when logged. If the LAN Manager is started with wrong date and time information it becomes rather confusing to search for events in the event log. The same considerations apply for alerts logged, and therefore care should always be taken to ensure that the date-and-time information is as accurate as possible. It is also recommended that this date-and-time information is synchronized with the host system's date-and-time so that alerts generated from the LAN and recorded at the host do not contradict this information.

Then check that the host communications interface is ready (if required).

The last task to do is to ensure that each application in the LAN Manager's workstation that will use the LAN adapter resources is started first **before** you start the LAN Manager (which should be started last). The reason for this is that LAN Manager will open one SAP and as many link stations as it can find available on the adapter up to a maximum of 64 (total amount of bridges it can link to). Large installations or installations that grow fast should note this behavior and plan to provide for enough link stations on the adapter (see discussion on defining these resources in "Installation and Setup" on page 443) to support dynamic expansion.

After the OS/2 Communications Manager is started, select the LAN Manager V2.0 entry from the Start Programs list. Wait for the logo panel and then press the Enter key. If you do not press the Enter key it will time out and proceed anyway in about 10 seconds. Once the initialization is complete the main selection menu called LAN Manager Functions is displayed. You are now ready to customize and use the LAN Manager.

#### 51.4.3.2 Customization

The following functions must be done and maintained regularly. For step-by-step assistance in doing the actual customization follow the steps in "Customizing the LAN Manager" in the *IBM LAN Manager Version 2.0 User's Guide*.

**Add Adapter Names:** The adapter definition file contains symbolic names for adapters in the domain of the LAN Manager. Here you should at least define all the critical adapters that need monitoring as we have seen before. The symbolic name that you provide allows for easy identification of an adapter in events or alerts, or when LAN Manager operator wants to issue a command to an adapter.

**Add Bridge Definitions:** A bridge definition needs to be added for each bridge with which you need to establish a communications link. Whenever a change in the bridge definitions needs to be done it should be properly planned and done



in such a way so that all bridges using the same segment will identify the segment by the same number. Also single route broadcasting parameters need to be defined correctly so that one and only one path exists for single route broadcast frames from any adapter to any other adapter in the network.

**Select Adapter Number:** If two LAN adapters are installed on a LAN Manager machine this function allows you to define which adapter should be used by the LAN Manager the next time that it will restart or be reset. This could be used to activate the LAN Manager on another segment if the current segment fails.

**Add LAN Name:** This function defines the name for the logical LAN that the LAN Manager is controlling. This name will be added to any alert generated by the LAN Manager. Alerts passed from applications using the LAN Manager's alert transport services will carry the name provided by the application

**Add Operator Password:** Operator access to the user interface of the LAN Manager program can be restricted by defining a password in the Systems definition panel (subpanel - Security). Once defined this password will have to be entered correctly every time the LAN Manager is restarted or after the operator has selected "Secure system" from the main panel. The password will restrict any unauthorized user from entering any commands to the LAN Manager program on this LAN Manager machine. It however does not restrict the access of a NetView operator issuing LAN Manager commands.

**Set Trace Option:** The default setting for trace control is to allow all trace adapters to trace. A controlling LAN Manager could restrict tracing to only a few adapters which are authorized for tracing. The other option would be to prohibit all tracing by any adapter.

**Set Configuration Logging Options:** Configuration logging is a function that allows you to monitor any insertion and de-insertion activity on all segments or a particular segment of the LAN.

**Define Reporting Link for Bridges:** The reporting link of a LAN Manager is defined in the *system definition* panel. The reporting link number determines whether the LAN Manager is a *controlling* or an *observing* LAN Manager. You also need to provide a password which will be used to verify if this LAN Manager is allowed to access a bridge in the requested mode.

**Define Host Connection:** The host connection reporting mechanism should be defined by selecting the system definition panel from the main menu and then host connection. Here you define whether LAN Manager will use the OS/2 Communications Manager or the NetView/PC Version 1.2 Communications Manager to communicate with the NetView host.

**Select Colors:** The colors of the LAN Manager panels are defined in a file called DFI.PRO. There are four sample profiles that provide different background colors for the LAN Manager panels. These are:

|              |                            |
|--------------|----------------------------|
| DFIBLACK.PRO | Black background (default) |
| DFIWHITE.PRO | White background           |
| DFIBLUE.PRO  | Blue background            |
| DFICYAN.PRO  | Cyan background            |

To select a new background color select the appropriate profile and copy it to the DFI.PRO file. These files are all located in the \LANMNGR directory of the hard disk where LAN Manager is installed.

### 51.4.3.3 Shutdown

Care should be taken to terminate LAN Manager with a **SHUTDOWN** from the main menu, rather than a simple switch-off or a re-boot of the machine. This process closes open files, disconnects links to bridges, frees up adapter resources and logs termination messages as events in the event log.

This will ensure a normal start-up again and avoid unpredictable results.

### 51.4.4 Operational Considerations

1. Periodically print out the event log (if required) and delete it. This makes processing and searching for specific events easier by removing older events. You can also keep a backup copy of the file by renaming it to some other file name. The new file is not directly accessible from the LAN Manager, but in the event that you need to reference it again, you can always back up the current file and rename the old one to the file that LAN Manager accesses - **DFIEVENT.LOG**. This can only be done when LAN Manager is shut down.
2. Clean out the *alert log* regularly by attending to the causes as soon as they occur and then erasing the alert from the alert display panel.
3. Backup the following files regularly:
  - DFIADFS.DAT - adapter definition file
  - DFIEVENT.LOG - event log file
  - DFIALDET.LOG - alert detail file
  - DFISYS.DAT - system parameter file
  - DFIBDEFS.DAT - bridge definition file.

This will save a lot of time and valuable information in the event that something goes wrong and the files become corrupted.

---

## 51.5 Migration and Coexistence

The functions and messages of IBM LAN Manager Version 2.0 are similar to those used by IBM LAN Manager Version 1.0. Panels are redesigned to offer better usability of functions. Panel layouts, function selection, key stroke entry and use of common function keys conform to the Common User Access (CUA) specification of IBM's Systems Application Architecture<sup>57</sup>.

In addition a supplied utility package (MIGRATE) allows you to migrate the symbolic names file and bridge definition file from IBM LAN Manager Version 1.0 to IBM LAN Manager Version 2.0. The symbolic names file of IBM LAN Manager Version 1.0 becomes the adapter definition file of IBM LAN Manager Version 2.0.

---

<sup>57</sup> Systems Application Architecture and SAA are trademarks of the International Business Machines Corporation.

With respect to the enhancements discussed in the previous paragraphs, migration to IBM LAN Manager Version 2.0 is strongly recommended. The only instance in which migration may be temporarily delayed is when an existing IBM LAN Manager Version 1.0 runs as a NetView/PC Version 1.1 application using the Remote Console Facility which is not available in NetView/PC Version 1.2. If a host NetView Release 3 connection is available many of the LAN Manager commands can be issued from the NetView console, but it does not support full remote console operations as is available from NetView/PC Version 1.1<sup>58</sup>.

When migrating to IBM LAN Manager Version 2.0, bridges running IBM Token-Ring Bridge Program Version 1.0 or 1.1 should be upgraded simultaneously to IBM Token-Ring Network Bridge Program Version 2.0 in order to allow proper multi-segment LAN management. Refer to the section "Local and Remote Bridges" in the document *IBM Multi-Segment LAN Design Guidelines*.

In a NetView/PC environment, migration to IBM LAN Manager Version 2.0 implies either concurrent migration from NetView/PC Version 1.1 to NetView/PC Version 1.2 if required, or use of Operating System/2 Extended Edition Ver 1.1's host gateway communications capability.

IBM LAN Manager Version 2.0 functions are partially supported when running with NetView Release 2. The LAN Manager commands implemented via the SPCS and the Alert Transport Facility (with the new LAN alert code points) will only be available when running with NetView Release 3.

---

## 51.6 Where To Go For More Information

You will find it helpful to be familiar with the IBM Token-Ring Network and how it works. There is a lot of useful information in the following publications:

- *IBM LAN Manager User's Guide, Version 2.0, shipped with the product.*
- *GA27-3367 IBM Token-Ring Network Introduction and Planning Guide*
- *GA27-3748 IBM Local Area Network Administrator's Guide*
- *GA27-3678 IBM Token-Ring Network Installation Guide*
- *SX27-3710 IBM Token-Ring Network Problem Determination Guide*
- *SC30-3408 IBM NetView/PC Planning and Operation Guide*
- *SC30-3482 IBM NetView/PC Installation Guide*
- *GG24-3388-00 LAN Manager V 2.0 and LAN Manager Entry V 1.0 Installation Guidelines.*

---

<sup>58</sup> The NetView/PC Version 1.1 remote console could only be used without alert forwarding to NetView because of memory restrictions.

---

## Chapter 52. 3270 Emulation LAN Management Program

---

### 52.1 Overview

The 3270 Emulation LAN Management Program provides small, single, remote Token-Ring Networks (or PC Networks) with the capability for centralized network management. Residing in a workstation serving as a 3270 Emulation Program Gateway, the Management Program monitors the LAN for failures and forwards alerts automatically to NetView at host.

The management program runs in the same machine as the gateway and uses the host link provided by the gateway.

The 3270 emulation program continues to provide functions for the workstations on the LAN while the management program monitors LAN operations.

---

### 52.2 Planning Checklist

#### 52.2.1 Prerequisites - Hardware

1. The 3270 Emulation LAN Management Program will operate on any PC that is configured for the 3270 emulation program with an SDLC or Token-Ring connection to the host. In addition, you will need 48 Kb of memory which is required by the LAN Manager.

The 3270 Emulation LAN Management Program will not work with a 3270 Emulation Program DFT Gateway.

2. The 3270 Emulation LAN Management Program uses 48 Kb of memory.
3. 3270 Emulation Program Gateway uses 248 Kb of memory.
4. Appropriate LAN adapter.

#### 52.2.2 Prerequisites - Software

1. NetView Release 2 is required at the host. This is the only release of NetView that will recognize the alert messages that LAN Manager sends it.
2. 3270 Emulation Program V3.02.
3. DOS V3.3.
4. LAN Support Program.

---

### 52.3 Installation Steps

1. Copy the 3270 LAN Management Program to disk or to diskette.
2. Install the LAN Support Program if not already installed. You will need to edit the CONFIG.SYS file so that 'dxmT0mod.sys' command has "es=1" as a parameter such as:

```
device = dxmT0mod.sys es = 1
```

If your 3270 Emulation Program has two adapters in it then you must code the following in the CONFIG.SYS file:

```
device=dxmt0mod.sys es=1 / es=1 est=1
```

The additional parameters refer to the alternate adapter.

3. Install the 3270 Emulation Program V3 as a gateway or gateway with network station. The details covering this installation can be found in "PC 3270 Emulation Program Version 3" on page 123.
4. You may need to change your AUTOEXEC.BAT file if you wish to load everything automatically. To load the 3270 LAN Management Program, use the command:

```
DWZMAIN ring0001
```

where "ring0001" is the name or number of the Token-Ring which will identify alerts, etc., from this ring to the NetView operators.

The order of loading is:

- a. LAN Management Program
  - b. 3270 Emulation.
5. A message will be displayed if the program loads successfully.

---

## 52.4 Where To Go For More Information

- *IBM PC 3270 Emulation Local Area Network Management Program User's Guide*, which comes with the product.

---

## Chapter 53. Trace and Performance Program

---

### 53.1 Overview

The IBM Token-Ring Network Trace and Performance Program is designed to assist users of IBM Token-Ring Networks in problem determination and performance analysis of the network.

The Trace and Performance Program measures the ring activity and stores data only on the ring to which it is attached. However, that ring may be connected to other rings by network bridges. The program will capture data from the ring and save it on disk or diskette. It can then present several different views of this data, either in detail or in summary, to aid in the discovery of problems on the ring. It also collects and stores data relating to the amount of traffic on the ring at any given time and can present this data as a percentage of the maximum amount of traffic that the ring can handle.

---

### 53.2 Planning Checklist

#### 53.2.1 Minimum Requirements

- An IBM Personal Computer or Personal System/2 with at least 512 Kb of memory and one diskette drive. This could be either:
  - A PC/XT Model 286
  - A PC/AT
  - A PS/2 Model 30, 50, 60, or 80.
- A display (monochrome or color graphics)
- One of the following special adapters:
  - IBM Token-Ring Network Trace and Performance Adapter II (for the PCs or PS/2 Model 30)
  - IBM Token-Ring Network Trace and Performance Adapter/A (for the PS/2 Models 50, 60, or 80).
- A copy of DOS Version 3.3 or higher.
- The Trace and Performance Program package. This includes:
  - *IBM Token-Ring Network Trace and Performance Program User's Guide*
  - One 3.5" and two 5.25" program diskettes.
- IBM LAN Support Program.

---

### 53.3 Installation

The hardware installation of the Token-Ring Network Trace and Performance Adapter II or Adapter/A is the same as for the PC Token-Ring Network adapters and is covered in the chapters on "PC Token-Ring Network Adapter

Installation" on page 9 and "PS/2 Token-Ring Adapter/A Installation" on page 17.

Installing the software simply means copying the programs and files from the diskettes to a directory on the fixed disk. The help text files must be placed in a subdirectory named DOC as the Trace and Performance program looks for this directory to locate these files. If they are not located in this directory, then the help text will not be available to the Trace and Performance program. All the other programs and files may be located in any directory as long as a DOS PATH command identifies the path to them. However we do recommend that for uniformity and ease of backup, they all be placed in a directory created exclusively for Trace and Performance (TAP).

Follow these steps to transfer the programs and files to your fixed disk:

1. Create directories for the help files and the program files.

Using your fixed disk as the default drive, type:

**MD DOC** This creates the "DOC" directory in which the help files must be placed.

**MD TAP** To create the directory to hold the Trace and Performance programs and files. You can use any name for this directory and it can be embedded in the root directory or any other subdirectory except the "DOC" directory.

2. Place the Trace and Performance program diskette in drive "A" and type:

**COPY A:\*. \* C:\TAP** This will copy all the Trace and Performance program files from the diskette to the directory on your hard disk.

**COPY A:\DOC\\*. \* C:\DOC** This will transfer the help files to the "DOC" directory.

3. Add a path statement to your AUTOEXEC.BAT file pointing to these new directories.
4. Remove the diskettes and store them in a safe place.

The installation is now complete.

---

## 53.4 User's Guide

### 53.4.1 Starting the Trace and Performance Program

Prior to starting the Trace and Performance program, initialize the IBM LAN Support program.

The Trace and Performance program is started by using a shell program (TAP.EXE) provided with the package. To start the program:

1. Ensure that there are no other application programs using the adapter.
2. Change to the directory in which the programs reside.
3. Type TAP and press Enter.

In a few seconds the program's title will be displayed. Press the Enter key and the main menu panel will be displayed.

```

 Trace and Performance Program
 Main Menu

 1 Trace the Token-Ring
 2 Analyze a Ring Trace
 3 Measure Token-Ring Performance
 4 Report Token-Ring Performance

 Choice: Press <ENTER>

 F1: Help F3: F5: F7: F9:
 F2: Quit F4: F6: F8: F10:
```

4. Select the desired function from this menu by typing the number that corresponds to the function and press Enter.

**Trace Facility**

The Trace Facility captures data from the ring and stores it on the fixed disk. You can designate the data to be captured by type, source or destination addresses.

The data captured can be:

- Medium Access Control (MAC) frames only
- Non-MAC frames
- All frames
- Frames going to or coming from a specific address or group of addresses.

**Trace Analysis Facility**

The Trace Analysis Facility is used to view the data captured by the Trace Facility.

**Performance Facility**

The Performance Facility monitors the activity on the ring by displaying either of two panels while it is in operation. These panels indicate the relative loading of the ring in different ways. One shows the instantaneous loading and the other shows a performance graph over a prescribed period.

**Performance Analysis Facility**

The Performance Analysis Facility is used to display a performance summary, a graphic detail report and a tabular detail report.



## 53.4.2 The Trace Facility

Select Option 1 and press Enter. The first of a series of trace facility panels will be displayed.

```

 Trace Facility

Trace File Name:
 doug1
Parameter File Name and Extension:
Synonym File Name and Extension:

 To invoke the ring trace facility press <ENTER>

F1: Help F3: F5: F7: F9:
F2: Quit F4: F6: F8: F10:
```

### 1. Trace Facility panel 1.

- On this panel, you are required to name the file in which you want the Trace and Performance program to store the data collected.
- The parameter and synonym file names are optional. Use these if you have predefined parameters for the trace or you wish to use synonyms instead of addresses.

When you have entered the information on this panel, press Enter and the following panel will be displayed.

```

 Trace Facility
A Traffic to trace: MAC, Non-MAC, All (M,N,A)

Y Copy one buffer only: (Y/N)
Time based triggers (HH:MM:SS)
Start 14:40:00 Stop 14:43:00

Data based triggers
Start Pattern Stop Pattern
Start Offset Stop Offset

 Trace File Name
DOUG1

F1: F3: F5: Start F7: F9: Save Parm
F2: Quit F4: F6: F8: Set Addr F10:
```

### 2. Trace Facility panel 2.

On this panel you have the option to select certain parameters to limit the trace to specific data. If you are using a parameter file, the values from the file will be displayed here. The options are:

- The type of frames to be traced. M = MAC frames. N = Non-MAC frames, or A = All frames.

- Copy only one buffer (Y), or the entire frame (N). If you copy only one buffer of the frame, you will have access to the physical header of a MAC frame, the SAP addresses of a LLC frame, and the transmission and record headers for SNA-type frames.
- Time-based triggers: Enter the start and stop times you want the program to monitor the network. The format is: hours (HH), minutes (MM) and seconds (SS), which are based on the PC clock time.
- Data based triggers: Enter the trigger's start pattern as a sequence of hexadecimal characters representing up to eight bytes of frame data. Enter the start offset as a decimal number representing the number of bytes from the start of the frame. Enter the trigger's stop pattern and stop offset the same as you did for the start pattern and offset. This data identifies the frames with which you want to start and stop the trace.
- Enter the file name in which you want the data stored.

If you wish to trace the frames between MAC addresses, then press F8 and this panel will be displayed.

Trace Facility

Destination Addresses

|              |              |  |  |  |
|--------------|--------------|--|--|--|
| 10005A107E41 | 400051130005 |  |  |  |
|              |              |  |  |  |

N All addresses EXCEPT those in destination list? (Y/N)

Source Addresses

|              |              |  |  |  |
|--------------|--------------|--|--|--|
| 400051130005 | 10005A107E41 |  |  |  |
|              |              |  |  |  |

N All addresses EXCEPT those in source list? (Y/N)

O Frame must match: One of Destination AND One of Source (A)  
 One of Destination OR One of Source (O)

F1:                    F3:                    F5: Start            F7: Perf Parms    F9: Save Parms  
 F2: Quit            F4:                    F6:                    F8:                    F10:

### 3. Trace Facility panel 3.

This panel allows you to set the source and destination addresses to trace. You may specify up to 10 source and destination addresses in the spaces provided on this display. Each address represents a specific station on the network and is 12 hexadecimal digits long. Any frame on the ring with one of the addresses selected may be traced. If no addresses are specified all frames on the ring will be traced.

- You can choose to trace frames to and from the addresses listed or to and from all addresses except those that you have listed. Answer (Y) YES or (N) NO to that question on both address fields. The default in both cases is NO.
- You can trace frames that match both a source and a destination address or frames that match either a source or a destination address. Answer (A) AND or (O) OR to this question. The default is OR.

Having made your selections, you can now start the trace. To do this, press F5. The Trace Facility will start saving the data from the ring to the file that you specified. If no frames are transmitted for a 15-second period, a message will be displayed indicating that there is no data on the ring.

To stop the trace, you can:

- Wait until either the time or data trigger's criteria are met (if you had set some).
- Press Ctrl + Q key combination.

To view the data collected by the trace, return to the Trace and Performance main menu and select option 2 to analyze a ring trace.

Press Enter and this screen will be displayed.

Trace Analysis Facility

Trace File Name and Extension:  
DOUG.TRO

Synonym File Name and Extension:

To invoke the trace analysis facility press <ENTER>

|          |     |     |     |      |
|----------|-----|-----|-----|------|
| F1: Help | F3: | F5: | F7: | F9:  |
| F2: Quit | F4: | F6: | F8: | F10: |

#### 1. Trace Analysis Facility panel 1.

On this panel, enter the name of the file that contains the trace data to be analyzed. If the trace was just done and you had not run any other programs, had quit the trace function or re-IPLed the machine, then the name of the file just used will be displayed. Press the Enter key.

The Trace Analysis Facility will display a message stating that an index for the trace data is being formed. When this is completed, the following panel is displayed.

```

DOUG.TR0
 RTAP
 Build the File Index

File Name:
 DOUG.TR0

 988 records. 14 MAC Frames. 974 Non-MAC Frames.

 First MAC Record Number 0. First Non-MAC Record Number 1.

F1: Help F3: F5: F7: F9:
F2: Quit F4: F6: F8: F10:

```

2. Trace Analysis Facility panel 2.

This panel indicates the quantity and type of data that was captured by the Trace Facility.

Press the Enter key and the RTAP menu will be displayed.

```

DOUG.TR0
 RTAP Trace Analysis Facility
 RTAP Menu

 1 Display Ring Configuration
 2 Display Summary
 3 Display Frame Detail
 4 Set Search Parameters
 5 Save or Get Search Parameters
 6 Specify Trace File

Choice: 2 Press <ENTER>

F1: Help F3: F5: F7: F9:
F2: Quit F4: F6: F8: F10:

```

3. Trace Analysis Facility panel 3.

From this menu you may select any of the Trace Analysis functions listed. These are dealt with in detail in the *IBM Token-Ring Network Trace and Performance User's Guide*.

Shown below is a typical example of what a summary display looks like.

```

DOUG.TRO

 RTAP Summary Display

FRM Destination Source Interpretation
0 C000FFFFFFFF RS 400051130005 RS <Standby Monitor Present>
1 10005A107E41 0C 400051130005 0C <RR> 92
2 400051130005 0C 10005A107E41 0C <RR> 5
3 400051130005 0C 10005A107E41 0C <I> 92 5 Req. FMD User data.
4 10005A107E41 0C 400051130005 0C <RR> 93
5 10005A107E41 0C 400051130005 0C <I> 5 93 Req. FMD User data.
6 400051130005 0C 10005A107E41 0C <RR> 6
7 400051130005 0C 10005A107E41 0C <I> 93 6 Req. FMD User data.
8 10005A107E41 0C 400051130005 0C <RR> 94
9 10005A107E41 0C 400051130005 0C <I> 6 94 Req. FMD User data.
10 400051130005 0C 10005A107E41 0C <RR> 7
11 400051130005 0C 10005A107E41 0C <I> 94 7 Req. FMD User data.
12 10005A107E41 0C 400051130005 0C <RR> 95
13 C000FFFFFFFF RS 400051130005 RS <Standby Monitor Present>
14 10005A107E41 0C 400051130005 0C <I> 7 95 Req. FMD User data.
15 400051130005 0C 10005A107E41 0C <RR> 8
16 400051130005 0C 10005A107E41 0C <I> 95 8 Req. FMD User data.
17 10005A107E41 0C 400051130005 0C <RR> 96

F1: Help F3: Search + F5: F7: F9: Print
F2: Quit F4: F6: Search - F8: F10: Srch Parm

```

#### 4. Trace Analysis Facility panel 4.

This is probably the most often used display of the Trace Analysis Facility. Each line of data shown represents one frame and the information displayed is the record number in the file, the destination address, the destination service access point (DSAP), the source address, the source service access point (SSAP), and the frame type for LLC frames or the major vector type for MAC frames.

### 53.4.3 The Performance Facility

The Performance Facility monitors the activity on the ring by displaying either of two panels. One of these panels shows the instantaneous loading of the ring, much like a speedometer, while the other displays a performance graph over a period of two hours.

To start the Performance Facility, select Option 3 from the Trace and Performance main menu.

```

 Trace and Performance Program
 Main Menu

1 Trace the Token-Ring
2 Analyze a Ring Trace
3 Measure Token-Ring Performance
4 Report Token-Ring Performance

Choice: 3 Press <ENTER>

F1: Help F3: F5: F7: F9:
F2: Quit F4: F6: F8: F10:

```

The next screen to be displayed requires that you enter the name of the file in which you want the performance data to be stored.

```

 Performance Facility

Performance File Name:
 DELPERF

Parameter File Name and Extension:

Synonym File Name and Extension:

 To invoke the performance facility press <ENTER>

F1: Help F3: F5: F7: F9:
F2: Quit F4: F6: F8: F10:

```

### 1. Performance Facility panel 1.

When you have entered the file name, press the Enter key and the following screen will be displayed.

```

 Performance Facility

 Time based triggers (HH:MM:SS)
Start Stop
128 256 512 Frame Size Distribution Intervals
 1024 2048

 Performance File Name
 DELPERF

F1: F3: F5: Start F7: F9: Save Parm
F2: Quit F4: F6: F8: Set Addr F10:

```

### 2. Performance Facility panel 2.

This panel allows you to select parameters that will limit the performance measurements to specific data.

- **Time-based triggers:** Enter the start and stop times you want the program to monitor the network. The format is: hours (HH), minutes (MM) and seconds (SS), which are based on the PC clock time.
- **The frame size distribution intervals** allow the selection of different frame lengths for monitoring. The defaults supplied can be changed to indicate the frame size distribution you want.

The intervals are (128) 0 - 128, which counts all frame sizes that are between 0 and 128 bytes long; (256) 129 - 256, which counts all frame sizes 129 to 256 bytes long, and so on.

The next Performance Facility panel allows you to select source and destination addresses to count.

To display this panel, press the F8 key.

| Performance Facility                                                                                    |              |           |               |               |
|---------------------------------------------------------------------------------------------------------|--------------|-----------|---------------|---------------|
| Destination Addresses                                                                                   |              |           |               |               |
| 10005A107E41                                                                                            | 400051130005 |           |               |               |
|                                                                                                         |              |           |               |               |
| N All addresses EXCEPT those in destination list? (Y/N)                                                 |              |           |               |               |
| Source Addresses                                                                                        |              |           |               |               |
| 400051130005                                                                                            | 10005A107E41 |           |               |               |
|                                                                                                         |              |           |               |               |
| N All addresses EXCEPT those in source list? (Y/N)                                                      |              |           |               |               |
| O Frame must match: One of Destination AND One of Source (A)<br>One of Destination OR One of Source (O) |              |           |               |               |
| F1:                                                                                                     | F3:          | F5: Start | F7: Perf Parm | F9: Save Parm |
| F2: Quit                                                                                                | F4:          | F6:       | F8:           | F10:          |

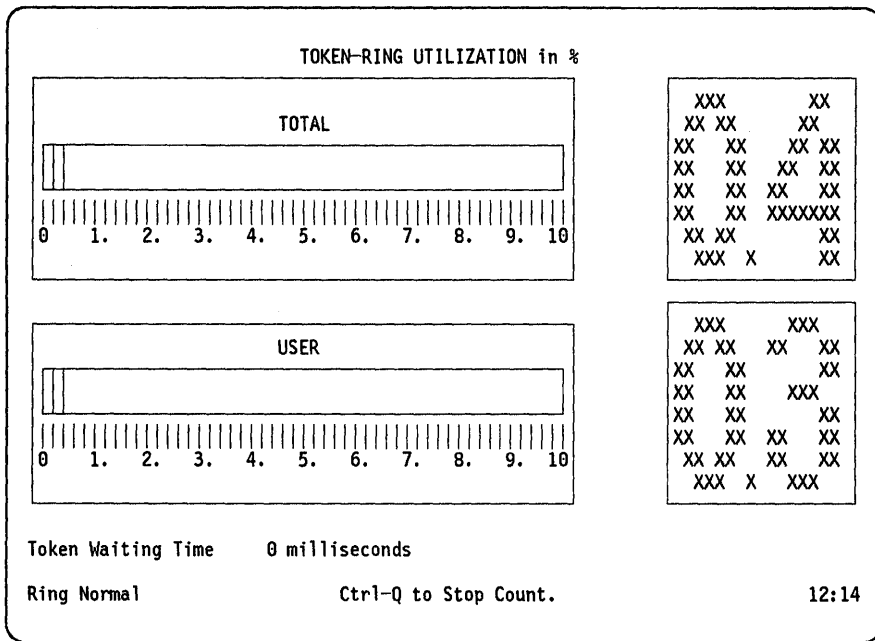
### 3. Performance Facility panel 3.

Up to 10 addresses can be specified in either group. Any frames on the ring with one of these addresses may be counted. Frames to or from addresses not listed will be ignored. If no addresses are selected, then all frames will be counted.

You have the choice of making the addresses listed on the panel the addresses to be counted, or they can be the addresses NOT to be counted. This choice is accomplished by answering (Y) YES, or (N) NO, to the question under each address field. The default is NO.

You also have the choice of selecting frames that have both a source AND a destination address listed (A), or those that have either a source OR a destination address listed (O).

Press F5 to start the performance logging process and one of two screens will be displayed.



#### 4. Performance Facility panel 4.

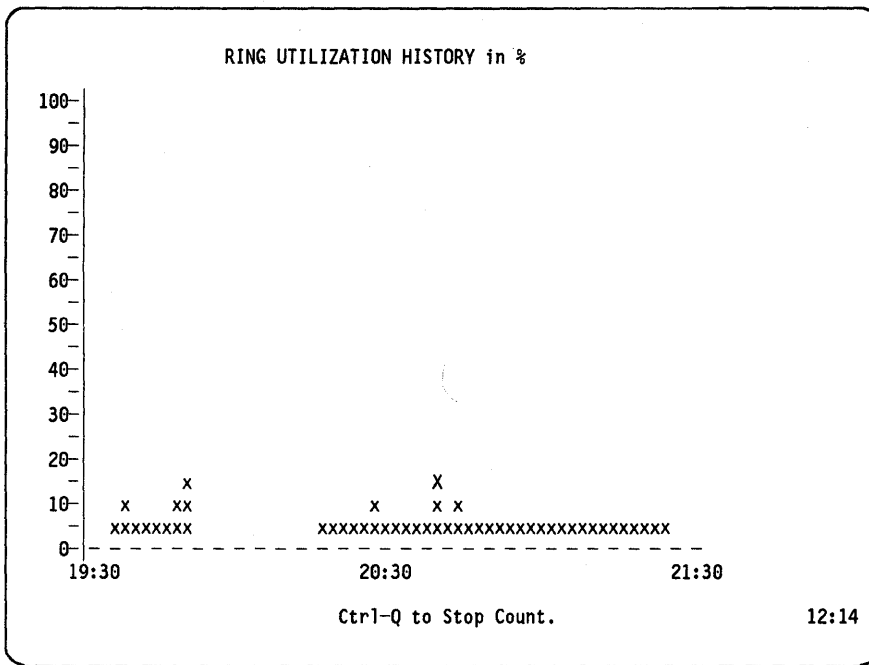
This screen shows the activity on the ring at any given time; therefore, as the amount of activity changes, so will the indicators and percentages. These changes are reflected at two-second intervals.

The top set of measurements depict the total utilization of the 4 Mbps bandwidth, while the lower set represents the percentage being used by the user data.

To view the ring utilization history graph, press the Home key.

- Note: The Home key acts as a toggle to switch between these two screens.





**5. Performance Facility panel 5.**

This graph shows the ring utilization over the last two hours. The screen is refreshed at four-minute intervals.

Hold down the Ctrl + Q keys together to stop the count and return to the Trace and Performance Main Menu.

Trace and Performance Program  
Main Menu

- 1 Trace the Token-Ring
- 2 Analyze a Ring Trace
- 3 Measure Token-Ring Performance
- 4 Report Token-Ring Performance

Choice: 4 Press <ENTER>

|          |     |     |     |      |
|----------|-----|-----|-----|------|
| F1: Help | F3: | F5: | F7: | F9:  |
| F2: Quit | F4: | F6: | F8: | F10: |

Select Option 4: "Report Token-Ring Performance" to use the Performance Analysis Facility.

This screen will be displayed.

```

Performance Analysis Facility

Performance File Name and Extension:

 DELPERF.CT0

To invoke the performance analysis facility press <ENTER> Ar. Ar.

F1: Help F3: F5: F7: F9:
F2: Quit F4: F6: F8: F10:

```

1. Performance Analysis Facility panel 1.

Type in the name of the count file that was used to collect the performance data and press Enter.

This screen will be displayed.

```

DELPERF.CT0 PMON
Sample date 05/27/1988
Sample period is 1 minute.
File Name:
 DELPERF.CT0

Finished...F2 to return to PMON Menu

F1: Help F3: F5: F7: F9:
F2: Quit F4: F6: F8: F10:

```

2. Performance Analysis Facility panel 2.

This panel shows the date the measurement was made and the duration of the sampling period.

Press F2 and the Performance Analysis Facility menu will be displayed.

```

DELPERF.CT0 PMON Performance Analysis Facility
 PMON Menu

 1 Display Ring Performance Summary
 2 Output Ring Performance Graphs
 3 Output Ring Performance Tables
 4 Specify Performance Count File

Choice: Press <ENTER>

F1: Help F3: F5: F7: F9:
F2: Quit F4: F6: F8: F10:

```

3. Performance Analysis Facility panel 3.

This menu lists the various types of reports that can be obtained from the performance data collected. They are described briefly here. A more detailed explanation of their formats and use can be found in the *IBM Token-Ring Network Trace and Performance Program User's Guide*.

- The performance summary shows date, start and stop times, duration in minutes, number of frames and bits per second, percentage bandwidth utilization and distribution of frames by frame sizes chosen.
- The ring performance graphs is a group of six bar charts showing the number of frames and bytes per second. Separate charts are produced for each interval showing the total data, non-MAC data and user data.
- The ring performance tables is a listing of the frames and bits per second for each interval in tabular form.
- Specifying the performance count file simply allows you to specify another performance data file from this menu.

Below is a sample of the Ring Performance Analysis Summary. To view this select Option 1 and press Enter.

The Performance Analysis Summary will be displayed.

```

DELPERF.CTO
 PMON Performance Analysis Summary

Date 05/27/1988 Start 12:13 End 12:13 Sample period is 1 minute.
Number of intervals with unreliable data 0.
 Frames/Sec Bits/Sec Utilization % % Non-MAC BW
Total 4 2,229 0.06
MAC Frames 0. 85 0.00
Non-MAC Frames 4 2,144 0.05 100.00

LLC Control 2 715 0.02 33.37
User Data 2 1,428 0.04 66.63

 Frame Size Distribution as a percent of Total Frames
0 - 128 - 256 - 512 - 1024 - 2048 - 32767
 88 9 1 0 2 0

F1: Help F3: F5: F7: F9: Print
F2: Quit F4: F6: F8: F10:

```

#### 4. Performance Analysis Facility panel 4.

## 53.5 Basic Troubleshooting

Problems with the Trace and Performance Program are indicated by messages displayed at the bottom of your screen. These messages take the form "EAJxxxxnE" where:

- 'xx' signifies the facility that issued the message. These codes are:
  - ME - Signifies that the message was issued by the Shell Program (TAP.EXE).

- TR - Signifies that the message was issued by the Trace Facility Program (TRACE.EXE).
- RA - Signifies that the message was issued by the Trace Analysis Facility Program (RTAP.EXE).
- PF - Signifies that the message was issued by the Performance Facility Program (PERF.EXE).
- PM - Signifies that the message was issued by the Performance Analysis Facility Program (PMON.EXE).
- 'nnn' is a three-digit decimal number corresponding to the message number within each category.

An explanation of each of the possible messages that can be displayed and the action to be taken to recover from the condition that caused the message to be issued appears in Appendix A of *IBM Token-Ring Network Trace and Performance Program User's Guide*.

---

## 53.6 Where To Go For More Information

- *IBM Token-Ring Network Trace and Performance Program User's Guide*, that comes with the product.
- *Using the IBM Trace and Performance Program for Problem Determination on a Token-Ring LAN*,. GG22-9456.



---

## Chapter 54. Ring Error Monitor Function

---

### 54.1 Overview

The Ring Error Monitor (REM) is an architectural function in the Token-Ring Network. A station with REM capabilities reads and analyzes the error frames that are transmitted by all the stations on the ring. The error frames are sent when a station detects "hard errors" or "soft errors." The hard errors are errors that have impact on the performance and operation of the ring. Soft errors have less impact on the ring.

Besides the different LAN Management products, the 3174 gateways and the 9370 have the REM function. The 37XX gateways do **not** have this function.

---

### 54.2 3174 REM Function

The 3174 Gateways have the capability to be REM stations. This is enabled by the reply to the 3174 microcode customization question 905. The reply '1' enables the function. When the function is enabled the 3174 receives and analyzes error frames on the ring.

In case of an error on the ring, REM can extract and analyze information from the ring to indicate the type and location of the failure. This information is forwarded as an alert, link event or PD statistics to NetView in the host. VTAM V3R1.2 or later is required to get the NetView support.

The 3174 cannot receive error information from another ring across a bridge. Only LAN Manager V1.0, or LAN Manager V2.0 in conjunction with Bridge Program V2.0 or 2.1 can do this.

The error information that the 3174 sends to NetView cannot be displayed locally at the 3174. So if you do not have NetView, the 3174 does not replace the LAN Manager Program.

---

### 54.3 9370 REM Function

The 9370 REM capability is enabled during the microcode customization of the Token-Ring adapter. If you want the 9370 Token-Ring subsystem to have the REM function included you must specify a 1, for "Enable Ring Error Monitor" at the 6130-0030 configuration screen. This is described in detail in the "Installation Cookbook" in "9370 Hardware" on page 77.

When the REM function is enabled, error frames from all the stations on the ring are received and analyzed by the 9370. Error from rings across bridges are not received by the 9370. The information will be made available to the processor console operator either in service, system programmer or system administrator mode. At this time there is no support in NetView for the 9370 REM function.



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## PART D. Connectivity Scenarios



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## **Chapter 55. PC 3270 Emulation Program Version 3 Scenarios**

The following pages present the parameters and parameter relationship required to set up the communication of a station running 3270 Emulation Program Version 3 to an SNA host across a Token-Ring Network.

The scenarios covered are:

1. Connection through a remote 3174 Token-Ring gateway
2. Connection through a local 3174 Token-Ring gateway
3. Connection through a Token-Ring-attached 9370
4. Connection through a Token-Ring-attached 37XX communications controller
5. Connection using the 3270 EP SDLC gateway.

# 55.1 3270 EP Connection to Remote 3174 Gateway

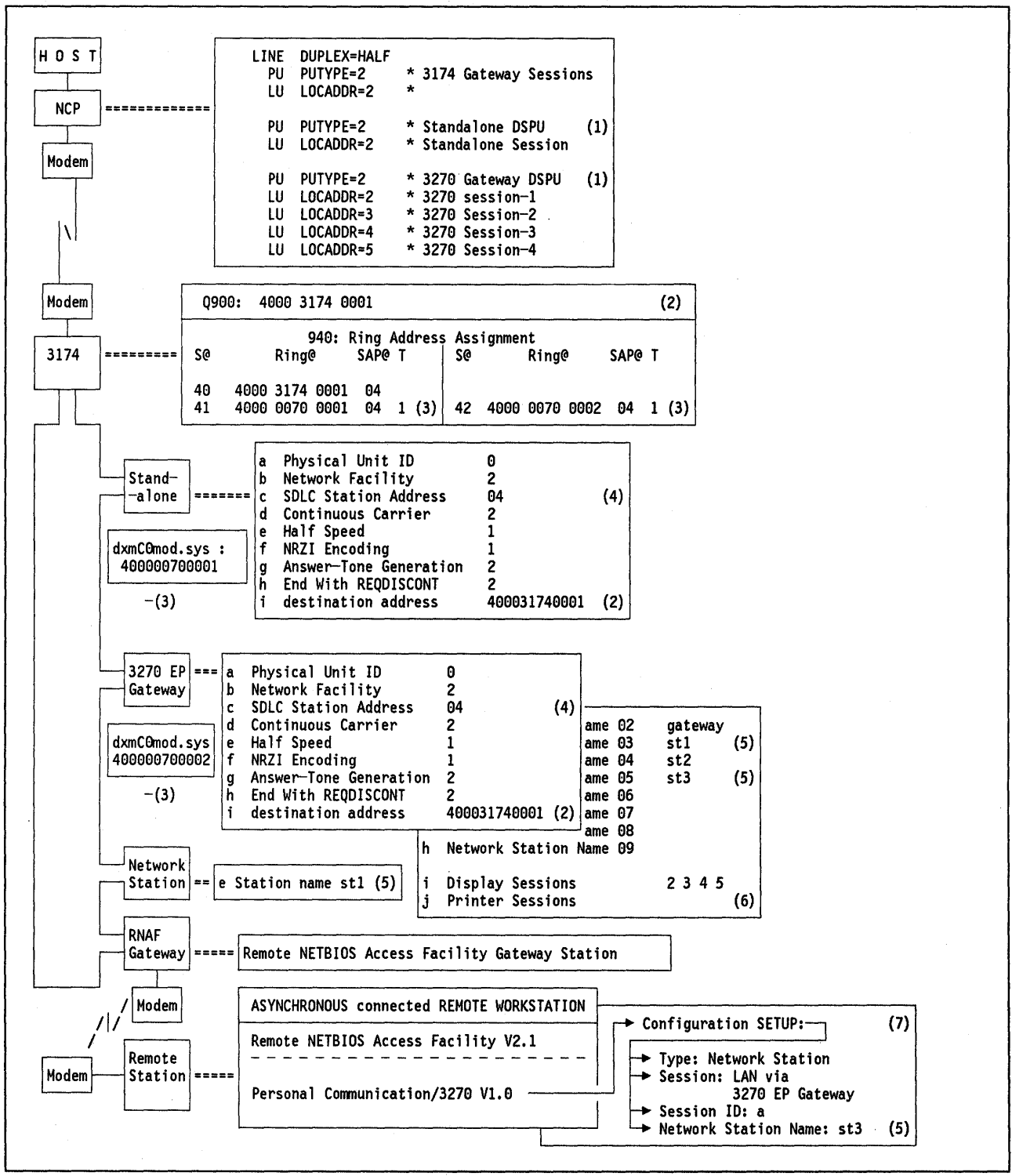


Figure 198. 3270 EP to Remote 3174 Gateway - Key Parameters

### Notes - 3270 EP Connection to Remote 3174 Gateway

1. The number of workstations with associated sessions must be defined at the host via PU and LU statements. Both the stand-alone station as well as the 3270 EP Gateway require a PU. Each network station (even the one in the gateway if it exists) requires an LU statement under the PU statement representing the associated gateway. Display sessions and printer sessions differ only in the MODETAB statement.
2. This is the Token-Ring adapter address of the 3174. This is a locally administered address. It should be entered as '4000XXXXXXXX' where X can be any digit between 0 - 7 and Y can be any hexadecimal digit between 0 - F. This address must match the destination address or host address configured in the PC/3270 program.
3. The address of the Token-Ring adapters of the PCs must match the 3174 definitions in Q940. This address can be either universal or locally administered. The recommendation is to use locally administered addresses, in which case it is defined as a dxmC0mod.sys parameter in the CONFIG.SYS file of the PC. It is further recommended that the local administered address would range from '400000000000' to '40007FFFFFFF' hexadecimal.
4. This is the SAP address of the 3174. Note that this is also shown in the first entry in the 3174 customization Q940 as SAP@ and must be "04."
5. The network station names must match those listed in the gateway's list of network names.
6. All sessions defined here are display sessions.
7. A remote workstation that is asynchronously connected to a Token-Ring using the Remote NETBIOS Access Facility Program Version 2.1 can obtain host access with the following combination of 3270 emulators:
  - a. On the Token-Ring a station has to be configured as a gateway using the PC 3270 Emulation Program Version 3.
  - b. The remote station has to be configured as a network station for 3270 EP gateway using the Personal Communications/3270 program.

**Note:** For using the Personal Communications/3270 program in the remote workstation, the statement STACKS=12,256 must be included in the CONFIG.SYS file.

## 55.2 3270 EP Connection through a Local 3174 Gateway

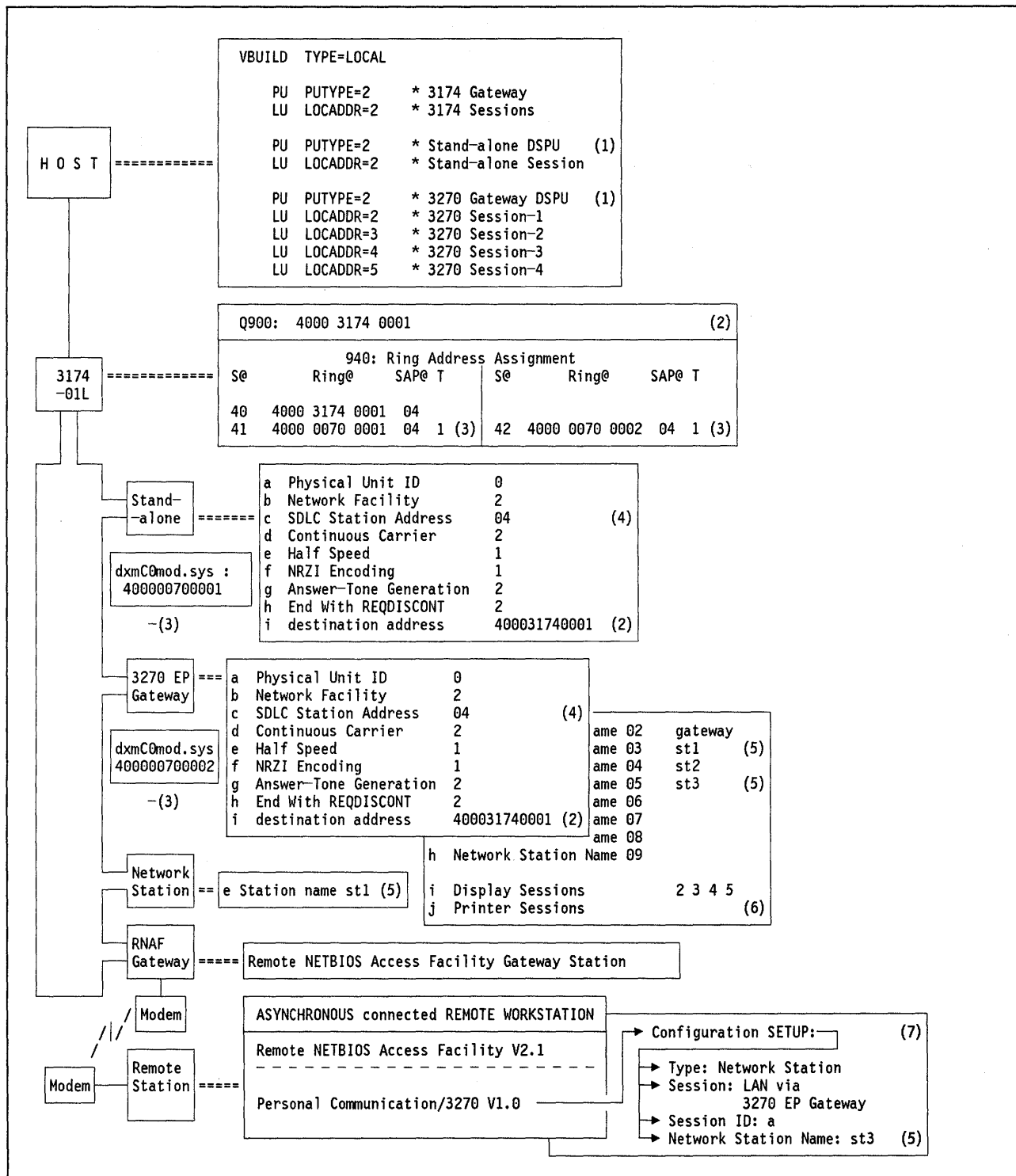


Figure 199. 3270 EP to Local 3174 Gateway - Key Parameters

### **Notes: 3270 EP Connection through a Local 3174 Gateway**

1. The number of workstations with associated sessions must be defined at the host via PU and LU statements. Both the stand-alone station as well as the 3270 EP gateway require a PU. Each network station (even the one in the gateway if it exists) requires an LU statement under the PU statement representing the associated gateway. Display sessions and printer sessions differ only in the MODETAB statement.
2. This is the Token-Ring adapter address of the 3174. This is a locally administered address. It should be entered as '4000XXXXXXXX' where X can be any digit between 0 - 7 and Y can be any hexadecimal digit between 0 - F. This address must match the destination address or host address configured in the PC/3270 program.
3. The address of the Token-Ring adapters of the PCs must match the 3174 definitions in Q940. This address can be either universal or locally administered. The recommendation is to use locally administered addresses in which case it is defined as a dxmC0mod.sys parameter in the CONFIG.SYS file of the PC. It is further recommended that the local administered address would range from '400000000000' to '40007FFFFFFF' hexadecimal.
4. This is the SAP address of the 3174. Note that this is also shown in the first entry in the 3174 customization Q940 as SAP@.
5. The network station names must match those listed in the gateway's list of network names.
6. All sessions defined here are display sessions.
7. A remote workstation that is asynchronously connected to a Token-Ring using the Remote NETBIOS Access Facility Program Version 2.1 can obtain host access with the following combination of 3270 emulators:
  - a. On the Token-Ring a station has to be configured as a gateway using the PC 3270 Emulation Program Version 3.
  - b. The remote station has to be configured as a network station for 3270 EP gateway using the Personal Communications/3270 program.

**Note:** For using the Personal Communications/3270 program in the remote workstation, the statement STACKS=12,256 must be included in the CONFIG.SYS file.

# 55.3 3270 EP Connection to a Token-Ring attached 9370

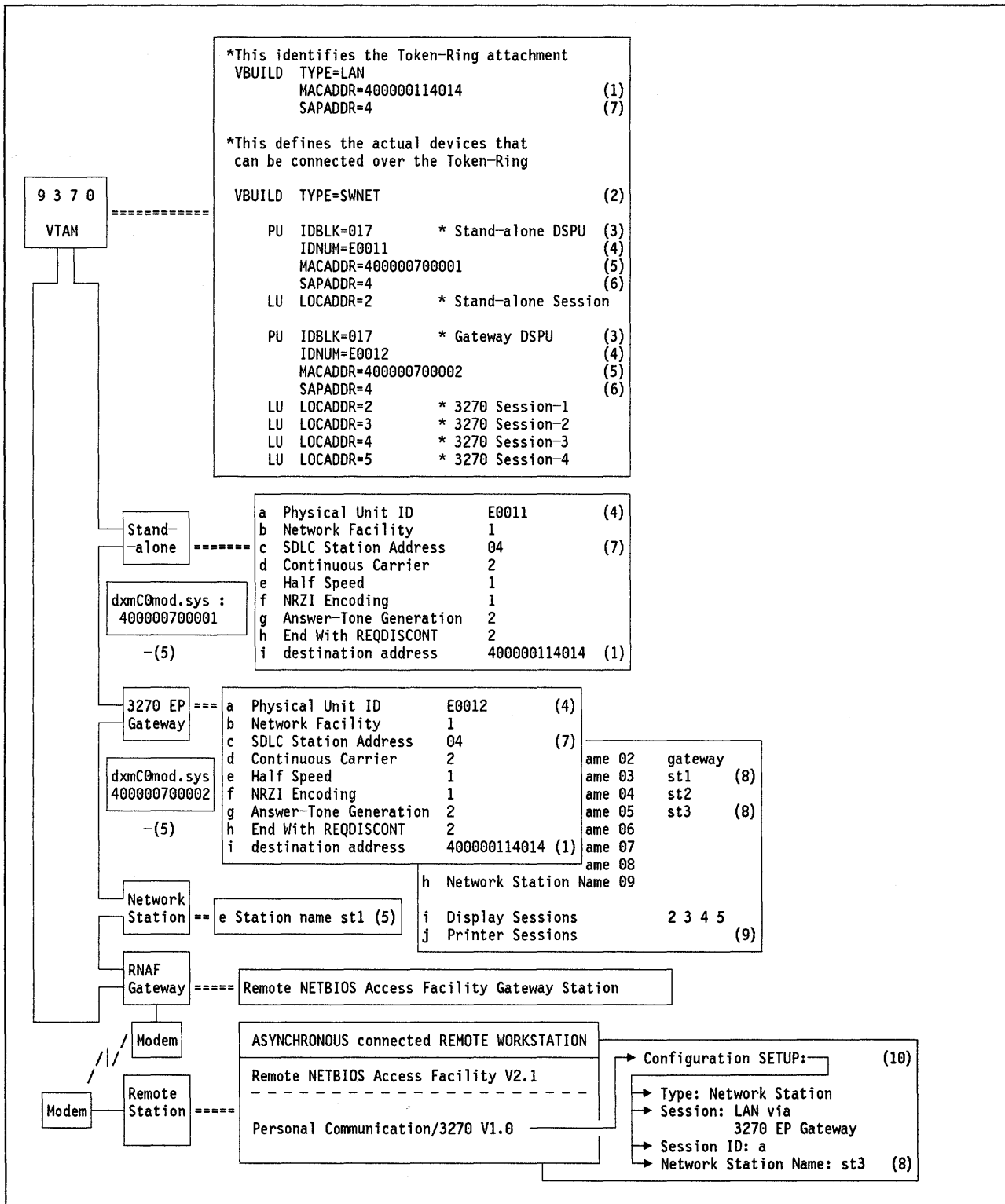


Figure 200. 3270 EP to 9370 - Key Parameters

### Notes - 3270 EP Connection to a Token-Ring Attached 9370

1. This is the Token-Ring adapter address of the 9370. This is a locally administered address. The 12-digit address is specified in the 3270 EP customization.

Note: For VTAM V3 R2 (MVS) and VTAM V3 R1.2 (VM) and later, hexadecimal digits are allowed.

2. The number of workstations with associated sessions must be defined at the host via PU and LU statements. Both the stand-alone station as well as the 3270 EP gateway require a PU. Each network station (even the one in the gateway if it exists) requires an LU statement under the PU statement representing the associated gateway. Display sessions and printer sessions differ only in the MODETAB statement.
3. IDBLK=017 must be used for the 3270 EP.
4. The PU ID specified in the 3270 EP must match the IDNUM parameter specified at the host. This number is different for each of the DSPUs.
5. The address of the Token-Ring adapters of the PCs must match the MACADDR parameter in the host. This address can be either universal or locally administered. The recommendation is to use local addresses, in which case it is defined as a dxmC0mod.sys parameter in the CONFIG.SYS file of the PC.
6. This is the SAP address of the 3270 Emulation Program.
7. This is the SAP address of the 9370.
8. The network station names must match those listed in the gateway's list of network names.
9. All sessions defined here are display sessions.
10. A remote workstation that is asynchronously connected to a Token-Ring using the Remote NETBIOS Access Facility Program Version 2.1 can obtain host access with the following combination of 3270 emulators:
  - a. On the Token-Ring a station has to be configured as a gateway using the PC 3270 Emulation Program Version 3.
  - b. The remote station has to be configured as a network station for 3270 EP gateway using the Personal Communications/3270 program.

**Note-** For using the Personal Communications/3270 program in the remote workstation, the statement STACKS=12,256 must be included in the CONFIG.SYS file.



# 55.4 3270 EP Connection to a Token-Ring attached 37XX

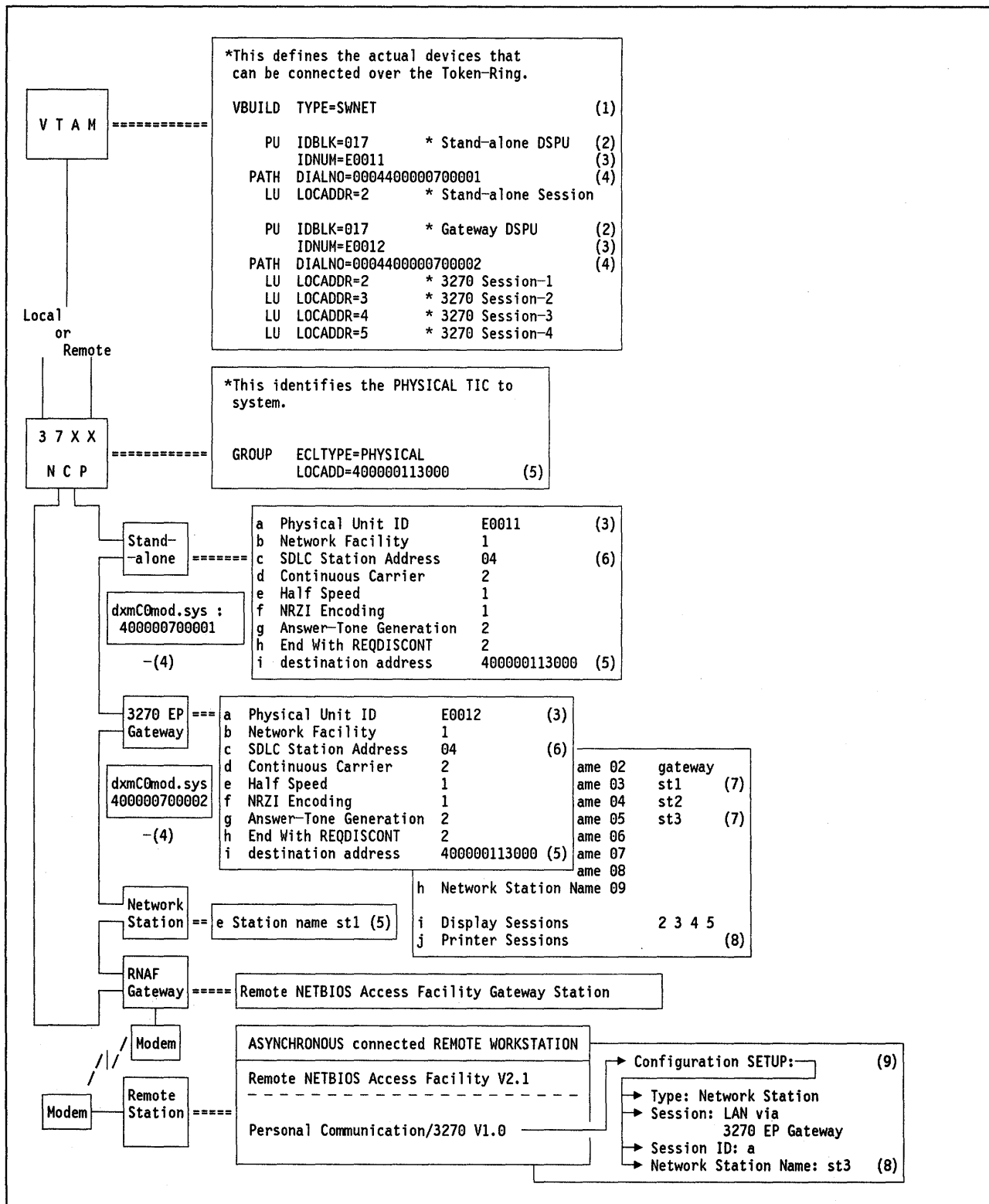


Figure 201. 3270 EP to 37XX - Key Parameters

### Notes - 3270 EP Connection to a Token-Ring attached 37XX

1. The number of workstations with associated sessions must be defined at the host via PU and LU statements. Both the stand-alone station as well as the 3270 EP gateway require a PU. Each network station (even the one in the gateway if it exists) requires an LU statement under the PU statement representing the associated gateway. Display sessions and printer sessions differ only in the MODETAB statement.
2. IDBLK=017 must be used for the 3270 EP.
3. The PU ID specified in the 3270 EP must match the IDNUM parameter specified at the host. This number is different for each of the DSPUs.
4. The DIALNO parameter needs to be coded only if the host will be attempting to establish sessions with the DSPU. The last 12 digits are the PC's Token-Ring Network adapter locally administered address. The first four digits specify the port address to use (first two digits) and the SAP of the 3270 EP (second two digits).
5. This is the Token-Ring Network Adapter address of the 37XX. This is a locally administered address. The twelve digits are specified in the 3270 EP customization - these must be decimal.

Note: For NCP V5 R2.1 and later, hexadecimal digits are allowed.

6. This is the SAP address of the 37XX.
7. The network station names must match those listed in the gateway's list of network names.
8. All sessions defined here are display sessions.
9. A remote workstation that is asynchronously connected to a Token-Ring using the Remote NETBIOS Access Facility Program Version 2.1 can obtain host access with the following combination of 3270 emulators:
  - a. On the Token-Ring a station has to be configured as a gateway using the PC 3270 Emulation Program Version 3.
  - b. The remote station has to be configured as a network station for 3270 EP gateway using the Personal Communications/3270 program.

**Note-** For using the Personal Communications/3270 program in the remote workstation, the statement STACKS=12,256 must be included in the CONFIG.SYS file.

## 55.5 3270 EP Connection to a 3270 SDLC Gateway

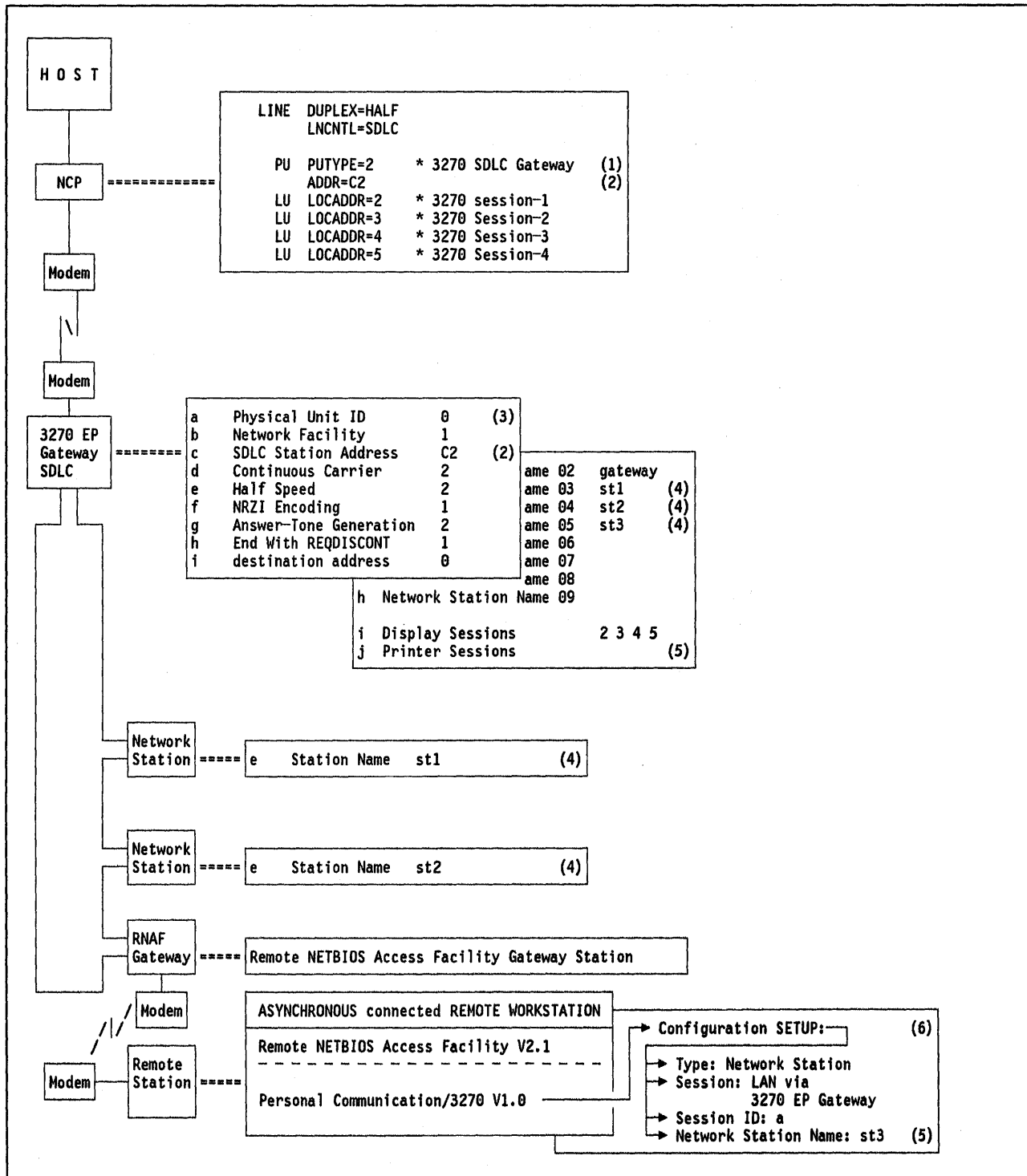


Figure 202. 3270 EP Network Stations to 3270 EP SDLC Gateway

### Notes - 3270 EP Connection to a 3270 SDLC Gateway

1. The number of workstations with associated sessions must be defined at the host via PU and LU statements. Both the stand-alone station as well as the 3270 EP gateway require a PU. Each network station (even the one in the gateway if it exists) requires an LU statement under the PU statement representing the associated gateway. Display sessions and printer sessions differ only in the MODETAB statement.
2. The SDLC station address given in the 3270 EP customization must match the ADDR= parameter at the host.
3. The PU ID is not required unless the connection is a "dial-up" switched connection.
4. The network station names must match those listed in the gateway's list of network names.
5. All sessions defined here are display sessions.
6. A remote workstation that is asynchronously connected to a Token-Ring using the Remote NETBIOS Access Facility Program Version 2.1 can obtain host access with the following combination of 3270 emulators:
  - a. On the Token-Ring a station has to be configured as a gateway using the PC 3270 Emulation Program Version 3.
  - b. The remote station has to be configured as a network station for 3270 EP gateway using the Personal Communications/3270 program.

**Note-** For using the Personal Communications/3270 program in the remote workstation, the statement STACKS=12,256 must be included in the CONFIG.SYS file.



---

## **Chapter 56. Workstation Program Connectivity Scenarios**

The following pages present the parameters and parameter relationship required to set up the communication of a station running the Workstation Program Version 1.1 to an SNA host across a Token-Ring Network.

The scenarios covered are:

1. Attachment through a remote 3174 gateway
2. Attachment through a local 3174 gateway
3. Attachment to a Token-Ring Network-connected 9370
4. Attachment through a local or remote 37XX gateway

## 56.1 Attachment through a Remote 3174 Gateway

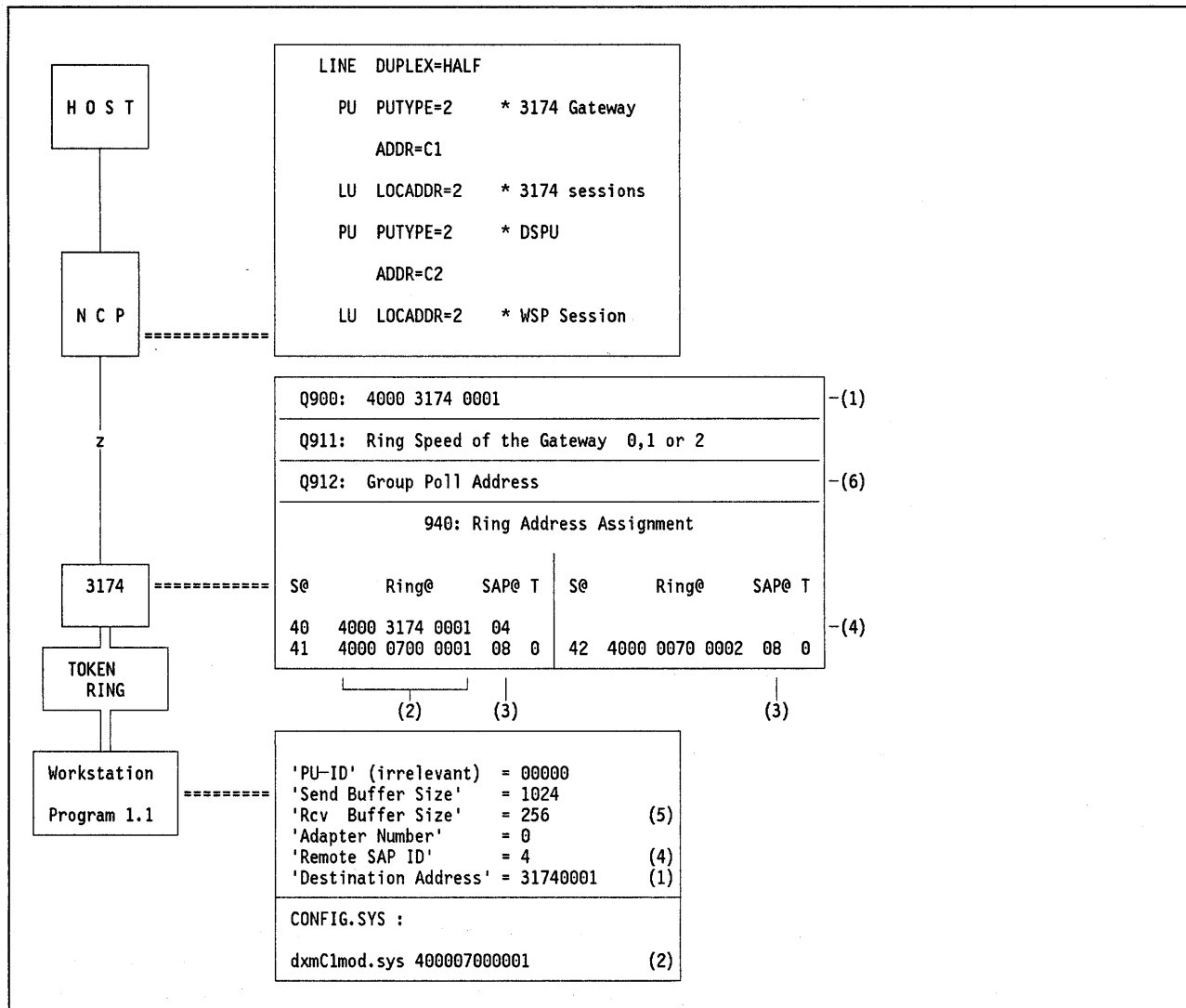


Figure 203. WSP to Remote 3174 Gateway - Key Parameters

### Notes:

1. Q900 specifies the 3174 adapter address. Note that the "Destination Address" specified in Workstation Program customization must match the last eight digits of this address.
2. The PC's Token-Ring Network address is specified as a parameter in the CONFIG.SYS file. This must match the RING@ parameter given in Q940 of the 3174 customization.
3. This is the SAP address of the Workstation Program.
4. This is the SAP address of the 3174.
5. This is a maximum of 256 unless the XMA card is installed, in which case it can be as high as 2042.
6. Specify a two-character hexadecimal group poll address that is less than or greater than the range specified in Q 104 and Q 105 but not equal to x'FF'.

## 56.2 Attachment through a Local 3174 Gateway

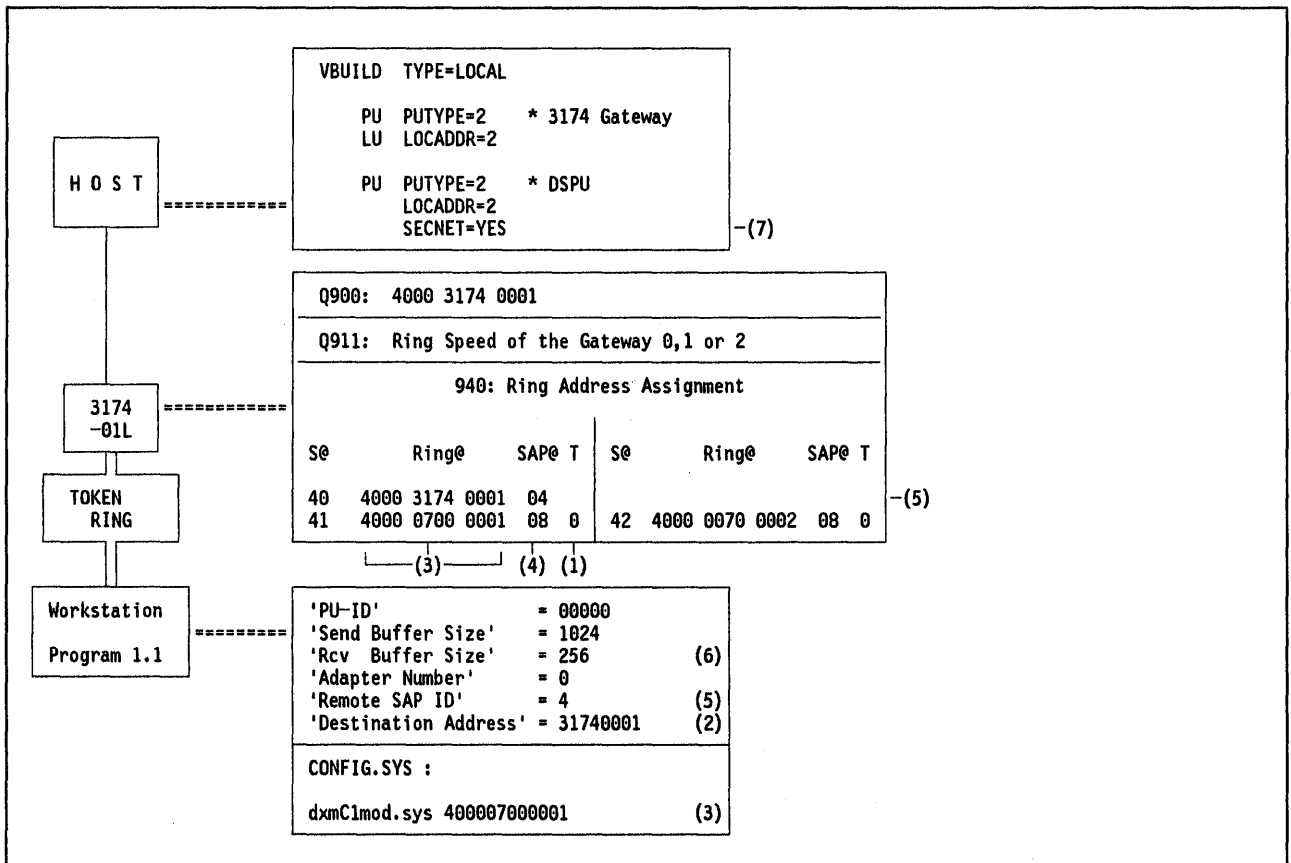


Figure 204. WSP to Local 3174 Gateway - Key Parameters

### Notes:

1. Specify T as 0. This will default the values of frame size and window size for the defined ring station to indicate a maximum frame size of 2042 bytes ( $F = 3$ ) and an acknowledgement window size of 2 ( $W = 2$ ) in question 381.
2. Q900 specifies the 3174 adapter address. Note that the "Destination Address" specified in Workstation Program Customization must match the last eight digits of this address.
3. The PC's Token-Ring Network address is specified as a parameter in the CONFIG.SYS file. This must match the RING@ parameter given in Q940 of the 3174 customization.
4. This is the SAP address of the Workstation Program.
5. This is the SAP address of the 3174.
6. This is a maximum of 256 unless the XMA card is installed, in which case it can be as high as 2042.
7. SECNET=Yes must be specified for DSPUs to prevent the operating system from generating I/O error messages for those DSPUs before they become active.



## 56.3 Attachment to a Token-Ring Network-Connected 9370

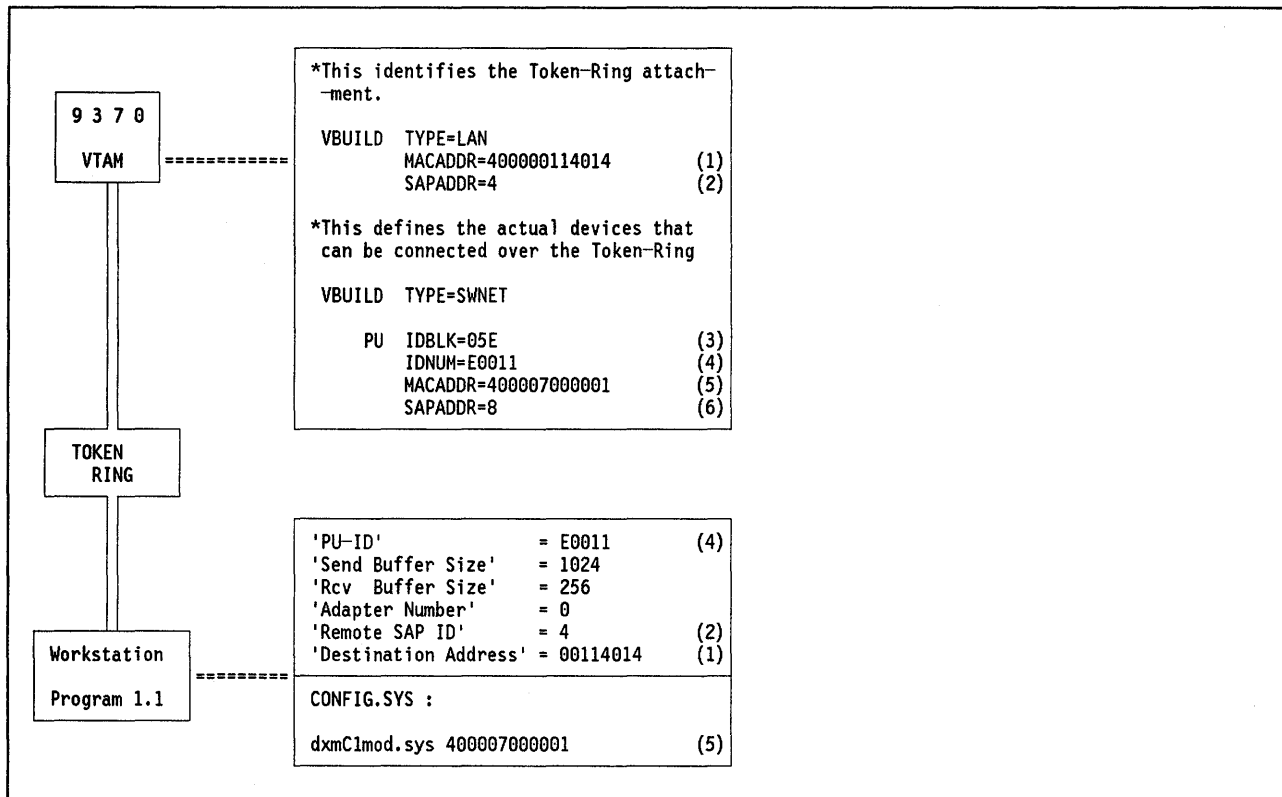


Figure 205. WSP to 9370 - Key Parameters

### Notes:

1. This is the locally administered address of the 9370 Token-Ring Network adapter and the last eight characters must match the "Destination Address" set in the Workstation Program.
2. This is the SAP of VTAM in the 9370.
3. IDBLK must be 05E for the Workstation Program.
4. IDNUM must match the PU ID specified in the Workstation Program.
5. This is the locally administered address of the PC Token-Ring Adapter. This is only required as a MACADDR parameter in the VTAM definitions if the host is to contact the workstation (for a dial-out operation).
6. This is the SAP ID of the Workstation Program, this must be coded as 08. The default of 04 will not work with the Workstation Program.

## 56.4 Attachment through a Local or Remote 37XX Gateway

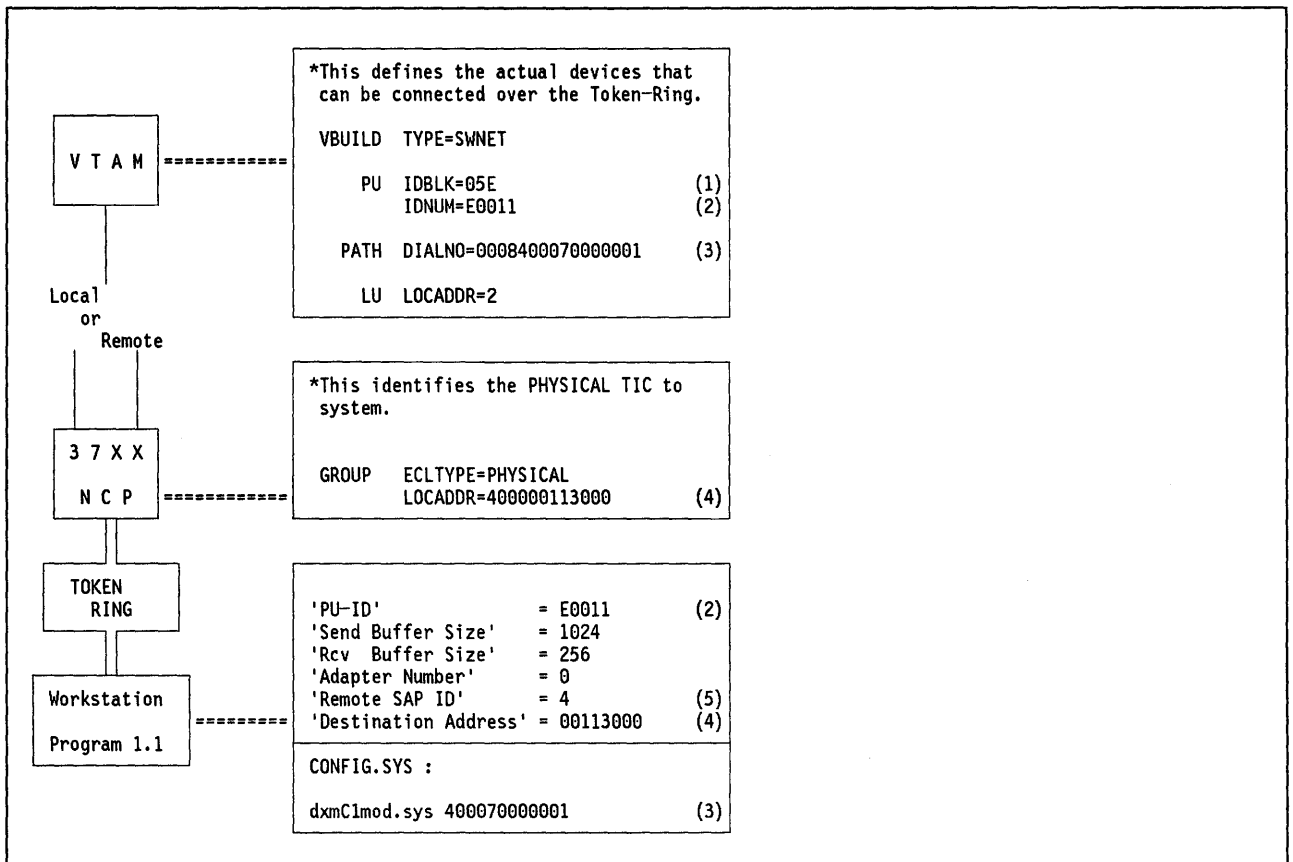


Figure 206. WSP to 37XX Gateway

### Notes:

1. This must be coded as 05E for the Workstation Program
2. IDNUM must match the PU ID specified in the workstation customization.
3. The DIALNO parameter only needs to be coded if the host will be attempting to establish sessions with the workstation (in a dial-out operation). The last 12 digits are the PC's Token-Ring adapter locally administered address. The first four digits specify the port address to use (first two digits) and the SAP of the Workstation Program (second two digits).
4. The LOCADDR is the locally administered address of the 37XX TIC. Note that only the last eight characters of this address are used in the workstation customization.
5. This is the SAP address of the 37XX TIC and is always 04.



---

## Chapter 57. Personal Communications/3270 Scenarios

The following pages present the parameters and parameter relationship required to set up the communication of station running the Personal Communications/3270 program to an SNA host across a Token-Ring Network.

The scenarios covered are:

1. Connection through a remote 3174 Token-Ring gateway
2. Connection through a local 3174 Token-Ring gateway
3. Connection through a Token-Ring-attached 9370
4. Connection through a Token-Ring-attached 37XX communications controller
5. Connection using the PC/3270 SDLC gateway

# 57.1 PC/3270 Connection to Remote 3174 Gateway

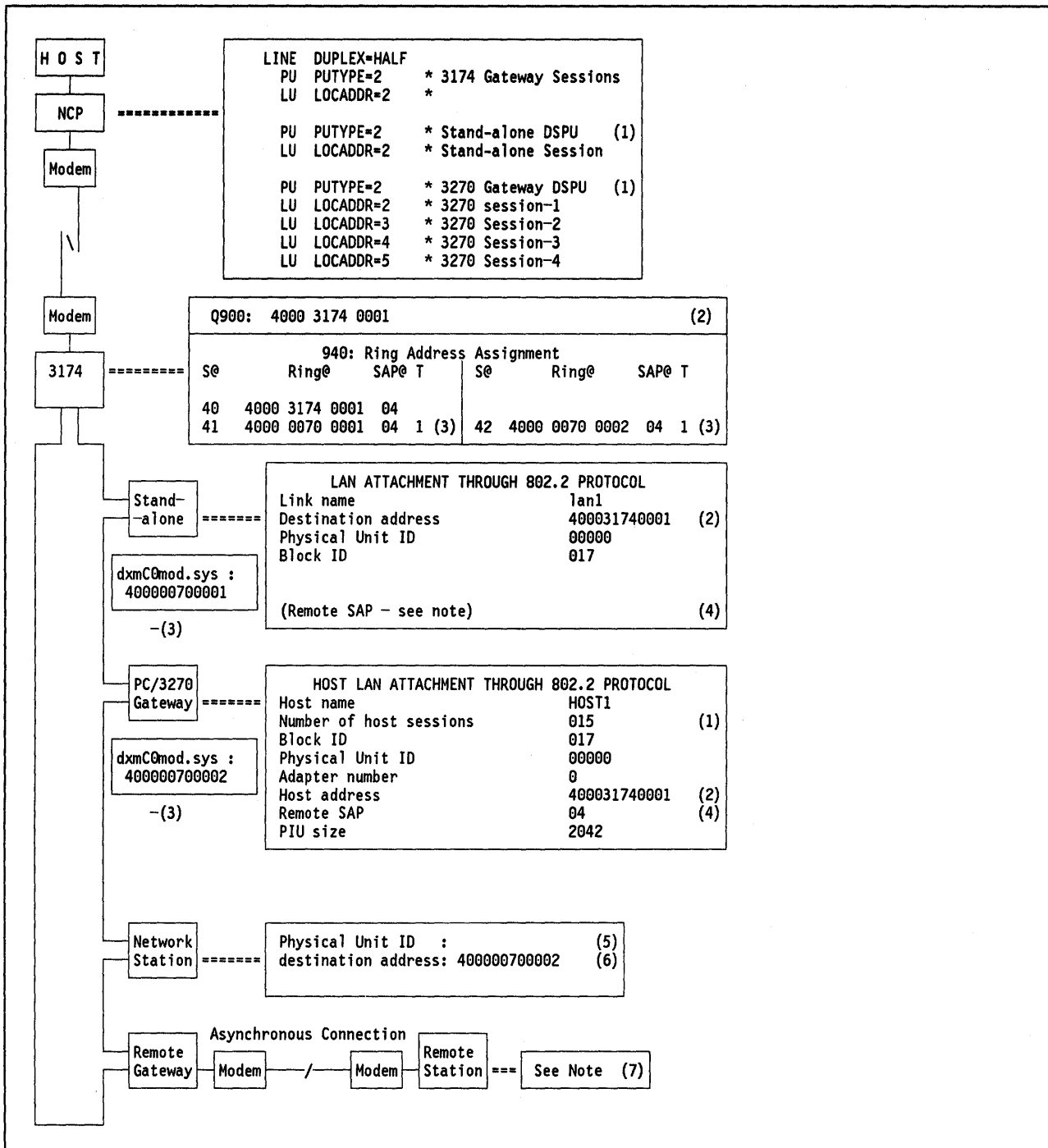


Figure 207. PC/3270 to Remote 3174 Gateway - Key Parameters

### **Notes - PC/3270 Connection to Remote 3174 Gateway**

1. The number of workstations with associated sessions must be defined at the host via PU and LU statements. Both the stand-alone station as well as the PC/3270 gateway require a PU. Each network station (even the one in the gateway if it exists) requires an LU statement under the PU statement representing the associated gateway. Display sessions and printer sessions differ only in the MODETAB statement.
2. This is the Token-Ring adapter address of the 3174. This is a locally administered address. It should be entered as '4000XXXXXXXX' where X can be any digit between 0 - 7 and Y can be any hexadecimal digit between 0 - F. This address must match the destination address or host address configured in the PC/3270 program.
3. The address of the Token-Ring adapters of the PCs must match the 3174 definitions in Q940. This address can be either universal or locally administered. The recommendation is to use locally administered addresses in which case it is defined as a dxmC0mod.sys parameter in the CONFIG.SYS file of the PC. It is further recommended that the local administered address would range from '400000000000' to '40007FFFFFFF' hexadecimal.
4. The SAP address of the 3174 is "04" which is the default setting for the remote SAP parameter in the PC/3270 program (can be changed via the advanced options menu).

Note that this is also shown in the first entry in the 3174 customization Q940 as SAP@ and must be entered there as "04."

5. The network station physical unit ID must match the PUID as defined in the gateway in those cases where a specific network station has been defined as pre-allocated (the PUID is defined in the network station profile).
6. The destination address must match the locally administered MAC address as defined in the CONFIG.SYS file of the gateway.
7. For asynchronously connected remote workstations - Please refer to 3270 EP connectivity scenarios.

## 57.2 PC/3270 Connection to a Local 3174 Gateway

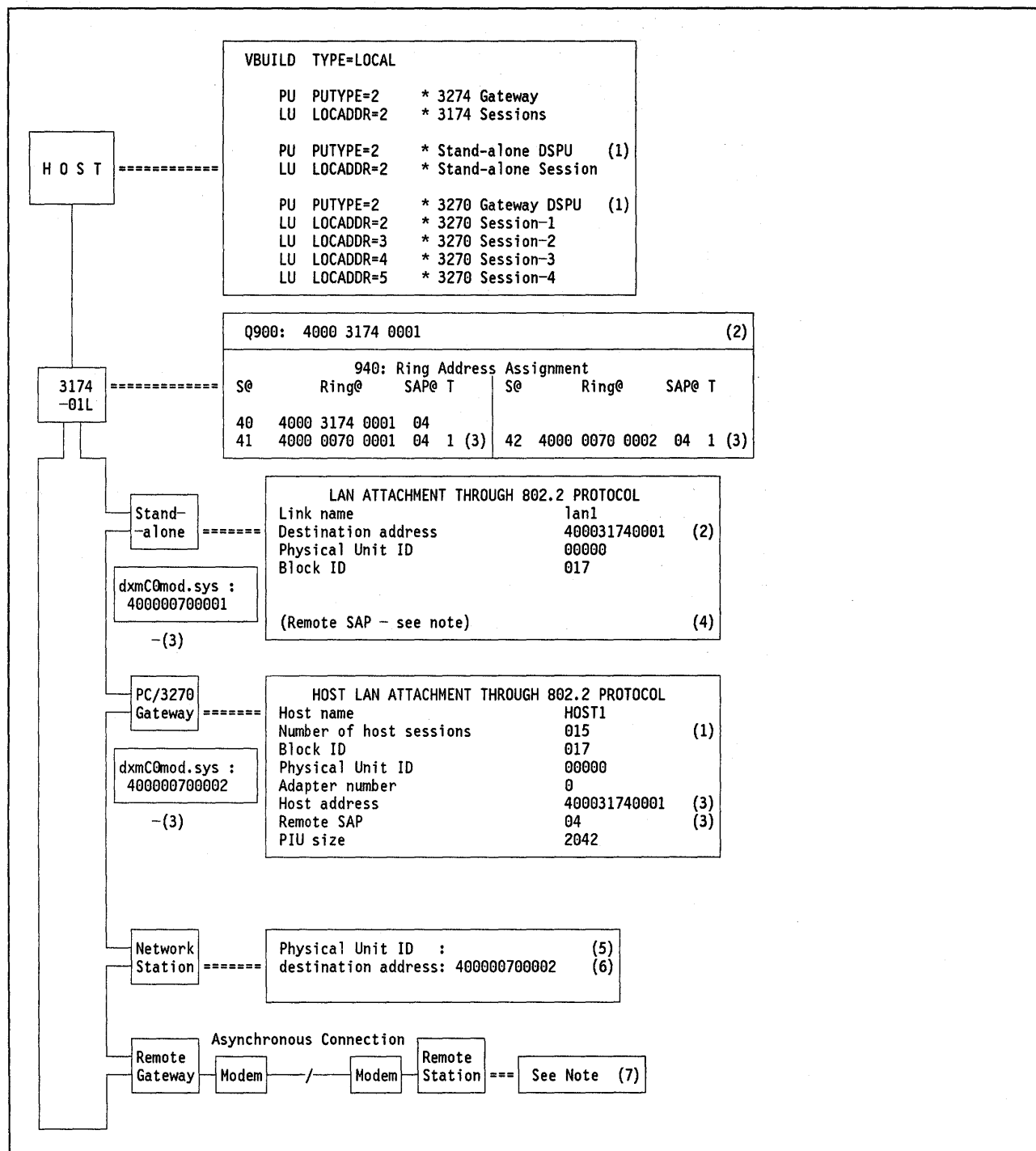


Figure 208. PC/3270 to Local 3174 Gateway - Key Parameters

### **Notes - PC/3270 Connection to a Local 3174 Gateway**

1. The number of workstations with associated sessions must be defined at the host via PU and LU statements. Both the stand-alone station as well as the PC/3270 gateway require a PU. Each network station (even the one in the gateway if it exists) requires an LU statement under the PU statement representing the associated gateway. Display sessions and printer sessions differ only in the MODETAB statement.
2. This is the Token-Ring adapter address of the 3174. This is a locally administered address. It should be entered as '4000XXXXXXXX' where X can be any digit between 0 - 7 and Y can be any hexadecimal digit between 0 - F. This address must match the destination address configured in the PC/3270 program.
3. The address of the Token-Ring adapters of the PCs must match the 3174 definitions in Q940. This address can be either universal or locally administered. The recommendation is to use locally administered addresses in which case it is defined as a dxmC0mod.sys parameter in the CONFIG.SYS file of the PC. It is further recommended that the local administered address would range from '400000000000' to '40007FFFFFFF' hexadecimal.
4. The SAP address of the 3174 is "04" which is the default setting for the remote SAP parameter in the PC/3270 program (can be changed via the advanced options menu).

Note that this is also shown in the first entry in the 3174 customization Q940 as SAP@ and must be entered there as "04".

5. The network station physical unit ID must match the PUID as defined in the gateway in those cases where a specific network station profile has been defined.
6. The destination address must match the locally administered MAC address as defined in the CONFIG.SYS file of the gateway.
7. For asynchronously connected remote workstations - Please refer to 3270 EP connectivity scenarios.



## 57.3 PC/3270 Connection to a Token-Ring-Attached 9370

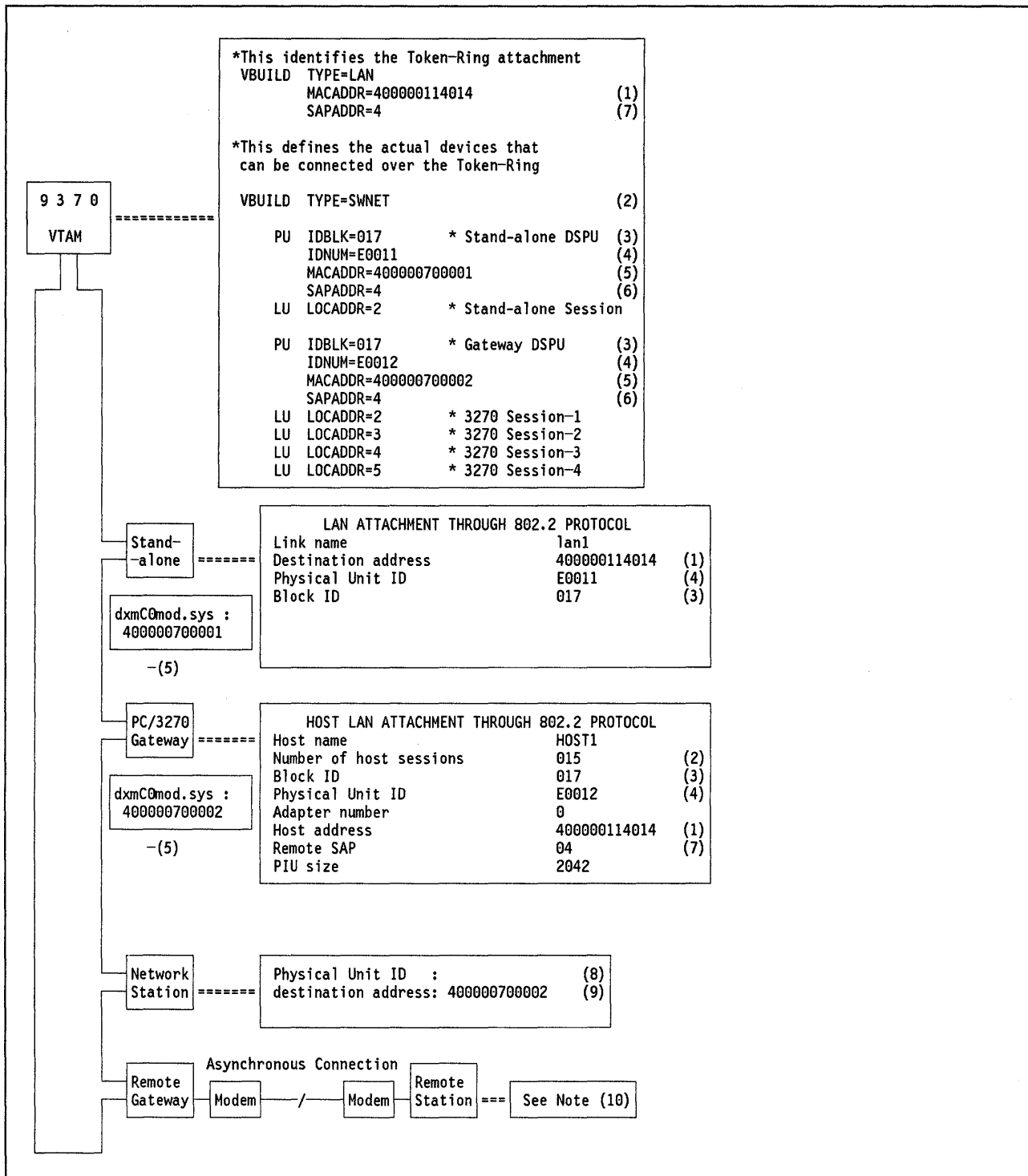


Figure 209. PC/3270 to 9370 - Key Parameters

### **Notes - PC/3270 Connection to a Token-Ring-Attached 9370**

1. This is the Token-Ring adapter address of the 9370. This is a locally administered address. The 12-digit address is specified in the PC/3270 customization - it must be decimal. Note that for VTAM V3 R2 (MVS) and VTAM V3 R1.2 (VM) and later, hexadecimal digits are allowed.
2. The number of workstations with associated sessions must be defined at the host via PU and LU statements. Both the stand-alone station as well as the PC/3270 gateway require a PU. Each network station (even the one in the gateway if it exists) requires an LU statement under the PU statement representing the associated gateway. Display sessions and printer sessions differ only in the MODETAB statement.
3. IDBLK must match the block ID parameter in the PC/3270 program.
4. The physical unit ID specified in the PC/3270 must match the IDNUM parameter specified at the host. This number is different for each of the DSPUs.
5. The address of the Token-Ring adapters of the PCs must match the MACADDR parameter in the host. This address can be either Universal or locally administered. The recommendation is to use local addresses in which case it is defined as a dxmC0mod.sys parameter in the CONFIG.SYS file of the PC.
6. This is the SAP address of the PC/3270 Program.
7. This is the SAP address of the 9370.
8. If a specific network station profile has been defined in the gateway, then the physical unit ID in the network station should match with the physical unit ID as defined in the network station profile at the gateway station.
9. The destination address must match the locally administered MAC address as defined in the CONFIG.SYS file of the gateway.
10. For asynchronously connected remote workstations - Please refer to 3270 EP connectivity scenarios.

## 57.4 PC/3270 Connection to a Token-Ring-Attached 37XX

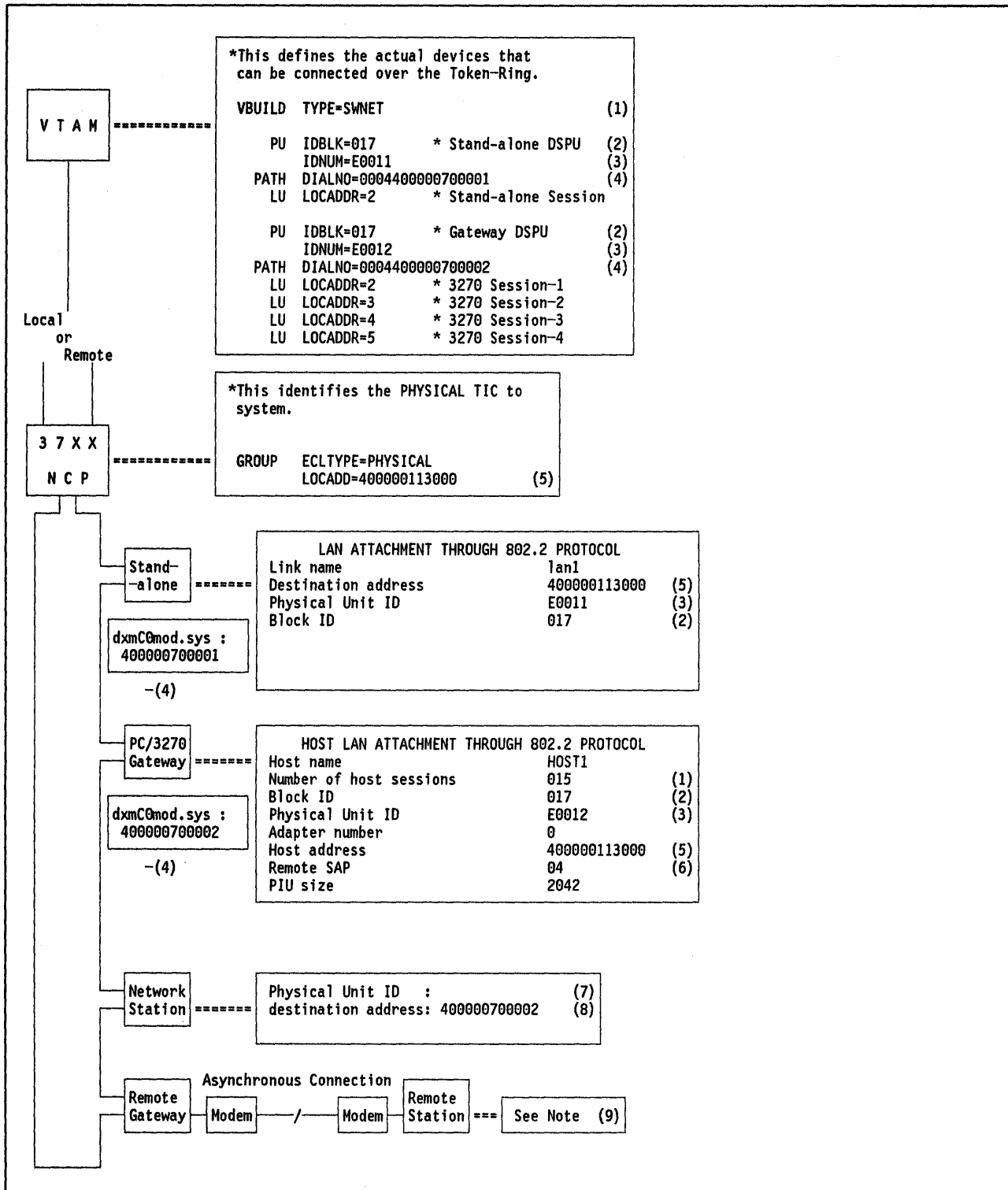


Figure 210. PC/3270 to 37XX - Key Parameters

### **Notes - PC/3270 Connection to a Token-Ring-Attached 37XX**

1. The number of workstations with associated sessions must be defined at the host via PU and LU statements. Both the stand-alone station as well as the PC/3270 gateway require a PU. Each network station (even the one in the gateway if it exists) requires an LU statement under the PU statement representing the associated gateway. Display sessions and printer sessions differ only in the MODETAB statement.
2. IDBLK must match the block ID parameter in the PC/3270 program.
3. The physical unit ID specified in the PC/3270 must match the IDNUM parameter specified at the host. This number is different for each of the DSPUs.
4. The DIALNO parameter needs to be coded only if the host will be attempting to establish sessions with the DSPU. The last 12 digits are the PC's Token-Ring network adapter locally administered address. The first four digits specify the port address to use (first two digits) and the SAP of the PC/3270 (second two digits).
5. This is the Token-Ring network adapter address of the 37XX. This is a locally administered address. The twelve digits are specified in the PC/3270 customization - these must be decimal. Note that for NCP V5 R2.1 and later, hexadecimal digits are allowed.
6. This is the SAP address of the 37XX.
7. If a specific network station profile has been defined in the gateway, then the physical unit ID in the network station should match with the physical unit ID as defined in the network station profile at the gateway station.
8. The destination address must match the locally administered MAC address as defined in the CONFIG.SYS file of the gateway.
9. For asynchronously connected remote workstations - Please refer to 3270 EP connectivity scenarios.

## 57.5 PC/3270 Connection to a PC/3270 SDLC Gateway

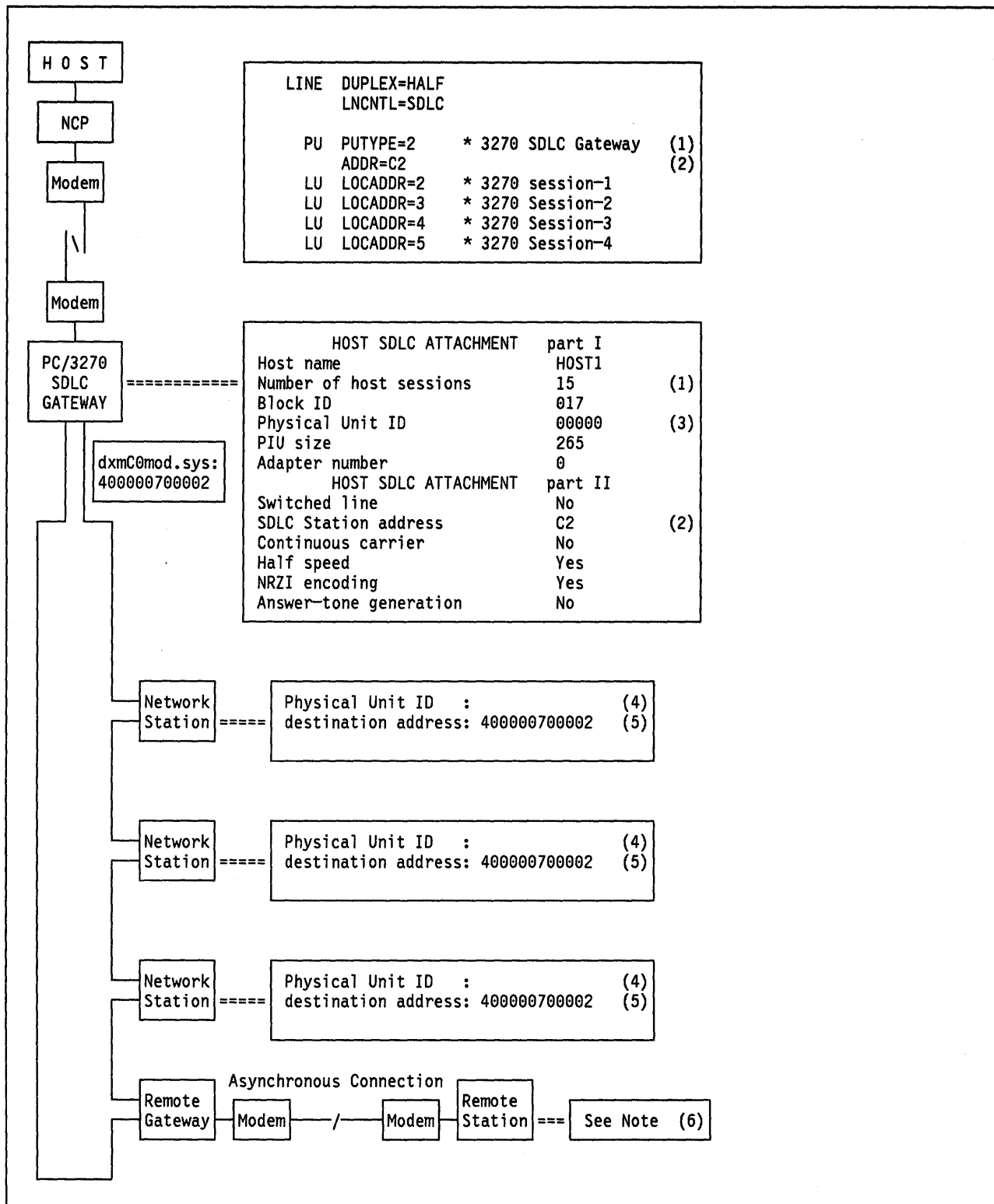


Figure 211. PC/3270 Network Stations to PC/3270 SDLC Gateway

### **Notes - PC/3270 Connection to PC/3270 SDLC Gateway**

1. The number of workstations with associated sessions must be defined at the host via PU and LU statements. Both the stand-alone station as well as the PC/3270 gateway require a PU. Each network station (even the one in the gateway if it exists) requires an LU statement under the PU statement representing the associated gateway. Display sessions and printer sessions differ only in the MODETAB statement.
2. The SDLC station address given in the PC/3270 customization must match the ADDR= parameter at the host.
3. The PU ID is not required unless the connection is a "dial-up" switched connection.
4. If a specific network station profile has been defined in the gateway, then the physical unit ID in the network station should match with the physical unit ID as defined in the network station profile at the gateway station.
5. The destination address must match the locally administered MAC address as defined in the CONFIG.SYS file of the gateway.
6. For asynchronously connected remote workstations - Please refer to 3270 EP connectivity scenarios.



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## **Chapter 58. OS/2 Local Area Network Server Version 1.0 Scenarios**

The following pages present the parameters and parameter relationship required to set up the communication of a station running the OS/2 LAN Server V1.0 program to other stations in a Token-Ring Network.

The scenarios covered are:

1. OS/2 EE V1.1 LAN Requester accessing OS/2 LAN Server V1.0
2. PC LAN Program 1.3 workstation accessing OS/2 LAN Server V1.0
3. PC LAN Program 1.3 workstation accessing OS/2 LAN Server V1.0 through remote NETBIOS
4. DOS remote IPL service of the OS/2 LAN Server V1.0.



## 58.1 OS/2 EE V1.1 LAN Requester Accessing OS/2 LAN Server V1.0

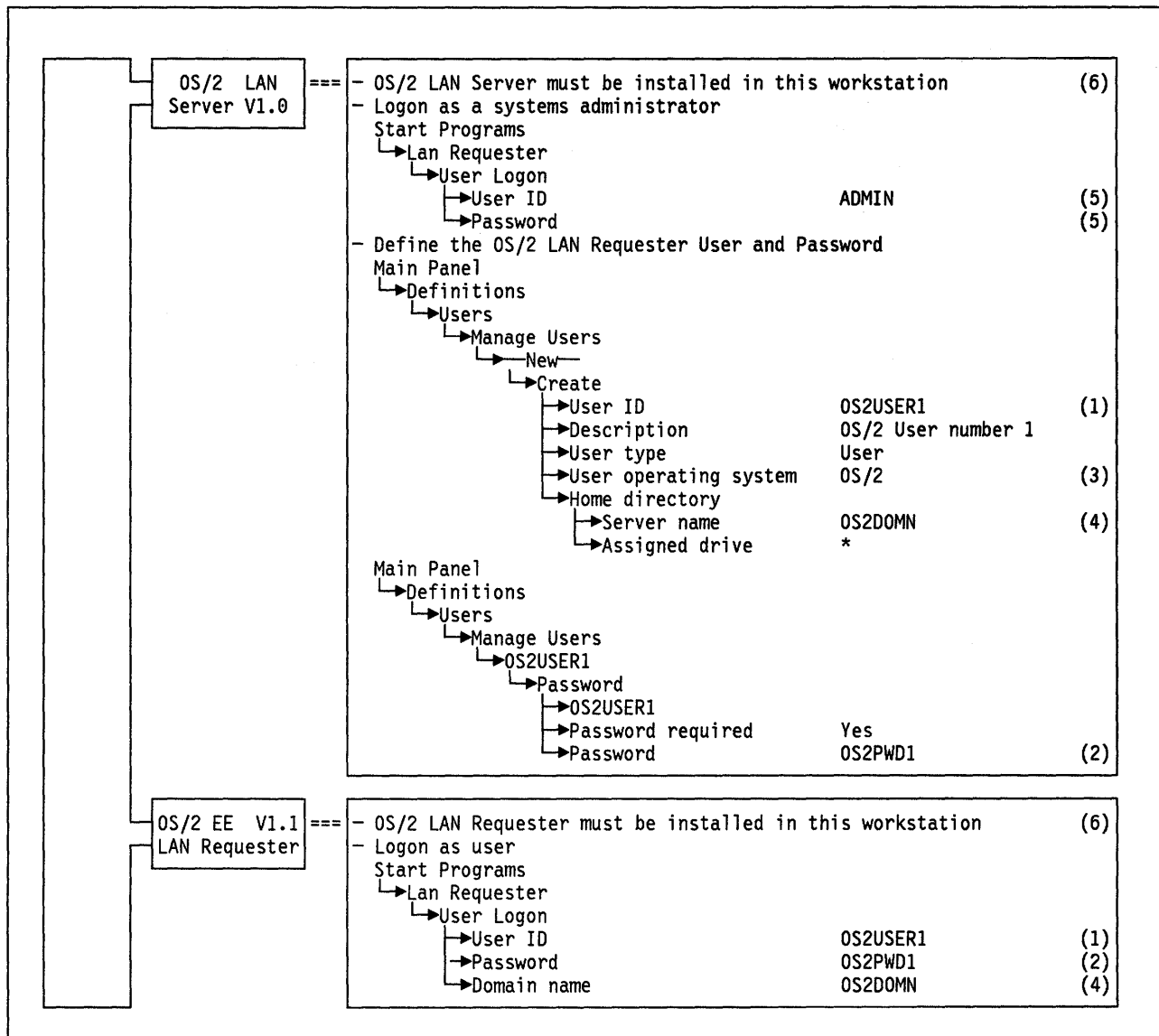


Figure 212. OS/2 EE V1.1 LAN Requester Accessing OS2 LAN Server V1.0

### Notes - OS/2 LAN Requester Accessing OS/2 LAN Server

1. The user ID defined by the administrator must be used by the user to log on to the system.
2. The password defined by the administrator must be used by the user to log on to the system at least the first time he logs on.
3. This parameter indicates that the defined user should log on to the system **only** from an OS/2 LAN requester workstation.
4. In this case, the server name and the domain name are the same because the server workstation was defined as the network domain controller at installation time.
5. "ADMIN" is an administrator user ID with no password required. It is provided by the OS/2 LAN server program as the initial user ID for the system administrator.
6. The Token-Ring adapter definition is usually done when installing and configuring the OS/2 EE Communications Manager (DLC feature). If it was not defined at the Communications Manager installation time, the OS/2 LAN requester installation procedure asks for specifications to define it.

## 58.2 PC LAN Program 1.3 Workstation Accessing OS/2 LAN Server V1.0

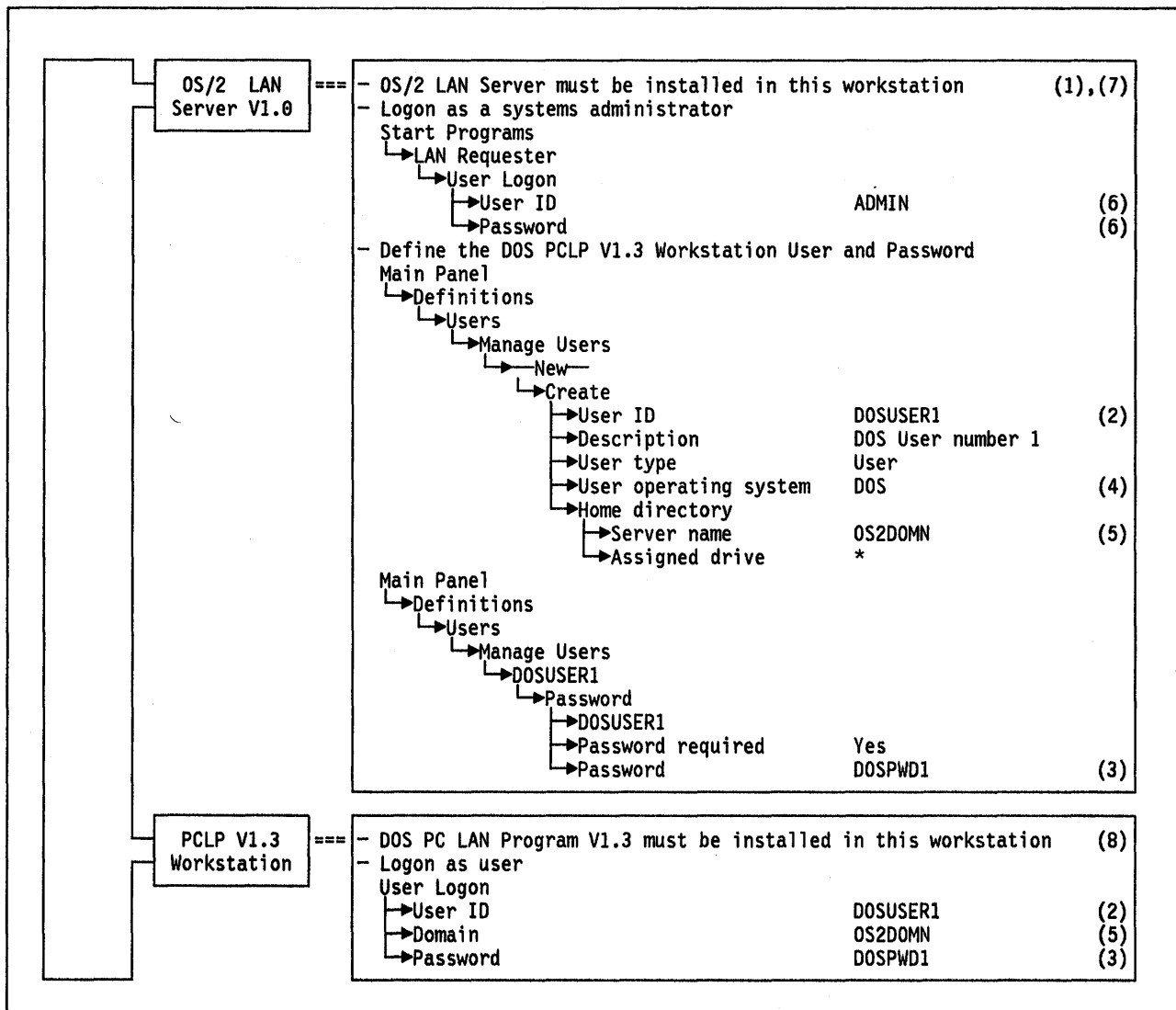


Figure 213. PC LAN Program 1.3 Workstation Accessing OS/2 LAN Server V1.0

### Notes - PCLP 1.3 Workstation Accessing OS/2 LAN Server

1. The OS/2 LAN server must have been installed including the PCLP 1.3 requester support service.

2. The user ID defined by the administrator must be used by the user to log on to the system.

If PCLP 1.3 Basic Services are used, then the machine ID used in the NET START command must be the same as the user ID defined by the administrator at the domain workstation.

3. The password defined by the administrator must be used by the user to log on to the system at least the first time he logs on.

If PCLP 1.3 Basic Services are used, then the password defined for the user ID at the domain must be used as the password in the NET USE commands when accessing a shared resource.

4. This parameter indicates that the defined user should log on to the system **only** from a DOS PCLP 1.3 workstation.

5. In this case, the server name and the domain name are the same because the server workstation was defined as the network domain controller at installation time.

6. "ADMIN" is an administrator user ID with no password required. It is provided by the OS/2 LAN server program as the initial user ID for the system administrator.

7. The Token-Ring adapter definition is usually done when installing and configuring the OS/2 EE Communications Manager (DLC feature). If it was not defined at the Communications Manager installation time, the OS/2 LAN requester installation procedure asks for specifications to define it.

8. To install the PCLP V1.3, the LAN Support Program must have been installed. The LAN Support Program is used to define and support the Token-Ring adapter which connects the workstation to the LAN environment.

# 58.3 PC LAN Program 1.3 Workstation Accessing OS/2 LAN Server V1.0 Through Remote NETBIOS

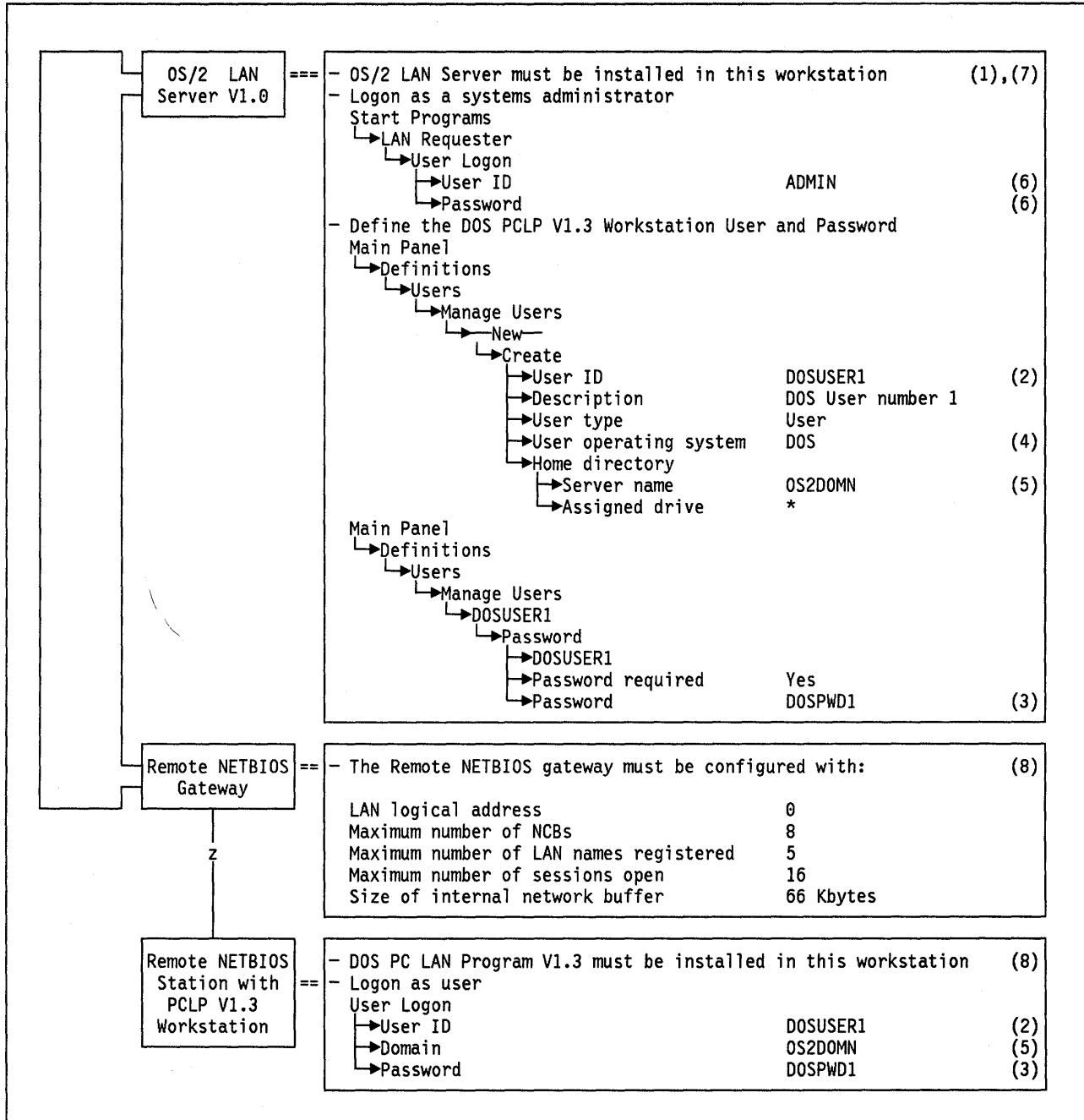


Figure 214. PCLP 1.3 Workstation Accessing OS/2 LAN Server 1.0 Through Remote NETBIOS

## **Notes - PCLP 1.3 Workstation Accessing OS/2 LAN Server Through Remote NETBIOS**

1. The OS/2 LAN server must have been installed including the PCLP 1.3 requester support service.

2. The user ID defined by the administrator must be used by the user to log on to the system.

If PCLP 1.3 Basic Services are used, then the machine ID used in the Net Start command must be the same as the user ID defined by the administrator at the domain workstation.

3. The password defined by the administrator must be used by the user to log on to the system at least the first time he logs on.

If PCLP 1.3 Basic Services are used, then the password defined for the user ID at the domain, must be used as the password in the NET USE commands when accessing a shared resource.

4. This parameter indicates that the defined user should log on to the system **only** from a DOS PCLP 1.3 workstation.

5. In this case, the server name and the domain name are the same because the server workstation was defined as the network domain controller at installation time.

6. "ADMIN" is an administrator user ID with no password required. It is provided by the OS/2 LAN server program as the initial user ID for the system administrator.

7. The Token-Ring adapter definition is usually done when installing and configuring the OS/2 EE Communications Manager (DLC feature). If it was not defined at the Communications Manager installation time, the OS/2 LAN requester installation procedure asks for specifications to define it.

8. For details on how the Remote NETBIOS Program is installed and customized, see "Remote NETBIOS Access Facility Version 2" on page 285 in this document.

## 58.4 DOS Remote IPL Service of the OS/2 LAN Server V1.0

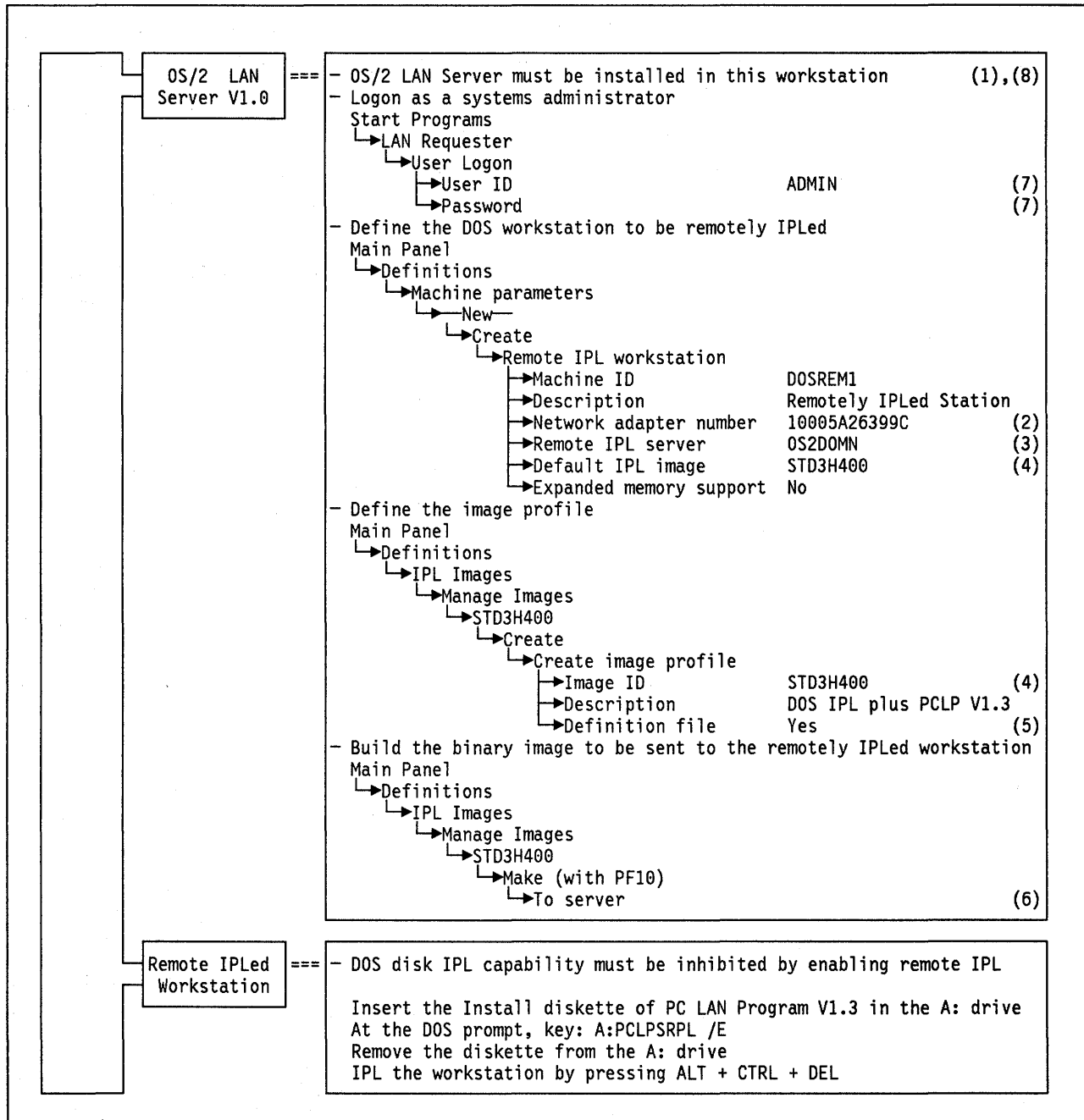


Figure 215. DOS Remote IPL Service of the OS/2 LAN Server

### **Notes - DOS Remote IPL Service of the OS/2 LAN Server**

1. The OS/2 LAN server must have been installed including the PCLP 1.3 requester support and the DOS remote IPL services.
2. This MAC address must be the universal administered address of the Token-Ring adapter installed at the workstation to be remotely IPLed.

Remember that the Token-Ring adapter installed at the remotely IPLed workstation must have the remote IPL feature on it.

The MAC address of the Token-Ring adapter installed at the server workstation supporting the remote IPL must also use a universal administered address.

3. The remote IPL server is the workstation that will support the remotely IPLed workstations (in this case the server and the domain controller are the same workstations).
4. This is a standard IPL image supplied by IBM. It contains DOS V4.0 and PCLP 1.3 customized as a workstation.
5. Specifying "Yes" indicates that the IPL image is going to be "made" based on a definition file in which a sequence of commands allows you to include the DOS, the CONFIG.SYS file, the AUTOEXEC.BAT file and the application programs that will be used to start and operate the remotely IPLed workstation.

The STD3H400 image has a definition file which will build an image containing DOS V4.0, CONFIG.SYS file, AUTOEXEC.BAT file and the PCLP 1.3 configured as a workstation.

If you specify "No" then the image will be created from an IPLable diskette which you are asked to insert in the A: drive when the image is being "made"

6. This parameter specifies where the "made" or built image is going to be stored. "To server" indicates that it is going to be put on the server disk in order to transmit it to the remotely IPLed workstation.  
  
"To diskette" indicates that the image will be put on a diskette (an IPLable diskette is created). This diskette can be used to IPL a diskette-based workstation. Note that in this case the remote IPL function will not be used.
7. "ADMIN" is an administrator user ID with no password required. It is provided by the OS/2 LAN server program as the initial user ID for the system administrator.
8. The Token-Ring adapter definition is usually done when installing and configuring the OS/2 EE Communications Manager (DLC feature). If it was not defined at the Communications Manager installation time, the OS/2 LAN requester installation procedure asks for specifications to define it.





# Chapter 59. PC LAN Program Version 1.3 Remote IPL Service

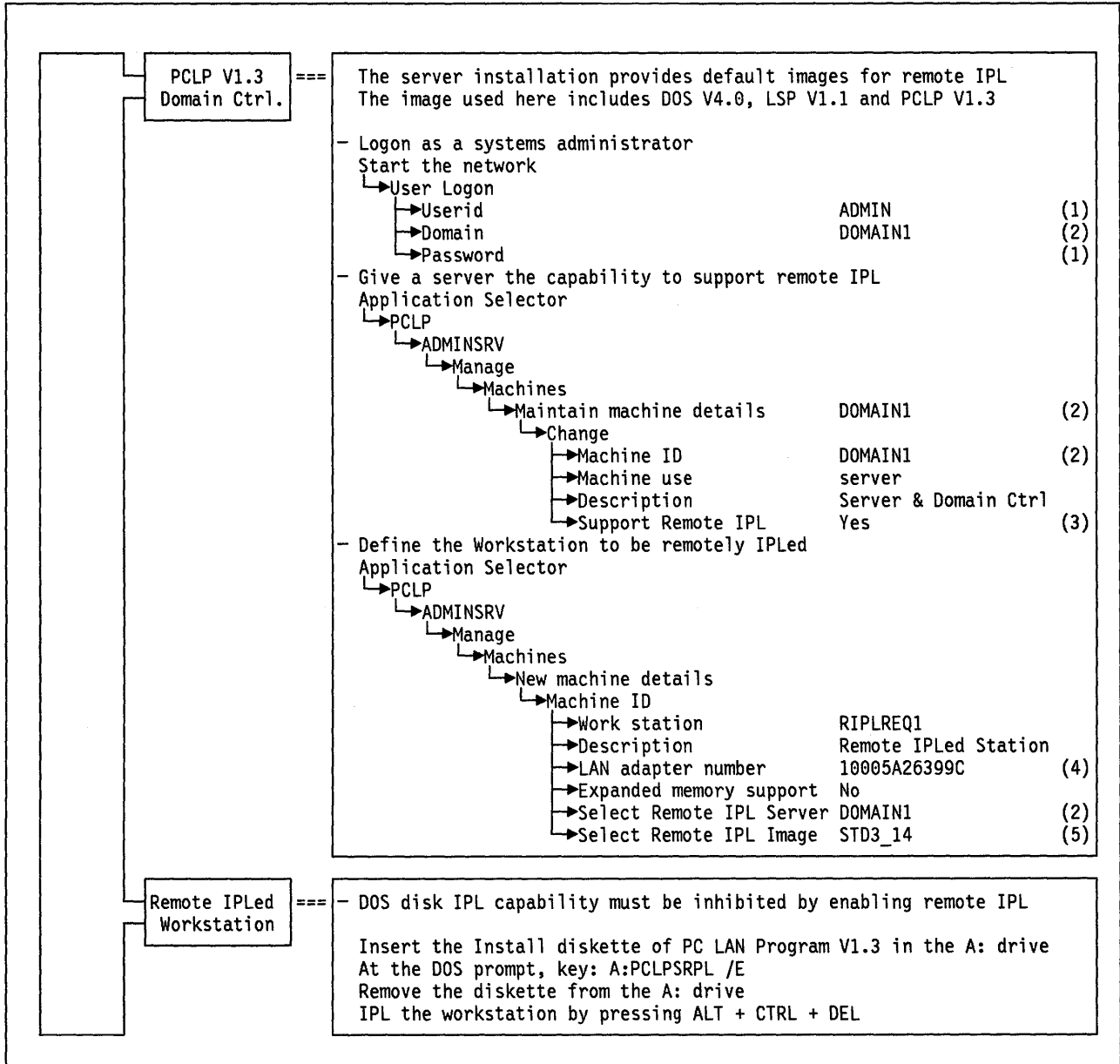


Figure 216. Remote IPL Service of the PC LAN Program Version 1.3

### **Notes - Remote IPL Service of the PC LAN Program V1.3**

1. "ADMIN" is an administrator user ID with no password required. It is provided by the PCLP V1.3 as the initial user ID for the system administrator.
2. The remote IPL Server is the workstation that will support the remotely IPLed workstations (in this case the server and the domain controller are the same workstations).
3. The server acquires the capability of supporting the remote IPL service for other medialess workstations when this parameter is set to "Yes."
4. This MAC address must be the Universal Administered Address of the Token-Ring adapter installed at the workstation to be remotely IPLed.

Remember that the Token-Ring adapter installed at the remotely IPLed workstation must have the Remote IPL feature on it.

5. This is an standard IPL image supplied by IBM. It contains DOS V4.0, LSP V1.1 and PCLP V1.3 customized as Workstation.

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## **Chapter 60. OS/2 Local Area Network Server Version 1.2 Scenarios**

The following pages present the parameters and parameter relationship required to set up the communication of a station running the OS/2 LAN Server V1.2 program to other stations in a Token-Ring Network.

The scenarios covered are:

1. OS/2 EE V1.2 LAN requester accessing OS/2 LAN Server V1.2
2. DOS LAN requester accessing OS/2 LAN Server V1.2
3. DOS LAN requester accessing OS/2 LAN Server V1.2 through remote NETBIOS
4. DOS remote IPL service of the OS/2 LAN Server V1.2.

## 60.1 OS/2 EE V1.2 LAN Requester Accessing OS/2 LAN Server V1.2

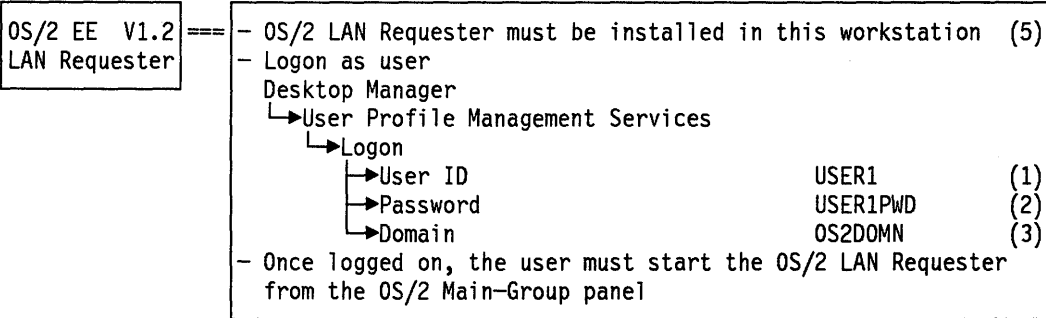
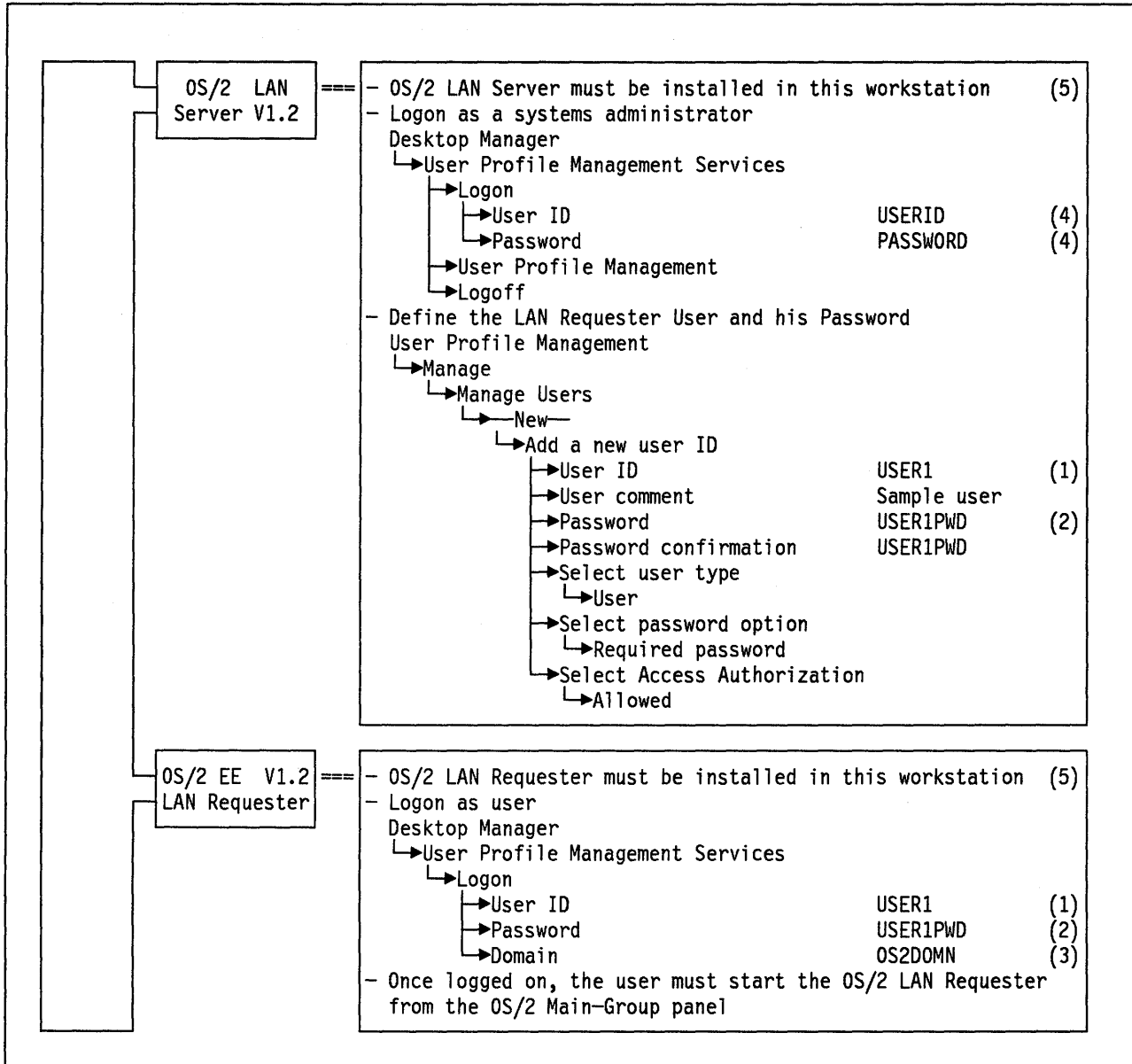


Figure 217. OS/2 EE V1.2 LAN Requester Accessing OS2 LAN Server V1.2

### **Notes - OS/2 LAN Requester Accessing OS/2 LAN Server**

1. The user ID defined by the administrator must be used by the user to log on to the system.
2. The password defined by the administrator must be used by the user to log on to the system at least the first time he logs on.
3. This must be the name of the domain in which the user was defined.
4. "USERID" is an administrator user ID and its associated password is "PASSWORD"; they are provided by the OS/2 LAN server program as the initial user ID and password values for the system administrator.
5. The Token-Ring adapter definition is usually done when installing and configuring the OS/2 EE Communications Manager (DLC feature). If it was not defined at the Communications Manager installation time, the OS/2 LAN requester installation procedure asks for specifications to define it.

## 60.2 DOS LAN Requester Accessing OS/2 LAN Server V1.2

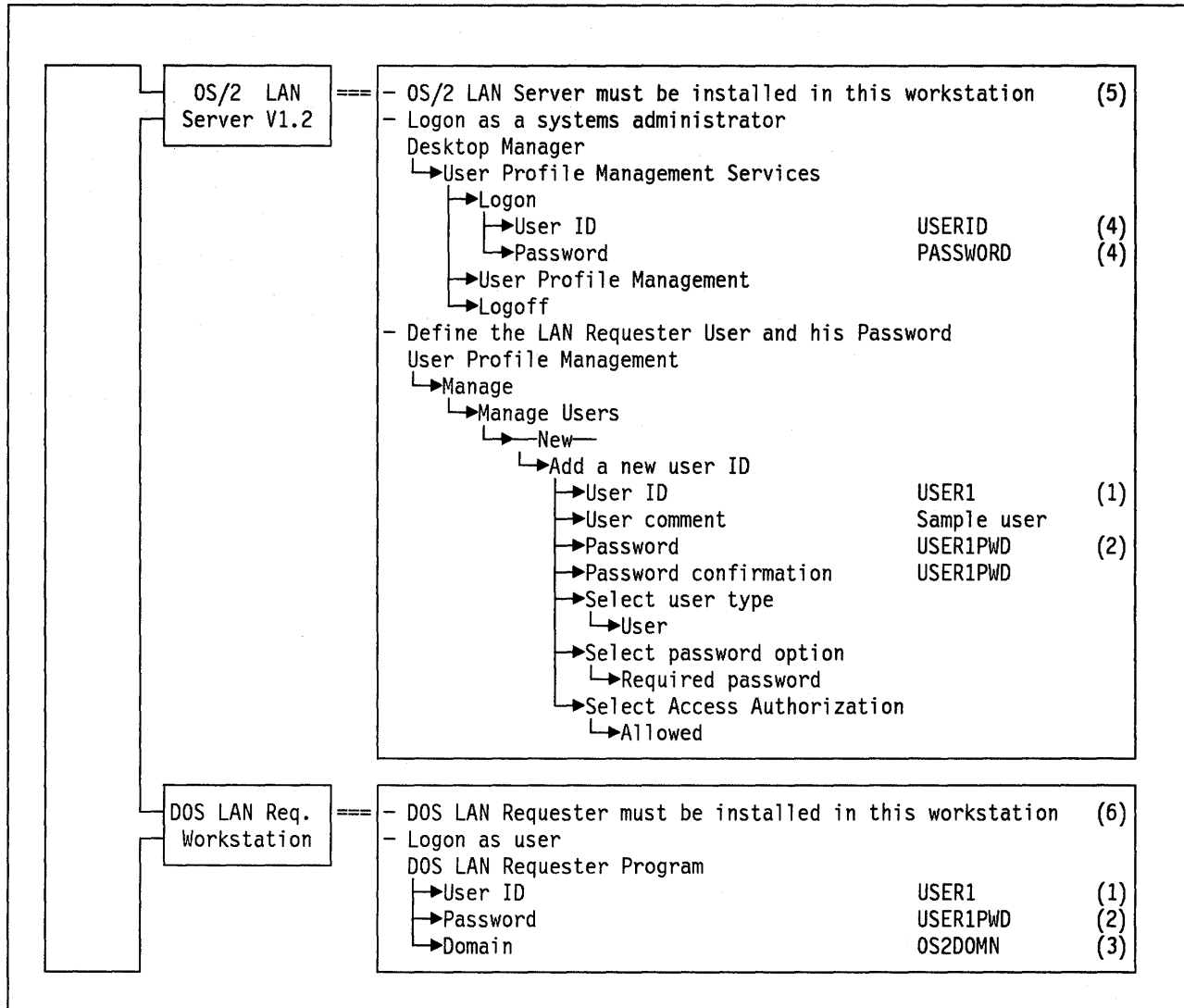


Figure 218. DOS LAN Requester Accessing OS/2 LAN Server V1.2

### **Notes - DOS LAN Requester Accessing OS/2 LAN Server**

1. The user ID defined by the administrator must be used by the user to log on to the system.
2. The password defined by the administrator must be used by the user to log on to the system at least the first time he logs on.
3. This must be the name of the domain in which the user was defined.
4. "USERID" is an administrator user ID and its associated password is "PASSWORD"; they are provided by the OS/2 LAN Server program as the initial user ID and password values for the system administrator.
5. The Token-Ring adapter definition is usually done when installing and configuring the OS/2 EE Communications Manager (DLC feature). If it was not defined at the Communications Manager installation time, the OS/2 LAN requester installation procedure asks for specifications to define it.
6. To install the DOS LAN requester, the LAN Support Program V1.1 or later must have been installed. The LAN Support Program is used to define and support the Token-Ring adapter which connects the workstation to the LAN environment.



## 60.3 DOS LAN Requester Accessing OS/2 LAN Server V1.2 Through Remote NETBIOS

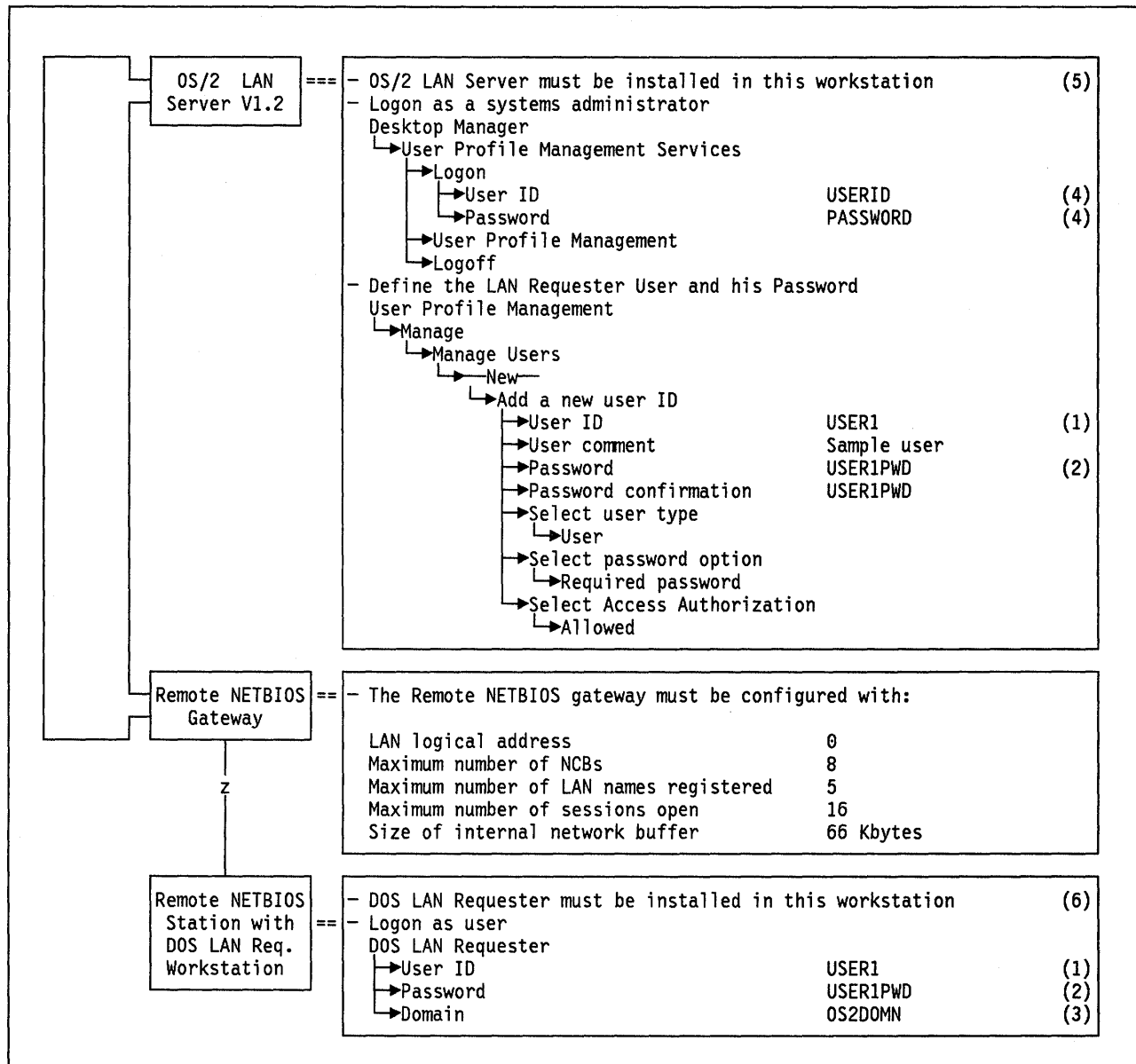


Figure 219. DOS LAN Requester Accessing OS/2 LAN Server 1.2 Through Remote NETBIOS

### **Notes - DOS LAN Requester Accessing OS/2 LAN Server Through Remote NETBIOS**

1. The user ID defined by the administrator must be used by the user to log on to the system.
2. The password defined by the administrator must be used by the user to log on to the system at least the first time he logs on.
3. This must be the name of the domain in which the user was defined.
4. "USERID" is an administrator user ID and its associated password is "PASSWORD"; they are provided by the OS/2 LAN server program as the initial user ID and password values for the system administrator.
5. The Token-Ring adapter definition is usually done when installing and configuring the OS/2 EE Communications Manager (DLC feature). If it was not defined at the Communications Manager installation time, the OS/2 LAN requester installation procedure asks for specifications to define it.
6. To install the DOS LAN requester, the LAN Support Program V1.1 or later, must have been installed. The LAN Support Program is used to define and support the Token-Ring adapter which connects the workstation to the LAN environment.

## 60.4 DOS Remote IPL Service of the OS/2 LAN Server V1.2

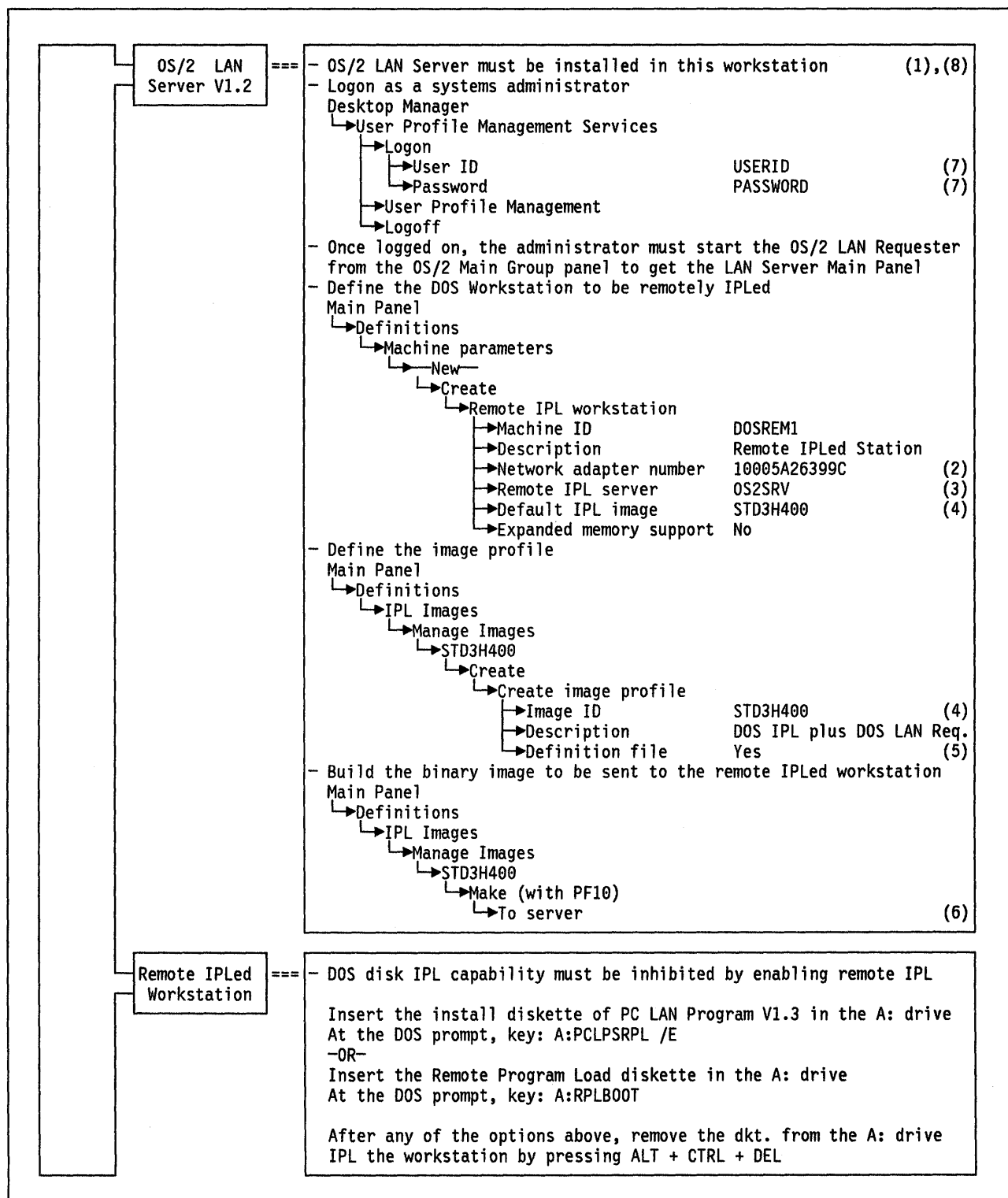


Figure 220. DOS Remote IPL Service of the OS/2 LAN Server

### **Notes - DOS Remote IPL Service of the OS/2 LAN Server**

1. The OS/2 LAN server must have been installed including the DOS LAN requester support and the DOS remote IPL services.
2. This MAC address must be the universal administered address of the Token-Ring adapter installed at the workstation to be remotely IPLed.

Remember that the Token-Ring adapter installed at the remotely IPLed workstation must have the remote IPL feature on it.

The MAC address of the Token-Ring adapter installed at the server workstation supporting the remote IPL, must also use a universal administered address.

3. The remote IPL server is the workstation that will support the remotely IPLed workstations (it can be the server on the domain controller or any additional server).
4. This is a standard IPL image supplied by IBM. It contains DOS V4.0 and DOS LAN requester program.
5. Specifying "Yes" indicates that the IPL image is going to be created based on a definition file in which a sequence of commands allows you to include the DOS, the CONFIG.SYS file, the AUTOEXEC.BAT file and the application programs that will be used to start and operate the remotely IPLed workstation.

The STD3H400 image has a definition file which will build an image containing DOS V4.0, CONFIG.SYS file, AUTOEXEC.BAT file and the DOS LAN requester program.

If you specify "No" then the image will be created from an IPLable diskette which you are asked to insert in the "A" drive when the image is being created.

6. This parameter specifies where the created or built image is going to be stored. "To server" indicates that it is going to be put on the server disk in order to transmit it to the remotely IPLed workstation.

"To diskette" indicates that the image will be put on a diskette (an IPLable diskette is created). This diskette can be used to IPL a diskette-based workstation. Note that in this case the remote IPL function will not be used.

7. "USERID" is an administrator user ID and its associated password is "PASSWORD"; they are provided by the OS/2 LAN server program as the initial user ID and password values for the system administrator.
8. The Token-Ring adapter definition is usually done when installing and configuring the OS/2 EE Communications Manager (DLC feature). If it was not defined at the Communications Manager installation time, the OS/2 LAN requester installation procedure asks for specifications to define it.



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## **Chapter 61. OS/2 EE 1.1 Communications Manager - 3270 Terminal Emulation Scenarios**

The following pages present the parameters and parameter relationship required to set up the communication of a station running OS/2 Extended Edition V1.1 - 3270 Emulation to an SNA host across a Token-Ring Network.

The scenarios covered are:

1. Connection through a local 3174 Token-Ring gateway
2. Connection through a Token-Ring-attached 9370 gateway
3. Connection through a Token-Ring-attached 37XX gateway

# 61.1 Workstation Connection Through a Local 3174 Token-Ring Gateway

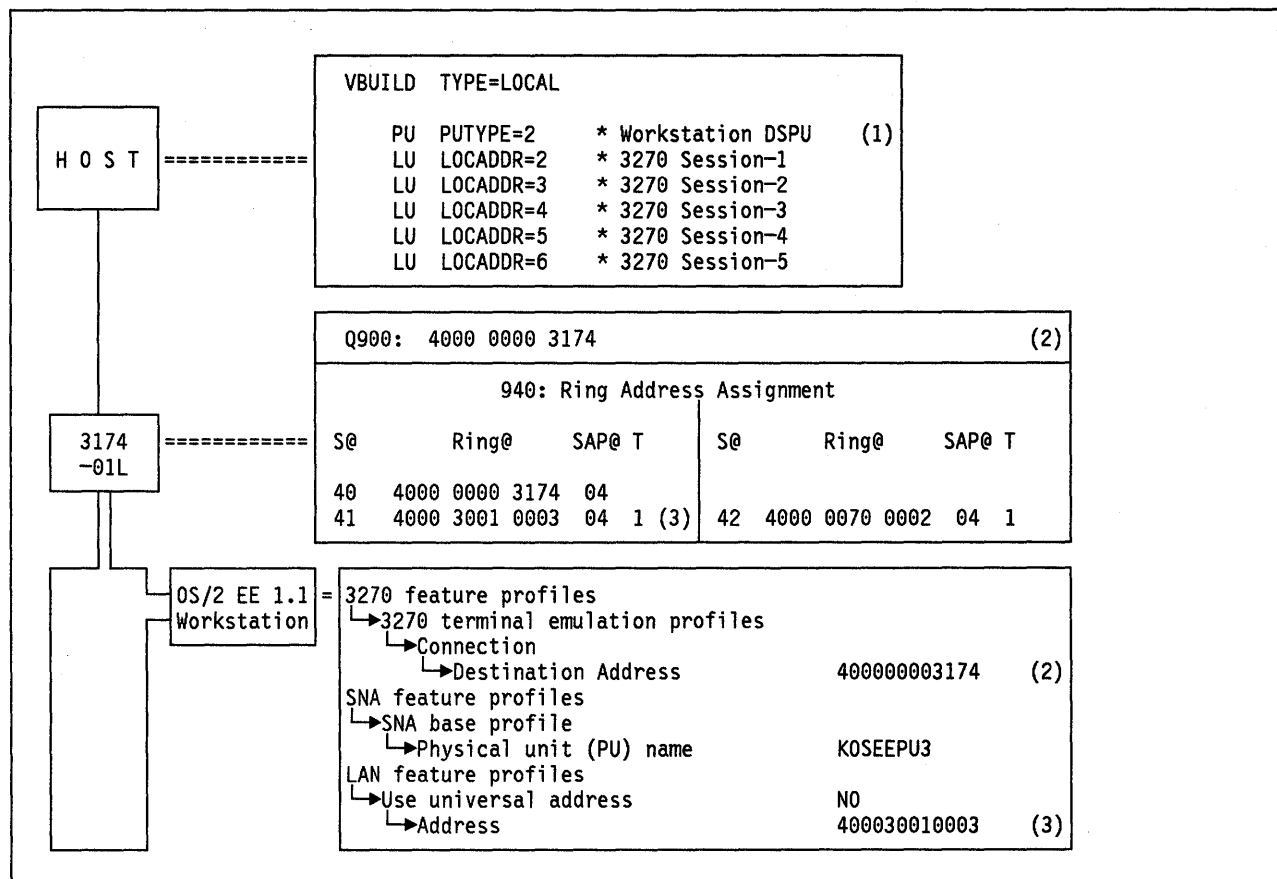


Figure 221. OS/2 EE 1.1 Workstation to Local 3174 Gateway - Key Parameters

## Notes - Attachment through a Local 3174 Gateway

1. The number of workstations with associated sessions must be defined at the host via PU and LU statements. One LU statement is defined per required session.
2. This is the Token-Ring adapter address of the 3174. This is a locally administered address.
3. The address of the Token-Ring adapters of the PCs must match the 3174 definitions in Q940. This address can be either universal or local. The recommendation is to use locally administered addresses.

## 61.2 Workstation Connection Through a Token-Ring-Attached 9370

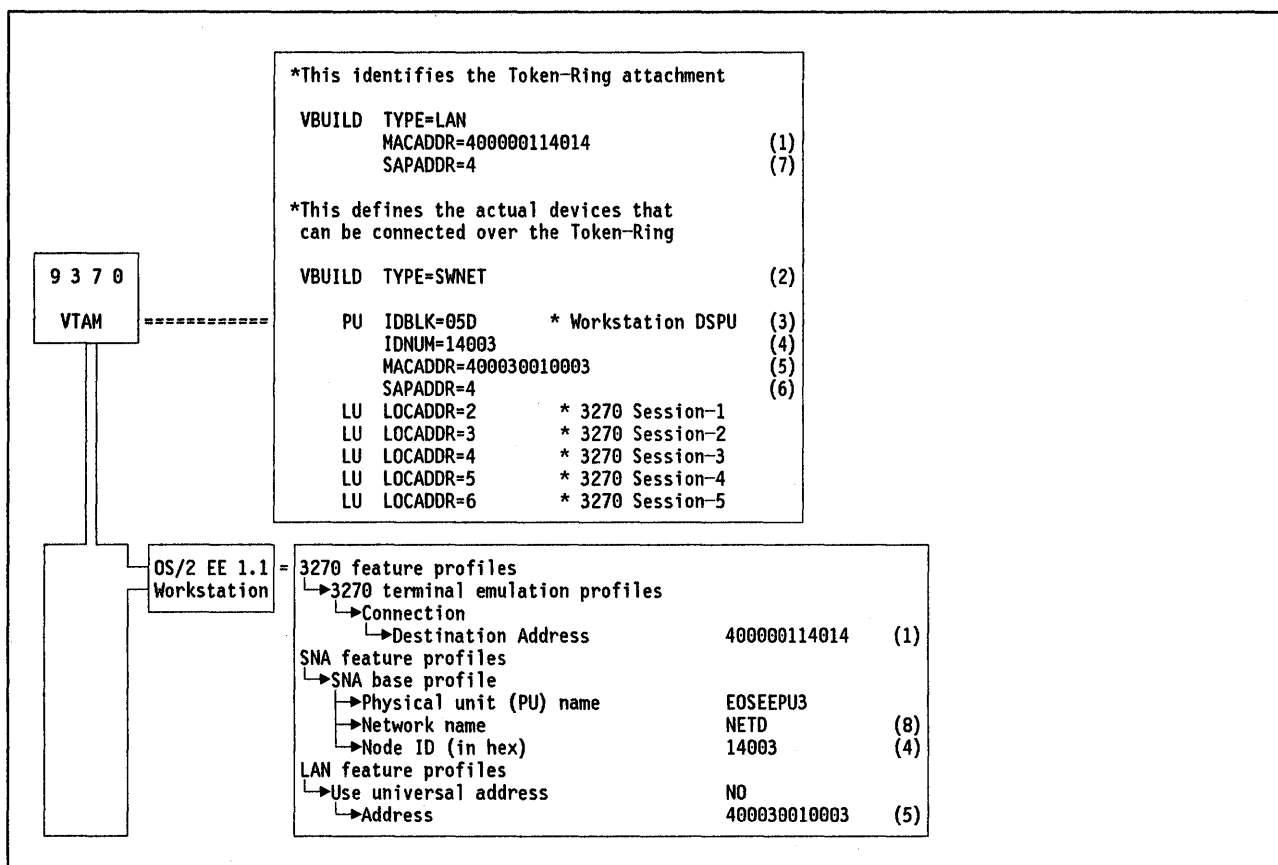


Figure 222. OS/2 EE 1.1 Workstation to 9370 Token-Ring - Key Parameters

### Notes - Attachment to a Token-Ring-Connected 9370

1. This is the Token-Ring adapter address of the 9370. This is a locally administered address.
2. The DSPU definition is done in a switched major node via PU and LU statements. One LU statement is defined per required session.
3. IDBLK=05D must be used for the OS/2 3270 emulation.
4. The node ID (in hex) in the OS/2 3270 emulation must match the IDNUM parameter specified at the host. This number is different for each of the DSPUs.
5. The address of the Token-Ring adapters of the PCs must match the MACADDR parameter in the host. This address can be either universal or locally administered. The recommendation is to use locally administered addresses. It is used only for dial-out operations.
6. This is the SAP address of the OS/2 3270 emulation.
7. This is the SAP address of the 9370.
8. Network name specified in the OS/2 3270 emulation configuration must match the NETID parameter used in the VTAM start parameters (ATCSTRxx).



## 61.3 Workstation Connection Through a Token-Ring-Attached 37XX

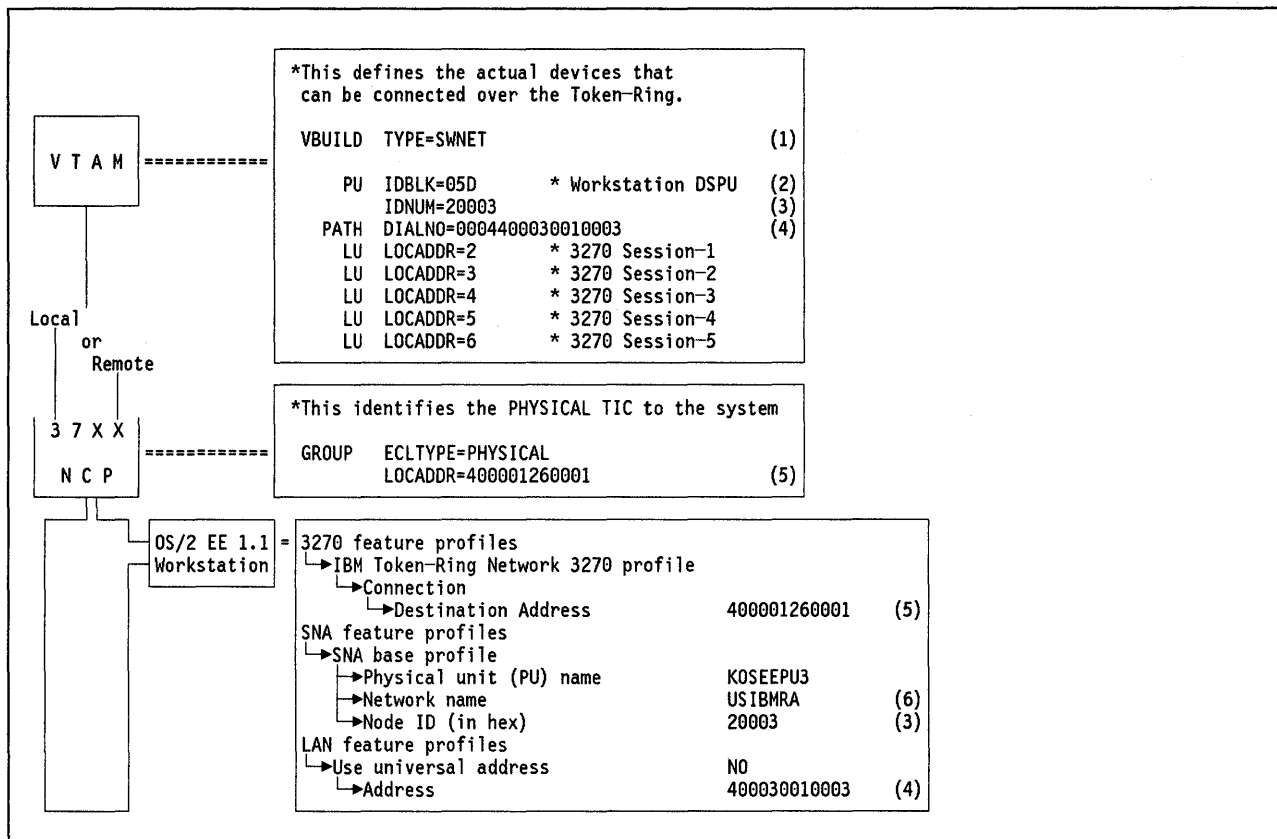


Figure 223. OS/2 EE 1.1 Workstation to 37XX - Key Parameters

### Notes - Attachment to a Token-Ring-Connected 37XX

1. The DSPU definition is done in a switched major node via PU and LUs statements. One LU statement is defined per required workstation.
2. IDBLK=05D must be used for the OS/2 3270 emulation.
3. The node ID (in hex) specified in the OS/2 3270 emulation configuration must match the IDNUM parameter specified at the host. This number is different for each of the DSPUs.
4. The DIALNO parameter needs to be coded only if the host will be attempting to establish sessions with the DSPU. The last 12 digits are the PC's Token-Ring Network adapter locally administered address. The first four digits specify the port address to use (first two digits) and the SAP of the OS/2 3270 emulation (second two digits).
5. This is the Token-Ring Network adapter address of the 37XX. This is a locally administered address.
6. The Network name parameter in the OS/2 3270 emulation configuration must match the NETID used in the VTAM start parameters (ATCSTRxx).

---

## **Chapter 62. OS/2 EE 1.2 Communications Manager - 3270 Terminal Emulation Scenarios**

The following pages present the parameters and parameter relationship required to set up the communication of a station running OS/2 Extended Edition V1.2 - 3270 Emulation to an SNA host across a Token-Ring Network.

The scenarios covered are:

1. Connection through a local 3174 Token-Ring gateway
2. Connection through a Token-Ring-attached 9370 gateway
3. Connection through a Token-Ring-attached 37XX gateway
4. Token-Ring Network connection through a local 3174
5. Token-Ring Network connection through a Token-Ring-attached 9370
6. Token-Ring Network connection through a Token-Ring-attached 37XX
7. SDLC gateway to an S/370 Host.

## 62.1 Workstation Connection Through a Local 3174 Token-Ring Gateway

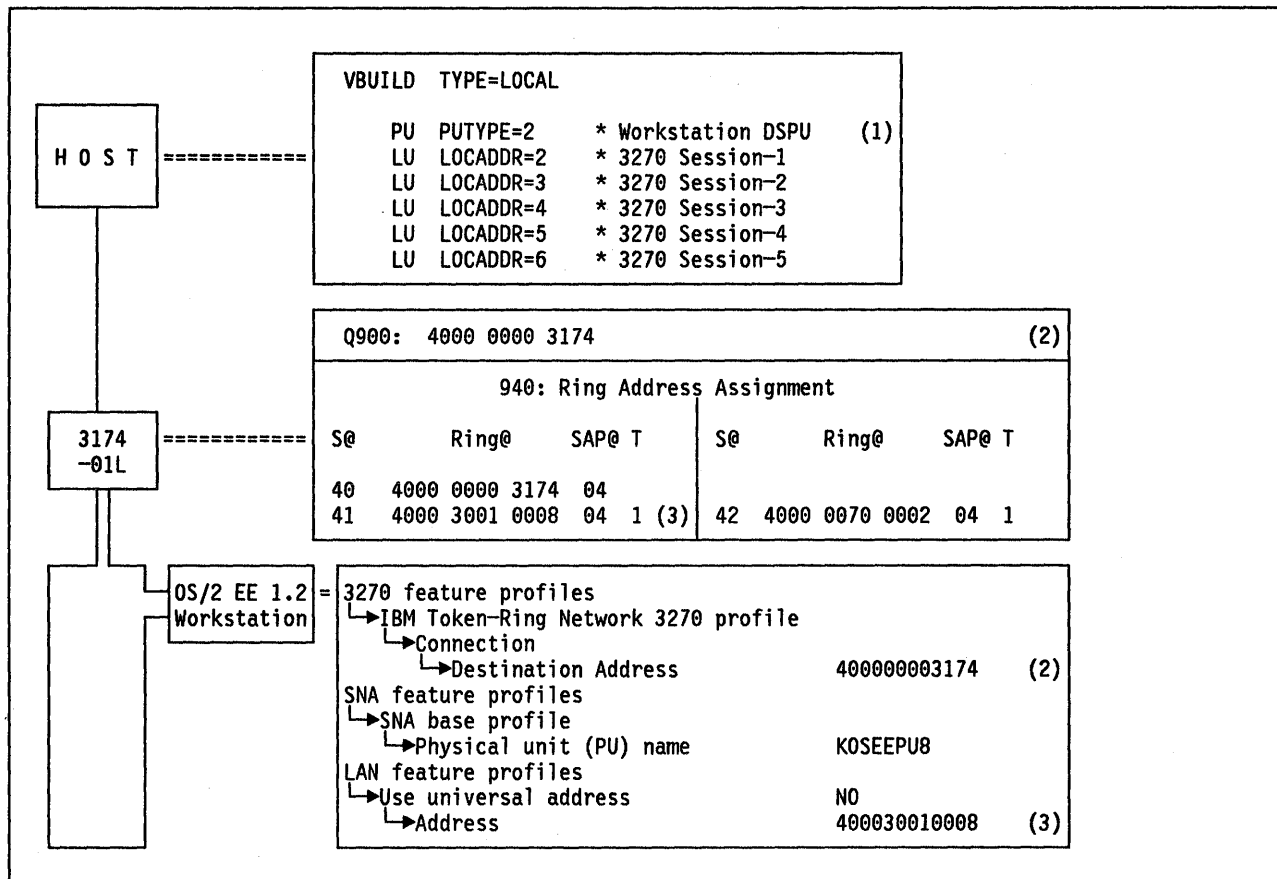


Figure 224. OS/2 EE 1.2 Workstation to Local 3174 Gateway - Key Parameters

### Notes - Attachment through a Local 3174 Gateway

1. The number of workstations with associated sessions must be defined at the host via PU and LU statements. One LU statement is defined per required session. If a printer session is required, your host programmer should use a different MODETAB statement.
2. This is the Token-Ring adapter address of the 3174. This is a locally administered address.
3. The address of the Token-Ring adapters of the PCs must match the 3174 definitions in Q940. This address can be either universal or local. The recommendation is to use locally administered addresses.

## 62.2 Workstation Connection Through a Token-Ring-Attached 9370

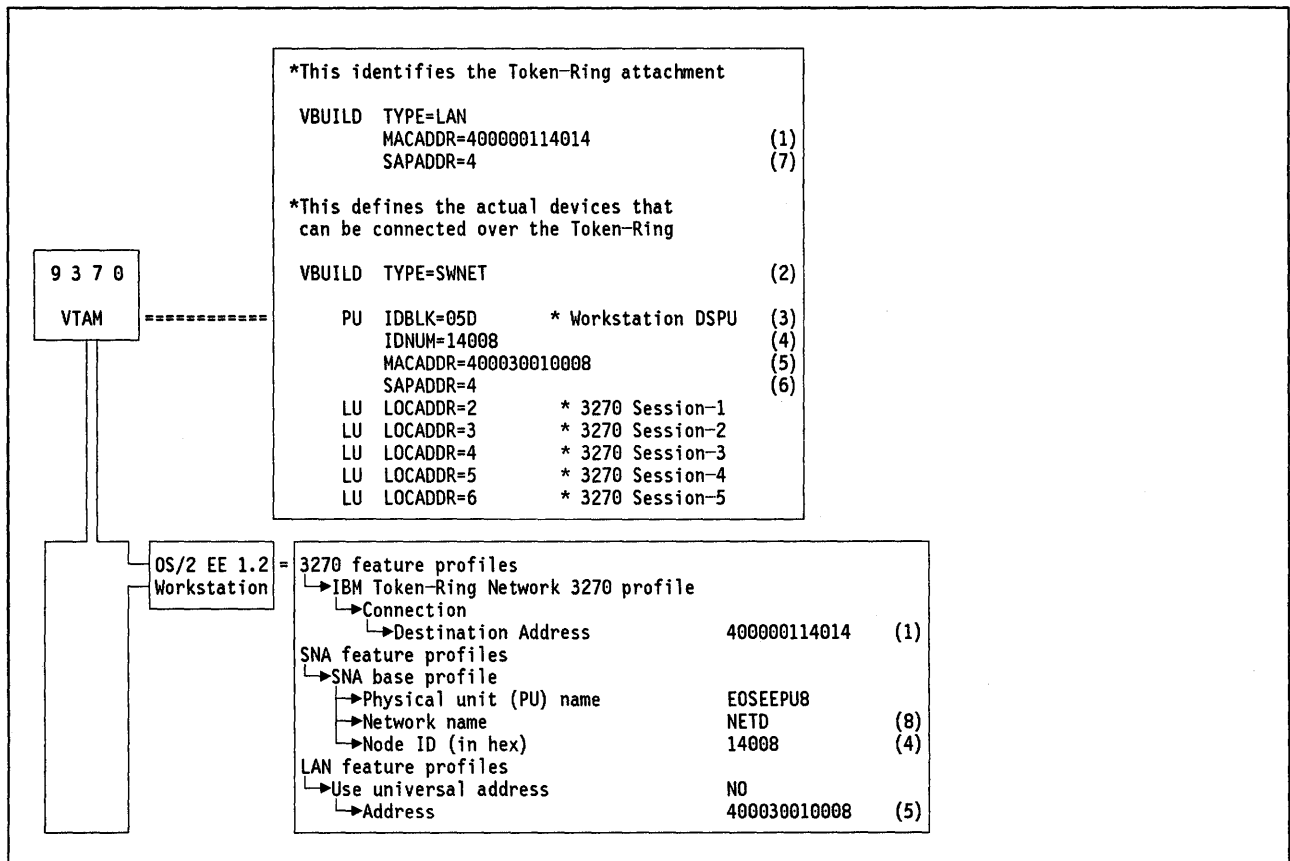


Figure 225. OS/2 EE 1.2 Workstation to 9370 Token-Ring - Key Parameters

### Notes - Attachment to a Token-Ring-Connected 9370

1. This is the Token-Ring adapter address of the 9370. This is a locally administered address.
2. The DSPU definition is done in a switched major node via PU and LU statements. One LU statement is defined per required session. If a printer session is required, your host programmer should use a different MODETAB statement.
3. IDBLK=05D must be used for the OS/2 3270 emulation.
4. The node ID (in hex) in the OS/2 3270 emulation must match the IDNUM parameter specified at the host. This number is different for each of the DSPUs.
5. The address of the Token-Ring adapters of the PCs must match the MACADDR parameter in the host. This address can be either universal or locally administered. The recommendation is to use locally administered addresses. It is used only for dial-out operations.
6. This is the SAP address of the OS/2 3270 emulation.
7. This is the SAP address of the 9370.
8. Network name specified in the OS/2 3270 emulation configuration must match the NETID parameter used in the VTAM start parameters (ATCSTRxx).

## 62.3 Workstation Connection Through a Token-Ring-Attached 37XX

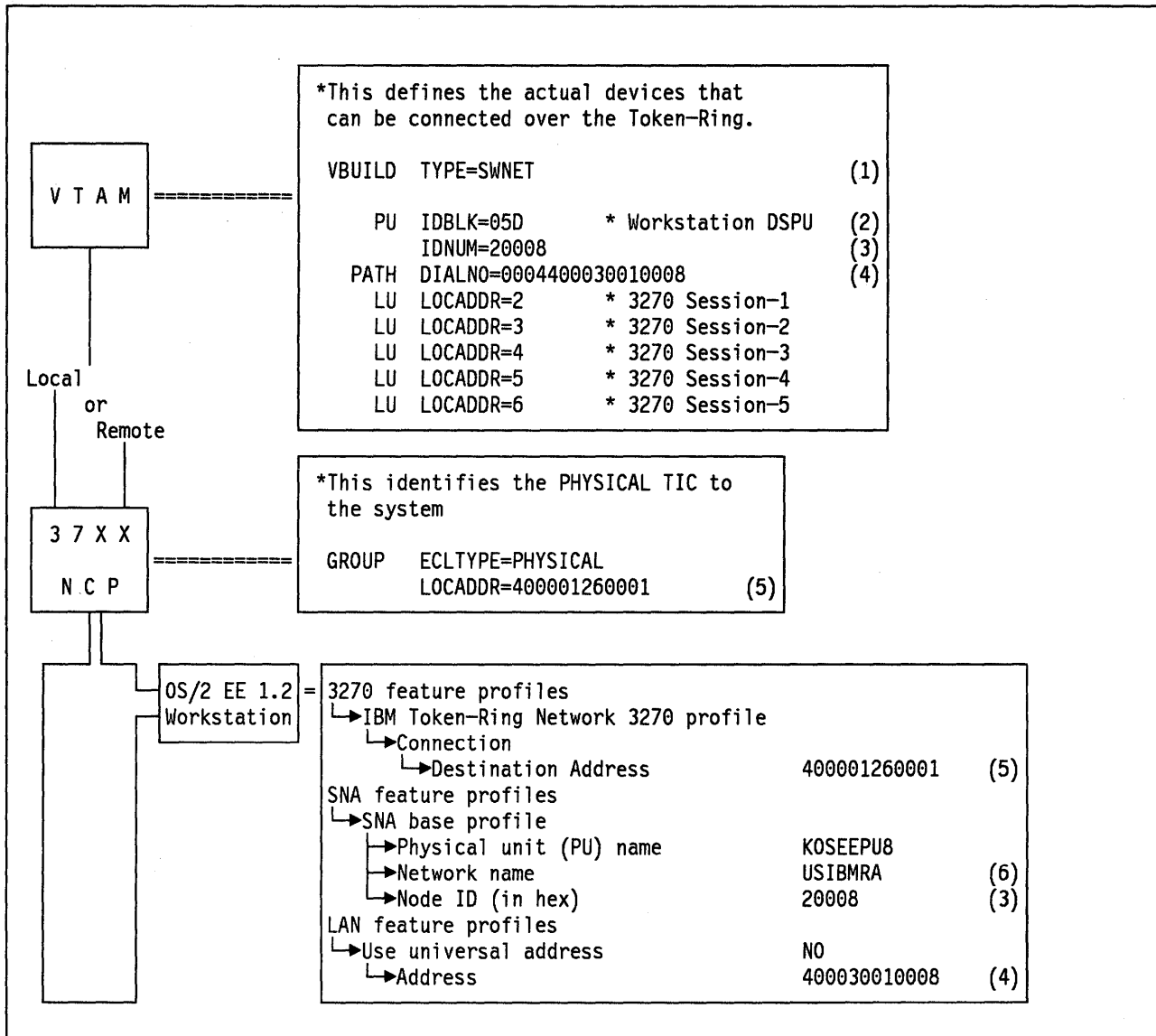


Figure 226. OS/2 EE 1.2 Workstation to 37XX - Key Parameters

### **Notes - Attachment to a Token-Ring-Connected 37XX**

1. The DSPU definition is done in a switched major node via PU and LUs statements. One LU statement is defined per required workstation. If a printer session is required, your host programmers should use a different MODETAB statement.
2. IDBLK=05D must be used for the OS/2 3270 emulation.
3. The node ID (in hex) specified in the OS/2 3270 emulation configuration must match the IDNUM parameter specified at the host. This number is different for each of the DSPUs.
4. The DIALNO parameter needs to be coded only if the host will be attempting to establish sessions with the DSPU. The last 12 digits are the PC's Token-Ring Network adapter locally administered address. The first four digits specify the port address to use (first two digits) and the SAP of the OS/2 3270 Emulation (second two digits).
5. This is the Token-Ring Network Adapter address of the 37XX. This is a locally administered address.
6. The network name parameter in the OS/2 3270 emulation configuration must match the NETID used in the VTAM start parameters (ATCSTRxx).

## 62.4 Token-Ring Gateway Connection Through a Local 3174

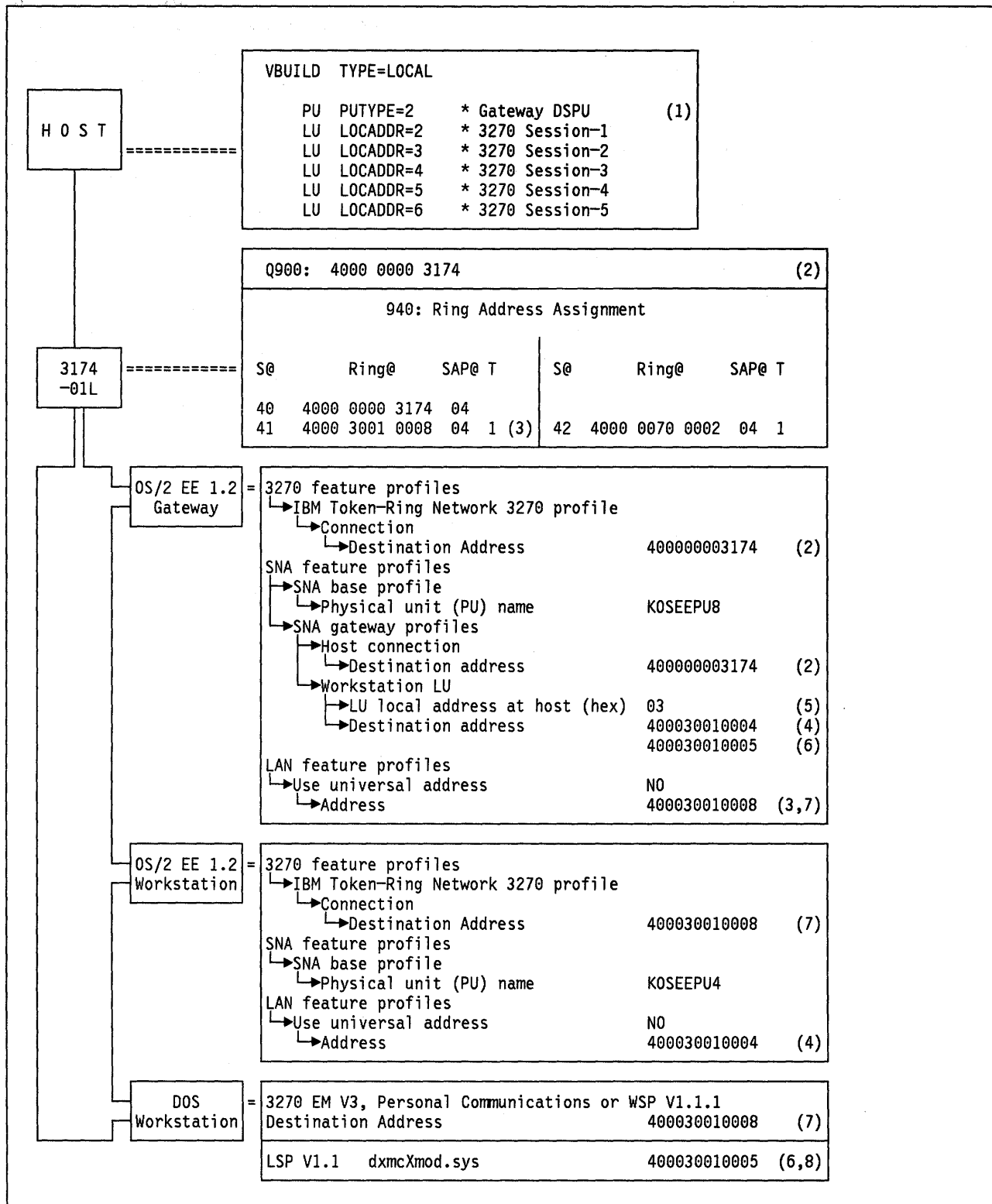


Figure 227. OS/2 EE 1.2 Gateway to Local 3174 Gateway - Key Parameters

### **Notes - Attachment through a Local 3174 Gateway**

1. The gateway with associated sessions must be defined at the host via PU and LU statements. One LU statement is defined per required session. If a printer session is required, your host programmers should use a different MODETAB statement.
2. This is the Token-Ring adapter address of the 3174. This is a locally administered address.
3. The address of the Token-Ring adapters of the PCs must match the 3174 definitions in Q940. This address can be either universal or local. The recommendation is to use locally administered addresses.
4. This must be the address of the Token-Ring adapter installed at the workstation that is being connected to the gateway.
5. This parameter must be unique for every workstation LU profile created at the gateway. It really means that the gateway is distributing the LU local addresses defined in VTAM, among the workstations that the gateway is going to control downstream. The workstations themselves can assign a different local address to refer to the same LU (the gateway makes the required mapping).
6. This must be the address of the Token-Ring adapter installed at the workstation that is being connected to the gateway.
7. This must be the address of the Token-Ring adapter installed at the gateway.
8. For the Workstation Program, dxmc1mod.sys must be used. For the 3270 Emulation Program and for the Personal Communications/3270, dxmc0mod.sys must be used.



## 62.5 Token-Ring Gateway Connection Through a Token-Ring-Attached 9370

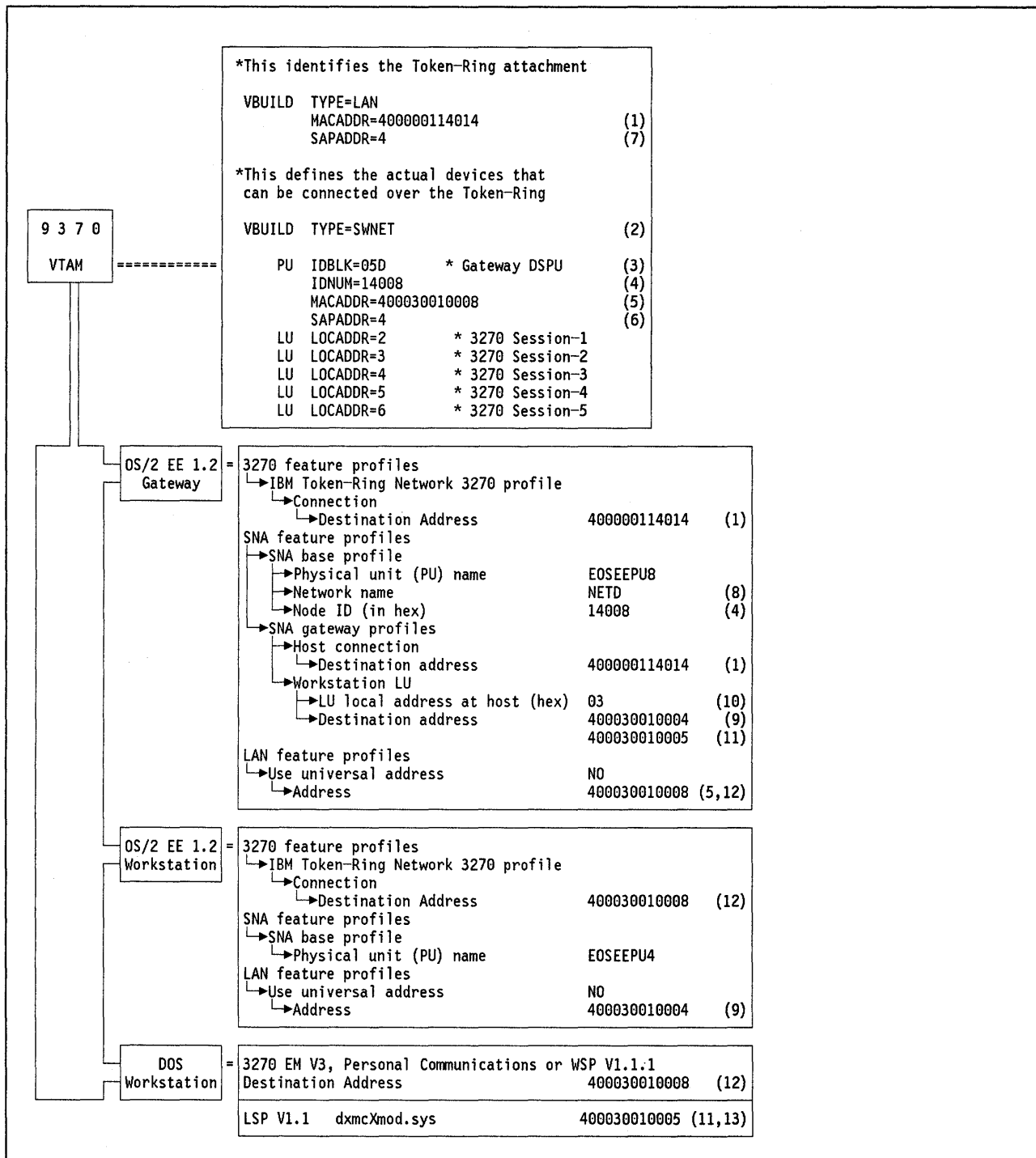


Figure 228. OS/2 EE 1.2 Gateway to 9370 - Key Parameters

### **Notes - Attachment to a Token-Ring Connected 9370**

1. This is the Token-Ring adapter address of the 9370. This is a locally administered address.
2. The gateway DSPU definition is done in a switched major node via PU and LU statements. One LU statement is defined per required session. If a printer session is required, your host programmers should use a different MODETAB statement.
3. IDBLK=05D must be used.
4. The node ID (in hex) must match the IDNUM parameter specified at the host. This number is different for each of the DSPUs.
5. The address of the Token-Ring adapters of the PCs must match the MACADDR parameter in the host. This address can be either universal or locally administered (the recommendation is to use local administered addresses), and it is used for dial-out operations.
6. This is the SAP address of the OS/2 3270 emulation.
7. This is the SAP address of the 9370.
8. Network name must match the NETID parameter used in the VTAM start parameters (ATCSTRxx).
9. This must be the address of the Token-Ring adapter installed at the workstation that is being connected to the gateway.
10. This parameter must be unique for every workstation LU profile created at the gateway. It really means that the gateway is distributing the LU local addresses defined in VTAM, among the workstations that the gateway is going to control downstream. The workstations themselves can assign a different local address to refer to the same LU (the gateway makes the required mapping).
11. This must be the address of the Token-Ring adapter installed at the workstation that is being connected to the gateway.
12. This must be the address of the Token-Ring adapter installed at the gateway.
13. For the Workstation Program, dxmc1mod.sys must be used. For the 3270 Emulation Program and for the Personal Communications/3270, dxmc0mod.sys must be used.

# 62.6 Token-Ring Gateway Connection through a Token-Ring-Attached 37XX

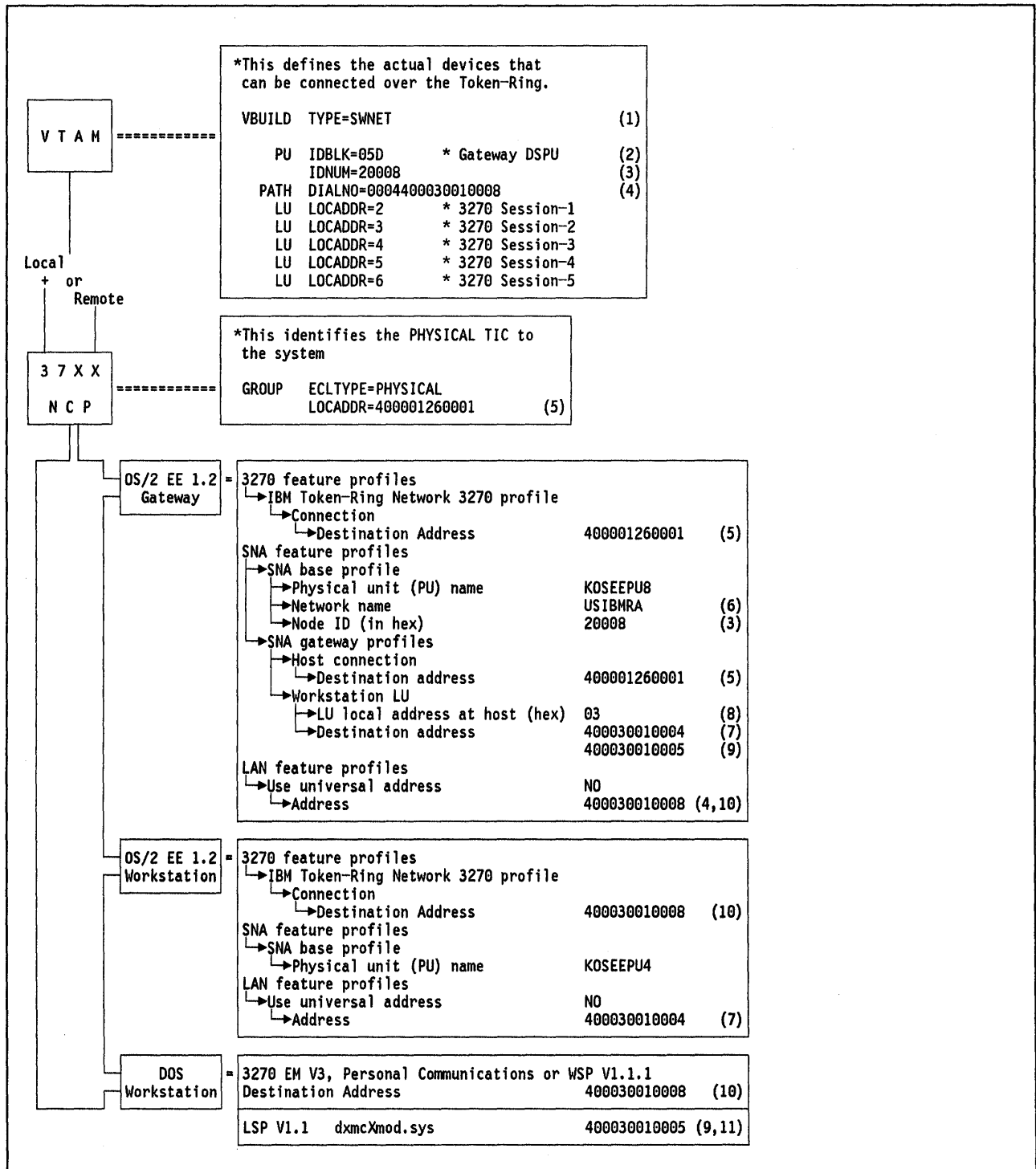


Figure 229. OS/2 EE 1.2 Gateway to 37XX - Key Parameters

### **Notes - Attachment to a Token-Ring Connected 37XX**

1. The gateway DSPU definition is done in a switched major node via PU and LUs statements. One LU statement is defined per required workstation. If a printer session is required, your host programmers should use a different MODETAB statement.
2. IDBLK=05D must be used.
3. The node ID (in hex) must match the IDNUM parameter specified at the host. This number is different for each of the DSPUs.
4. The DIALNO parameter needs to be coded only if the host will be attempting to establish sessions with the DSPU. The last 12 digits are the PC's Token-Ring Network adapter locally administered address. The first four digits specify the port address to use (first two digits) and the SAP of the OS/2 3270 emulation (second two digits).
5. This is the Token-Ring Network adapter address of the 37XX. This is a locally administered address.
6. The network name parameter must match the NETID used in the VTAM start parameters (ATCSTRxx).
7. This must be the address of the Token-Ring adapter installed at the workstation that is being connected to the gateway.
8. This parameter must be unique for every workstation LU profile created at the gateway. It really means that the gateway is distributing the LU local addresses defined in VTAM, among the workstations that the gateway is going to control downstream. The workstations themselves can assign a different local address to refer to the same LU (the gateway makes the required mapping).
9. This must be the address of the Token-Ring adapter installed at the workstation that is being connected to the gateway.
10. This must be the address of the Token Ring adapter installed at the gateway.
11. For the Workstation Program, dxmc1mod.sys must be used. For the 3270 Emulation Program and for the Personal Communications/3270, dxmc0mod.sys must be used.

## 62.7 SDLC Gateway to S/370 Host

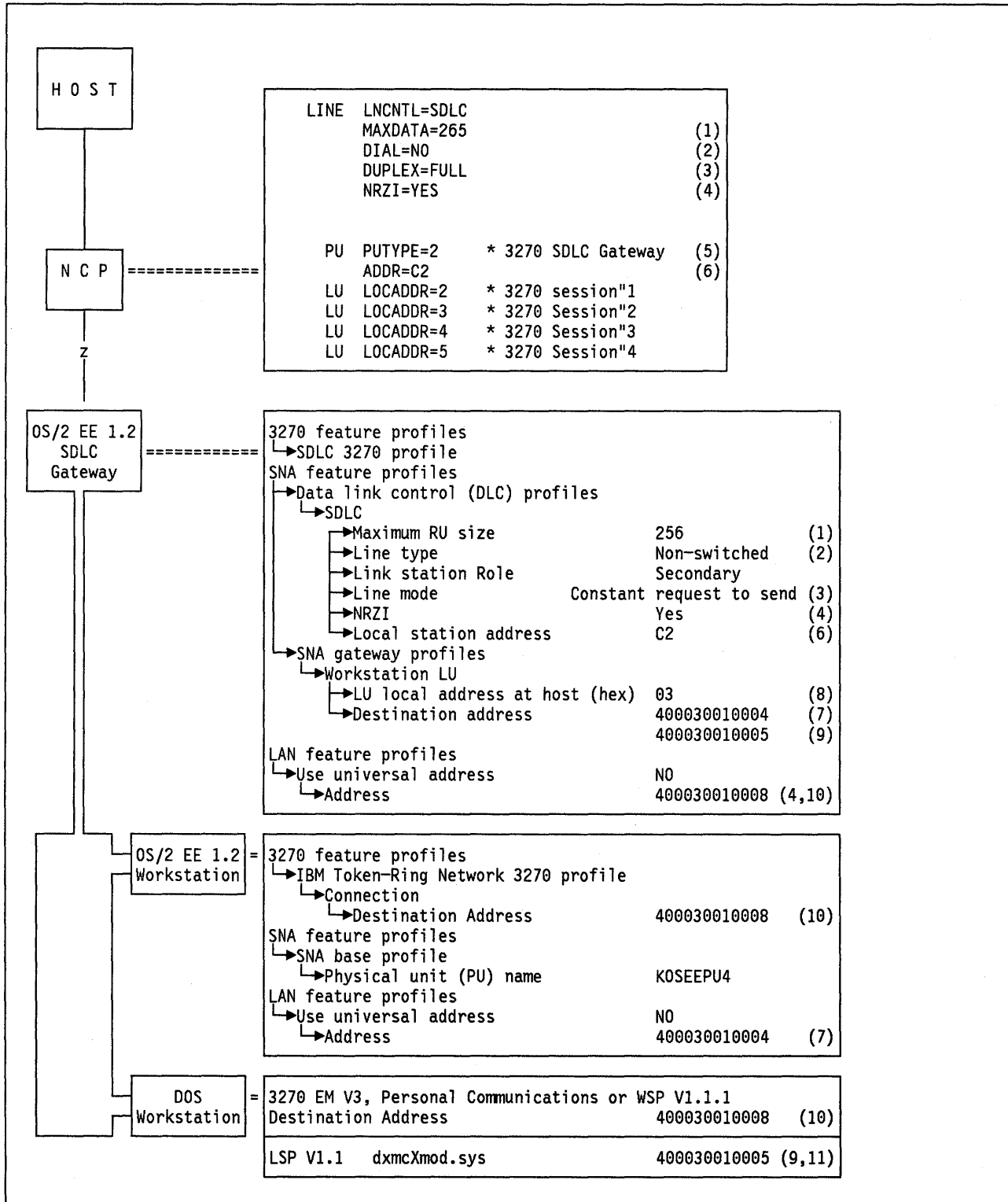


Figure 230. OS/2 EE 1.2 SDLC Gateway

### **Notes - Connection through and 3270 SDLC Gateway**

1. Maximum RU size plus 9, must match MAXDATA parameter in NCP definitions.
2. Line type corresponds to DIAL parameter in NCP definitions (non-switched and DIAL=NO refer to a leased line; switched and DIAL=YES refer to a switched line).
3. Line mode corresponds to DUPLEX parameter in NCP definitions and they deal with the way the modems are communicating with each other (Constant request to send and DUPLEX=FULL mean full-duplex communication; turn around required and DUPLEX=HALF mean half-duplex communication).
4. NRZI must match with NRZI in the NCP definitions (YES or NO).
5. The SDLC gateway and all its associated displays and printers must be defined in the host by PU and LU statements. If a printer session is required, your host programmers should use a different MODETAB statement.
6. The local station address must match the ADDR parameter of the PU macro in the NCP definitions.
7. This must be the address of the Token-Ring adapter installed at the workstation that is being connected to the gateway.
8. This parameter must be unique for every workstation LU profile created at the gateway. It really means that the gateway is distributing the LU local addresses defined in VTAM, among the workstations that the gateway is going to control downstream. The workstations themselves can assign a different local address to refer to the same LU (the gateway makes the required mapping).
9. This must be the address of the Token-Ring adapter installed at the workstation that is being connected to the gateway.
10. This must be the address of the Token-Ring adapter installed at the gateway.
11. For the Workstation Program, dxmc1mod.sys must be used. For the 3270 Emulation Program and for the Personal Communications/3270, dxmc0mod.sys must be used.



---

## **Chapter 63. AS/400 Connected to a S/370 Host Scenarios**

The following pages present the parameters and parameter relationship required to set up the communication of an AS/400 System to an SNA host across a Token-Ring Network.

The scenarios covered are:

1. AS/400 3270 Device emulation accessing a S/370 host
2. AS/400 RJE facilities accessing a S/370 host
3. AS/400 APPC to S/370 host CICS.



# 63.1 AS/400 3270 Device Emulation Accessing a S/370 Host

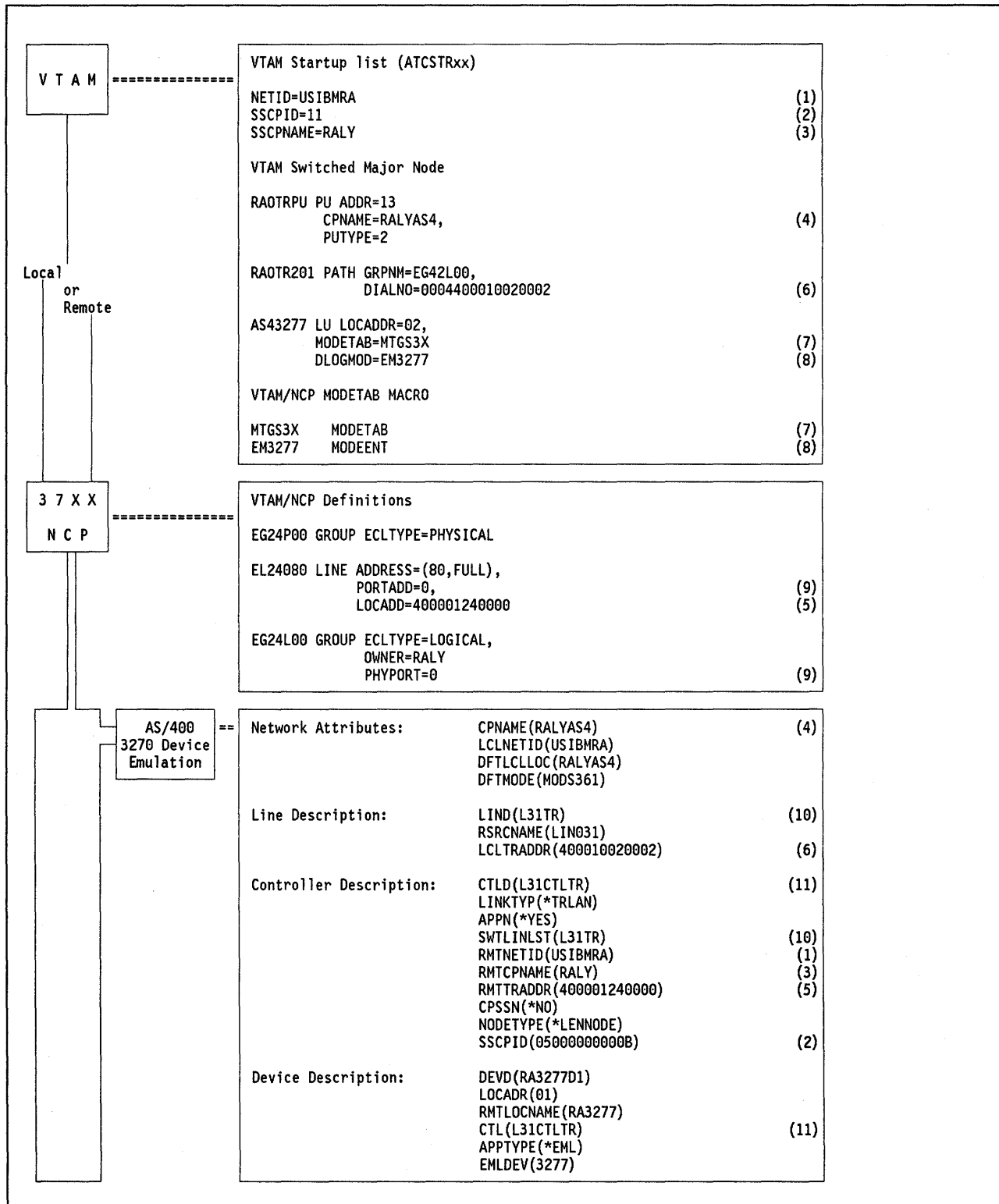


Figure 231. AS/400 3270 Device Emulation Accessing a S/370 Host

## Notes - AS/400 3270 Device Emulation to S/370

The AS/400 can be supported by VTAM and NCP as a T2.1 node. To provide the support, VTAM must be at Version 3 Release 2 and NCP must be at either Version 4 Release 3 or Version 5 Release 2.

This support allows the AS/400 (as a T2.1 node) to establish LU-LU sessions with other T2.1 nodes through the subarea network as well as LU-LU sessions with the subarea network itself. Due to this potential benefit, the definitions are given for T2.1 node which supports transparently the traditional dependent LUs used for applications like 3270 DE, RJE, DSNX, DHCF, etc. when the LU-LU sessions are established with the host. The parameter APPN(\*YES) in the controller description configuration enables the AS/400 as a T2.1 node.

1. This is the network ID in which the S/370 host resides. It must match the RMTNETID parameter defined in the controller description at the AS/400.
2. The SSCPID parameter is checked as part of the exchange ID. Its value in the VTAM start parameters must match the value specified in controller description at the AS/400. This parameter is mandatory if you define the AS/400 as an APPN-LEN node. Note that the specification in VTAM is decimal, and it is hexadecimal in the AS/400 (preceded by 0500000000).
3. This is the control point name for VTAM and must match the RMTCPNAME in the controller description at the AS/400.
4. CPNAME is a new parameter for the PU macro. It must match the CPNAME parameter in the network attributes defined at the AS/400. It is used to identify the T2.1 node to VTAM during the establishment of a switched connection (instead of IDBLK and IDNUM which can still be used).
5. This is the MAC address of the Token-Ring adapter at the S/370 host gateway and must match the parameter RMTTRADDR in the controller description at the AS/400.
6. This address is used when the S/370 host initiates the session establishment. The first two digits indicate the TIC number. The second two digits is the SAP address used to communicate to the AS/400 and the last 12 digits specify the MAC address of the Token-Ring adapter installed at the AS/400. This MAC address is specified with the LCLTRADDR parameter in the line description at the AS/400.
7. This is the name of the table containing the logmode entries.
8. This is the logmode entry used for the 3270 device emulation which specifies:  
FMPROF=X'03', TSPROF=X'03', PRIPROT=X'B1',  
SECPROT=X'90', COMPROT=X'3080',  
RUSIZES=X'A8A8', PSERVIC=X'020000000000000000000200
9. This is the physical address for the TIC. It must be specified in the LINE and in the GROUP macros.
10. This is the name of the line description configuration and the controller description configuration refers to it by the SWTLINLST parameter.
11. This is the name of the controller description configuration and the device description configuration refers to it by the CTL parameter.

## 63.2 AS/400 RJE Facilities Accessing a S/370 Host

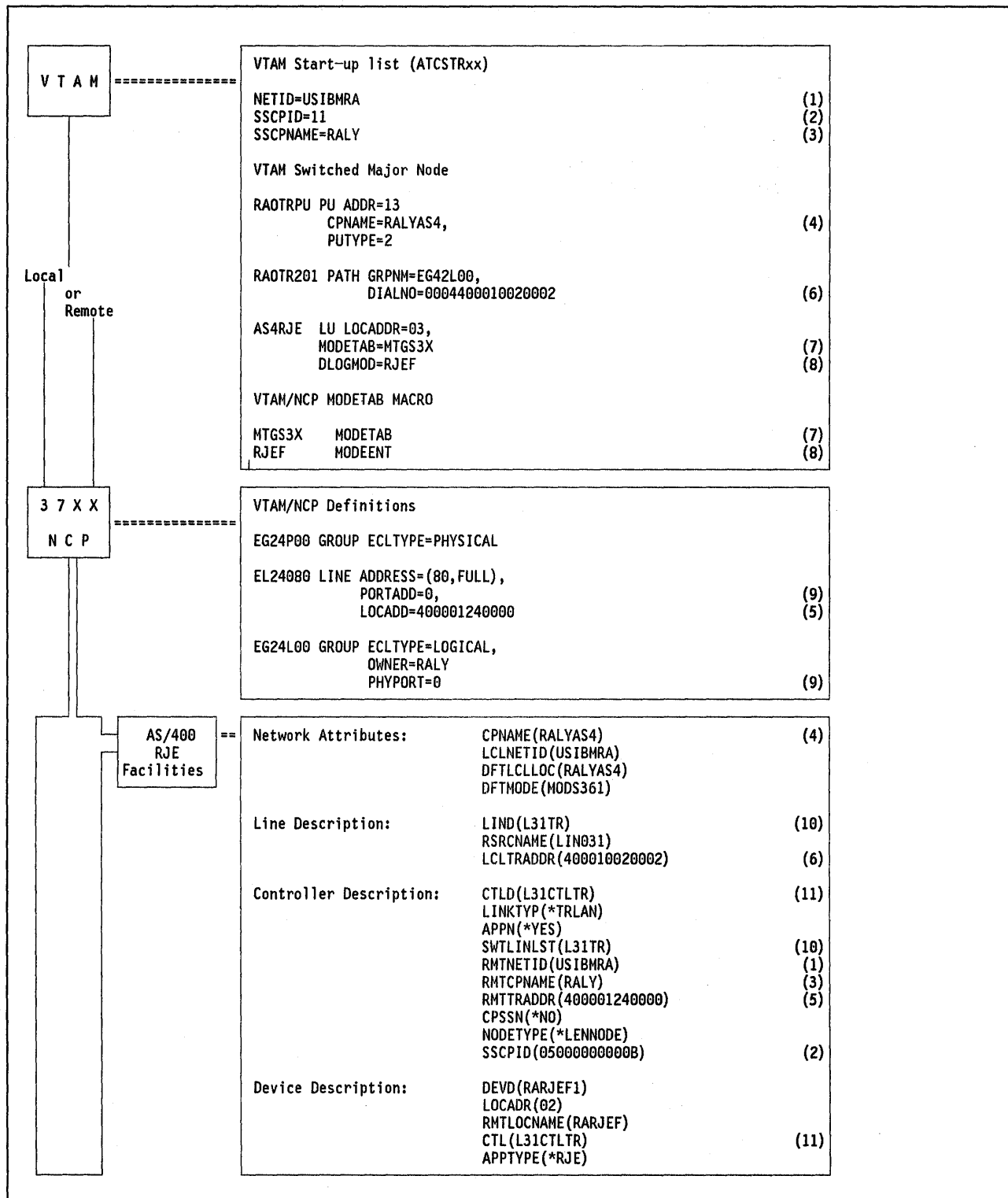


Figure 232. AS/400 RJE Facilities Accessing a S/370 Host

## Notes - AS/400 RJE Facilities to a S/370

The AS/400 can be supported by VTAM and NCP as a T2.1 node. To provide the support, VTAM must be at Version 3 Release 2 and NCP must be at either Version 4 Release 3 or Version 5 Release 2.

This support allows the AS/400 (as a T2.1 node) to establish LU-LU sessions with other T2.1 nodes through the subarea network as well as LU-LU sessions with the subarea network itself. Due to this potential benefit, the definitions are given for T2.1 node which supports transparently the traditional dependent LUs used for applications like 3270 DE, RJE, DSNX, DHCF, etc. when the LU-LU sessions are established with the host. The parameter APPN(\*YES) in the controller description configuration enables the AS/400 as a T2.1 node.

1. This is the network ID in which the S/370 host resides. It must match the RMTNETID parameter defined in the controller description at the AS/400.
2. The SSCPID parameter is checked as part of the exchange ID. Its value in the VTAM start parameters must match the value specified in controller description at the AS/400. This parameter is mandatory if you define the AS/400 as an APPN-LEN node. Note that the specification in VTAM is decimal, and it is hexadecimal in the AS/400 (preceded by 0500000000).
3. This is the control point name for VTAM and must match the RMTCPNAME in the controller description at the AS/400.
4. CPNAME is a new parameter for the PU macro. It must match the CPNAME parameter in the network attributes defined at the AS/400. It is used to identify the T2.1 node to VTAM during the establishment of a switched connection (instead of IDBLK and IDNUM which can still be used).
5. This is the MAC address of the Token-Ring adapter at the S/370 host gateway and must match the parameter RMTRADDR in the controller description at the AS/400.
6. This address is used when the S/370 host initiates the session establishment. The first two digits indicate the TIC number. The second two digits is the SAP address used to communicate to the AS/400 and the last 12 digits specify the MAC address of the Token-Ring adapter installed at the AS/400. This MAC address is specified with the LCLTRADDR parameter in the line description at the AS/400.
7. This is the name of the table containing the logmode entries.
8. This is the logmode entry used for the RJE facilities which specifies:  
FMPROF=X'03', TSPROF=X'03', PRIPROT=X'A1',  
SECPROT=X'A1, COMPROT=X'7080',  
SRCVPAC=X'07', SSNDPAC=X'07', RUSIZES=X'8888', PSERVIC=X'011020
9. This is the physical address for the TIC. It must be specified in the LINE and in the GROUP macros.
10. This is the name of the line description configuration and the controller description configuration refers to it by the SWTLINLST parameter.
11. This is the name of the controller description configuration and the device description configuration refers to it by the CTL parameter.

### 63.3 AS/400 APPC to S/370 Host CICS

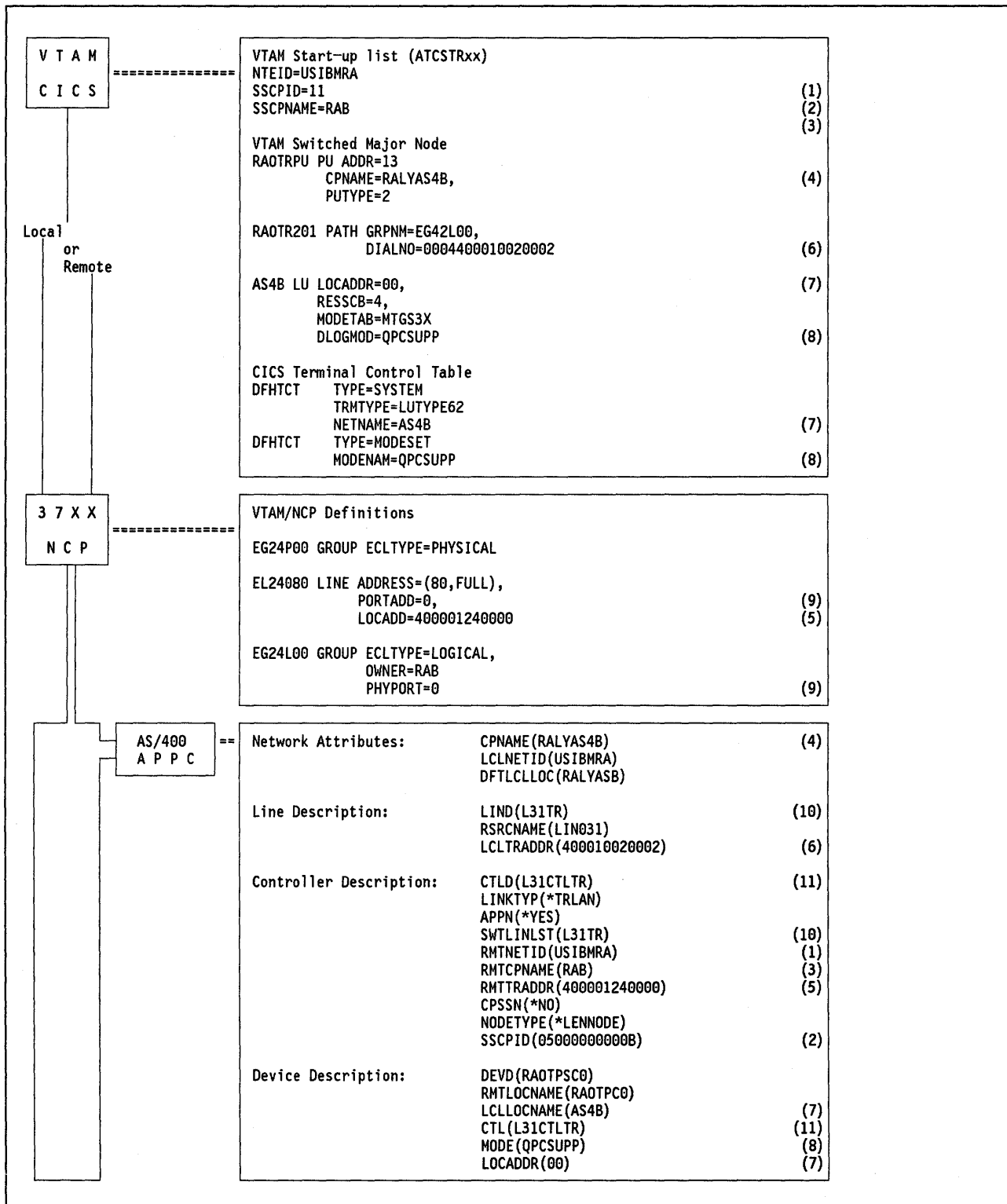


Figure 233. AS/400 APPC to S/370 Host CICS - Key Parameters

## Notes - AS/400 APPC to S/370 Host CICS

The AS/400 can be supported by VTAM and NCP as a T2.1 node. To provide the support, VTAM must be at Version 3 Release 2 and NCP must be at either Version 4 Release 3 or Version 5 Release 2.

This support allows the AS/400 to establish parallel sessions between a local LU and its partner LU at the subarea network. Due to this potential benefit, the definitions are given for T2.1 node. The parameter APPN(\*YES) in the controller description configuration enables the AS/400 as a T2.1 node.

1. This is the network ID in which the S/370 host resides. It must match the RMTNETID parameter defined in the controller description at the AS/400.
2. The SSCPID parameter is checked as part of the exchange id. Its value in the VTAM start parameters must match the value specified in controller description at the AS/400. This parameter is mandatory if you define the AS/400 as an APPN-LEN node. Note that the specification in VTAM is decimal, and it is hexadecimal in the AS/400 (preceded by 0500000000).
3. This is the control point name for VTAM and must match the RMTCPNAME in the controller description at the AS/400.
4. CPNAME is a new parameter for the PU macro. It must match the CPNAME parameter in the network attributes defined at the AS/400. It is used to identify the T2.1 node to VTAM during the establishment of a switched connection (instead of IDBLK and IDNUM which still can be used).
5. This is the MAC address of the Token-Ring adapter at the S/370 host gateway and must match the parameter RMTTRADDR in the controller description at the AS/400.
6. This address is used when the S/370 host initiates the session establishment. The first two digits indicate the TIC number. The second two digits is the SAP address used to communicate to the AS/400 and the last 12 digits specify the MAC address of the Token-Ring adapter installed at the AS/400. This MAC address is specified with the LCLTRADDR parameter in the line description at the AS/400.
7. The label for the LU macro specified in VTAM, must be used as the NETNAME parameter in the CICS DFHTCT table to link the terminal to the LU. Also, note that the LU LOCADDR parameter in VTAM as well as the LOCADDR parameter in the device description at the AS/400 is set to "00" which means that independent LUs will be used to establish the LU-LU session.
8. This is the logmode entry used for APPC. It is overridden by CICS default parameters or by the LOGMODE parameter specified in the DFHTCT table.
9. This is the physical address for the TIC. It must be specified in the LINE and in the GROUP macros.
10. This is the name of the line description configuration and the controller description configuration refers to it by the SWTLINLST parameter.
11. This is the name of the controller description configuration and the device description configuration refers to it by the CTL parameter.



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## Chapter 64. APPC/PC Scenarios

The following pages present the parameters and parameter relationship required to set up the communication of a station running the APPC/PC program to other stations across a Token-Ring Network.

The scenarios covered are:

1. APPC/PC connection via a remote 3174 Token-Ring gateway
2. APPC/PC connection via a local 3174 Token-Ring gateway
3. APPC/PC connection via a Token-Ring-Attached 9370
4. APPC/PC connection via a Token-Ring-Attached 37XX communications controller



## 64.1 APPC/PC Connection via Remote 3174 Gateway

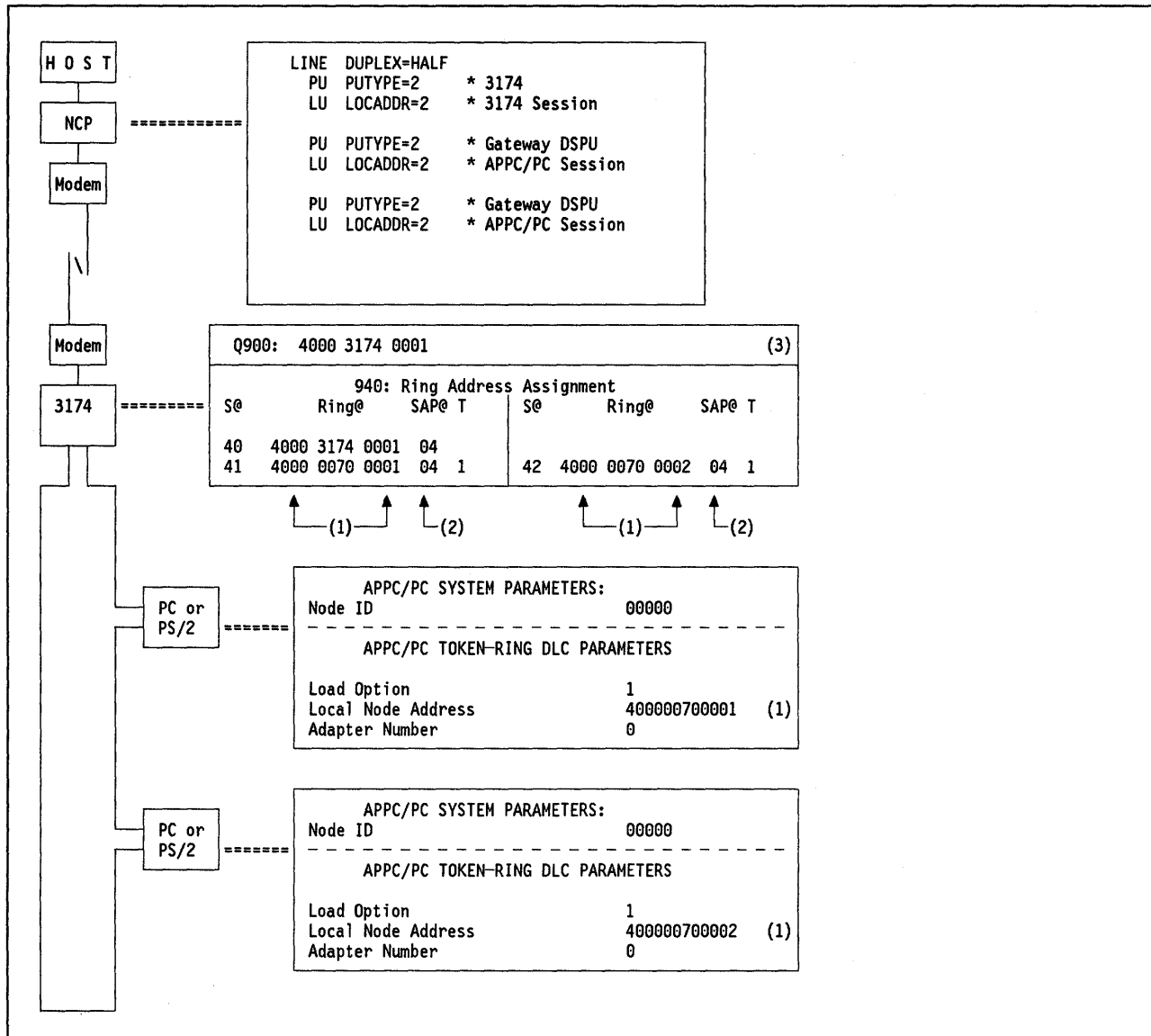


Figure 234. APPC/PC via Remote 3174 Gateway - Key Parameters

### Notes:

1. This is the Token-Ring address of the PC in which APPC/PC resides.
2. The SAP@ must be specified as 04 for APPC/PC.
3. The address specified here is the gateway's locally administered address. It should be known by the APPC/PC user application program to establish the communication.

## 64.2 APPC/PC Connection via a Local 3174 Gateway

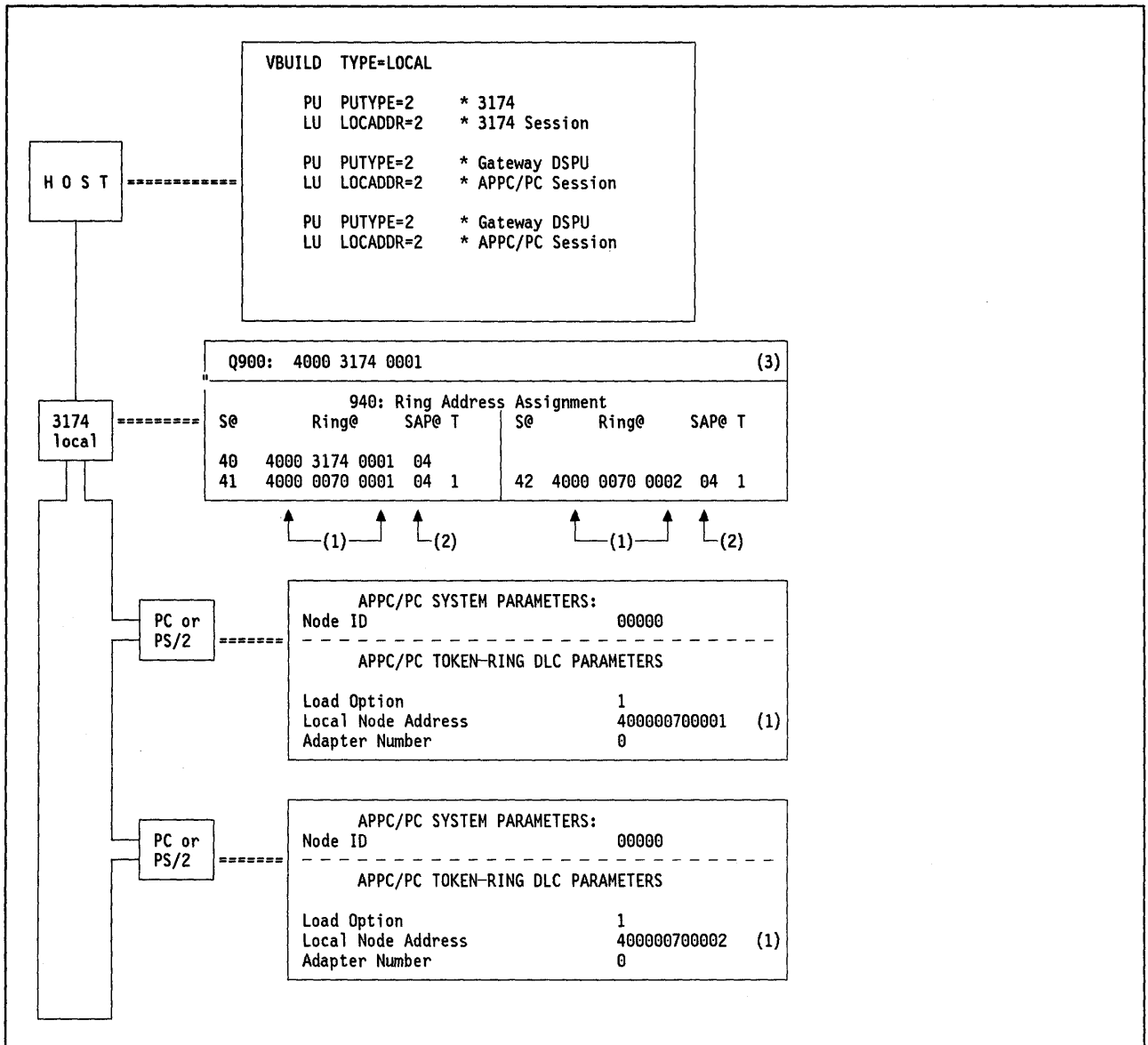


Figure 235. APPC/PC to Local 3174 Gateway - Key Parameters

### Notes:

1. This is the Token-Ring address of the PC in which APPC/PC resides.
2. The SAP@ must be specified as 04 for APPC/PC.
3. The address specified here is the gateway's locally administered address. It should be known by the APPC/PC user application program to establish the communication.

## 64.3 APPC/PC Connection via a Token-Ring attached 9370

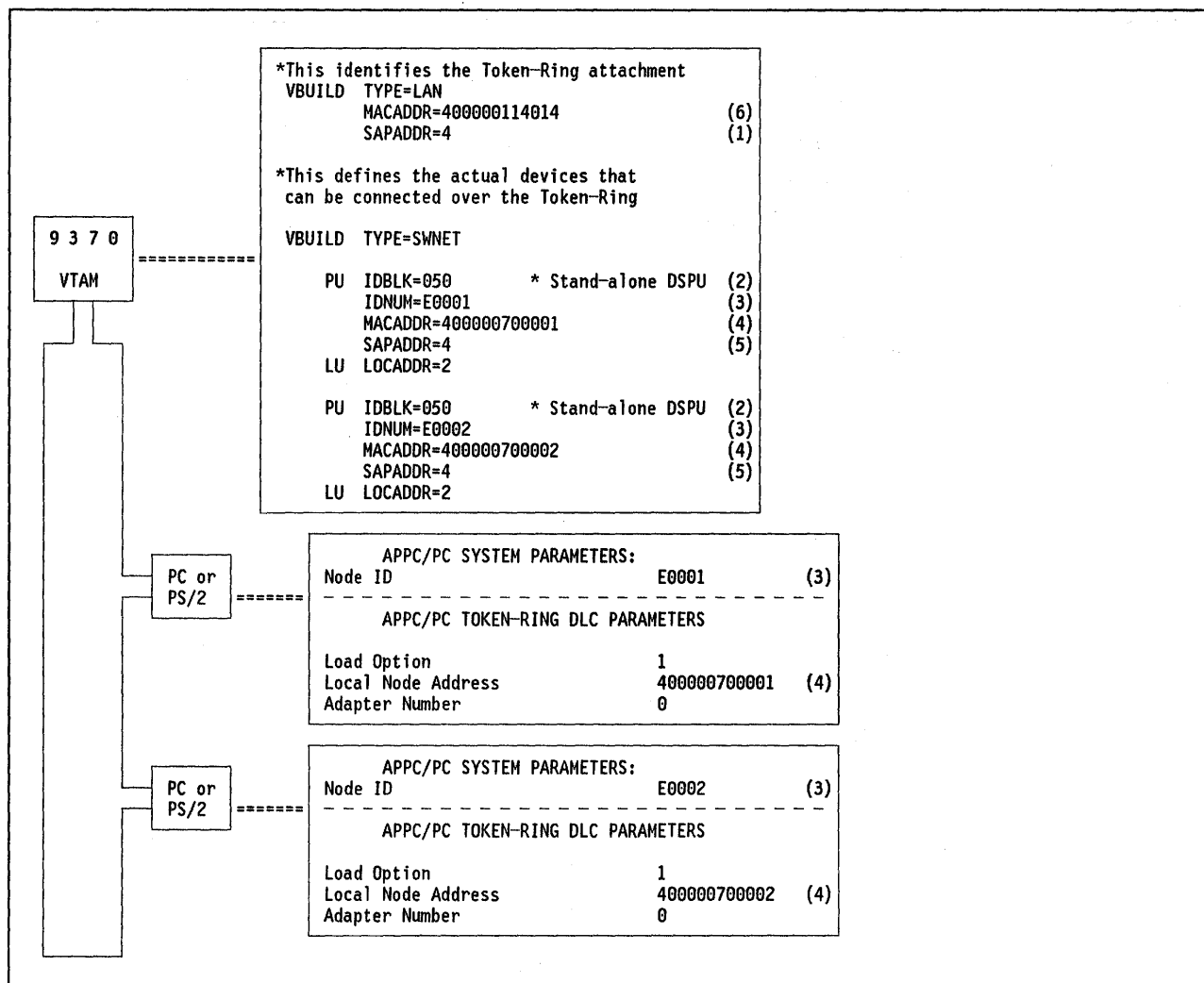


Figure 236. APPC/PC to 9370 - Key Parameters

### Notes:

1. This is the SAP address of the 9370. It must be set to 4 to enable APP/PC to communicate with the 9370.
2. IDBLK must be 050 for APPC/PC.
3. IDNUM must match the node ID specified in APPC/PC.
4. This is the locally administered address of the PC Token-Ring Adapter.
5. This is the SAP of the APPC/PC. It must be coded as 4.
6. The address specified here is the 9370 Token-Ring subsystem's locally administered address. It should be known by the APPC/PC user application program to establish the communication.

## 64.4 APPC/PC Connection via a Token-Ring Attached 37XX

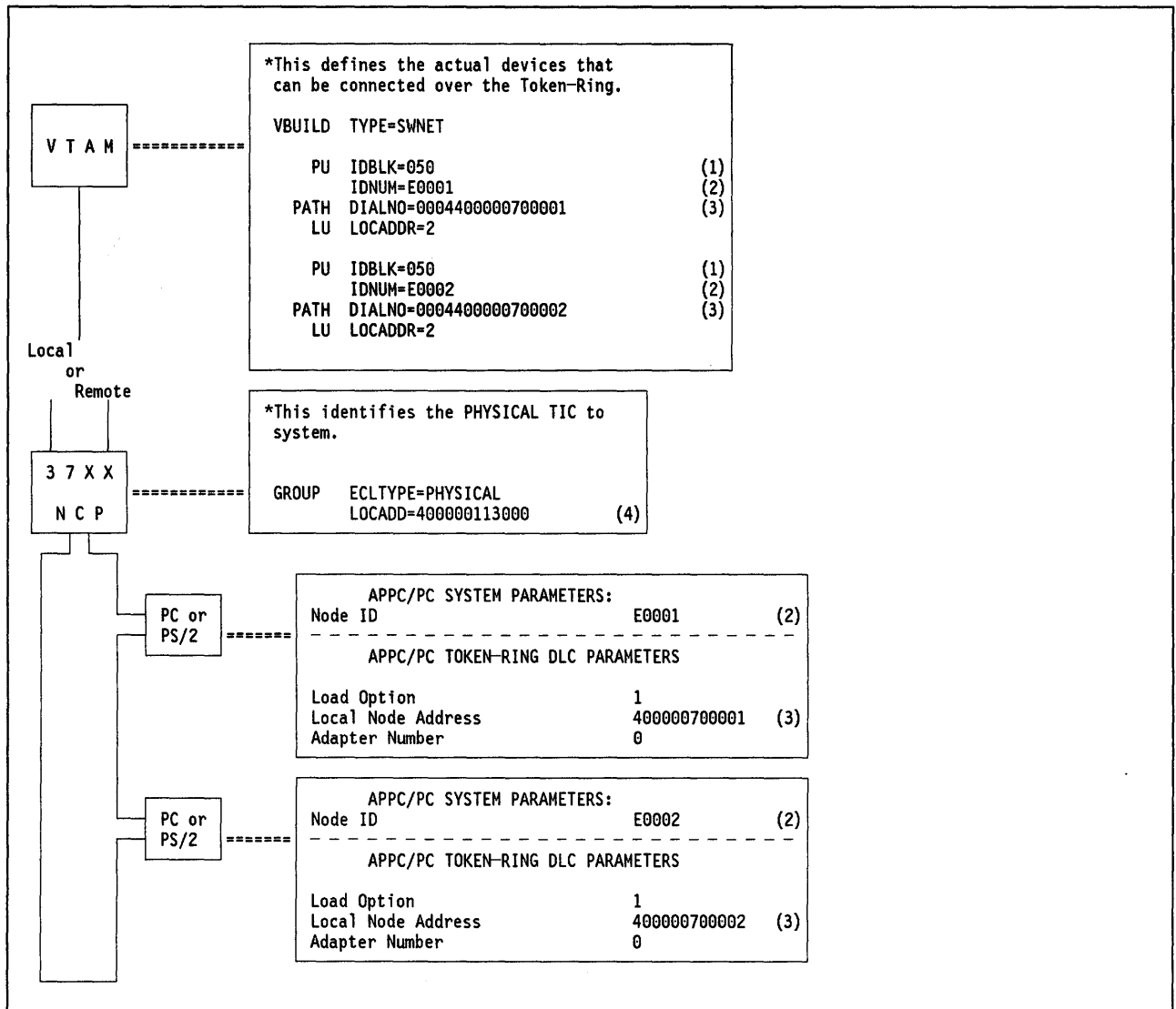


Figure 237. APPC/PC to 37XX - Key Parameters

### Notes.

1. This must be coded as 050 for APPC/PC.
2. IDNUM must match the node ID specified in the APPC/PC definition.
3. The DIALNO parameter only needs to be coded if the host will be attempting to establish sessions with the workstation (for dial-out operations). The last 12 digits are the PC's Token-Ring adapter locally administered address. The first four digits specify the port address to use (first two digits) and the SAP of the APPC/PC program (second two digits).
4. The address specified here is the gateway's locally administered address. It should be known by the APPC/PC program to establish the communication.



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## Chapter 65. TCP/IP Scenarios in a Token-Ring Environment

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### 65.1 Description

Although the scenario on the next page contains the basic parameters to configure TCP/IP in each of the nodes connected to the Token-Ring, it is followed with a complete set of common TCP/IP definitions and HELP text for an MVS system to run TCP applications.

# 65.1.1 TCP/IP Token-Ring Test Scenario

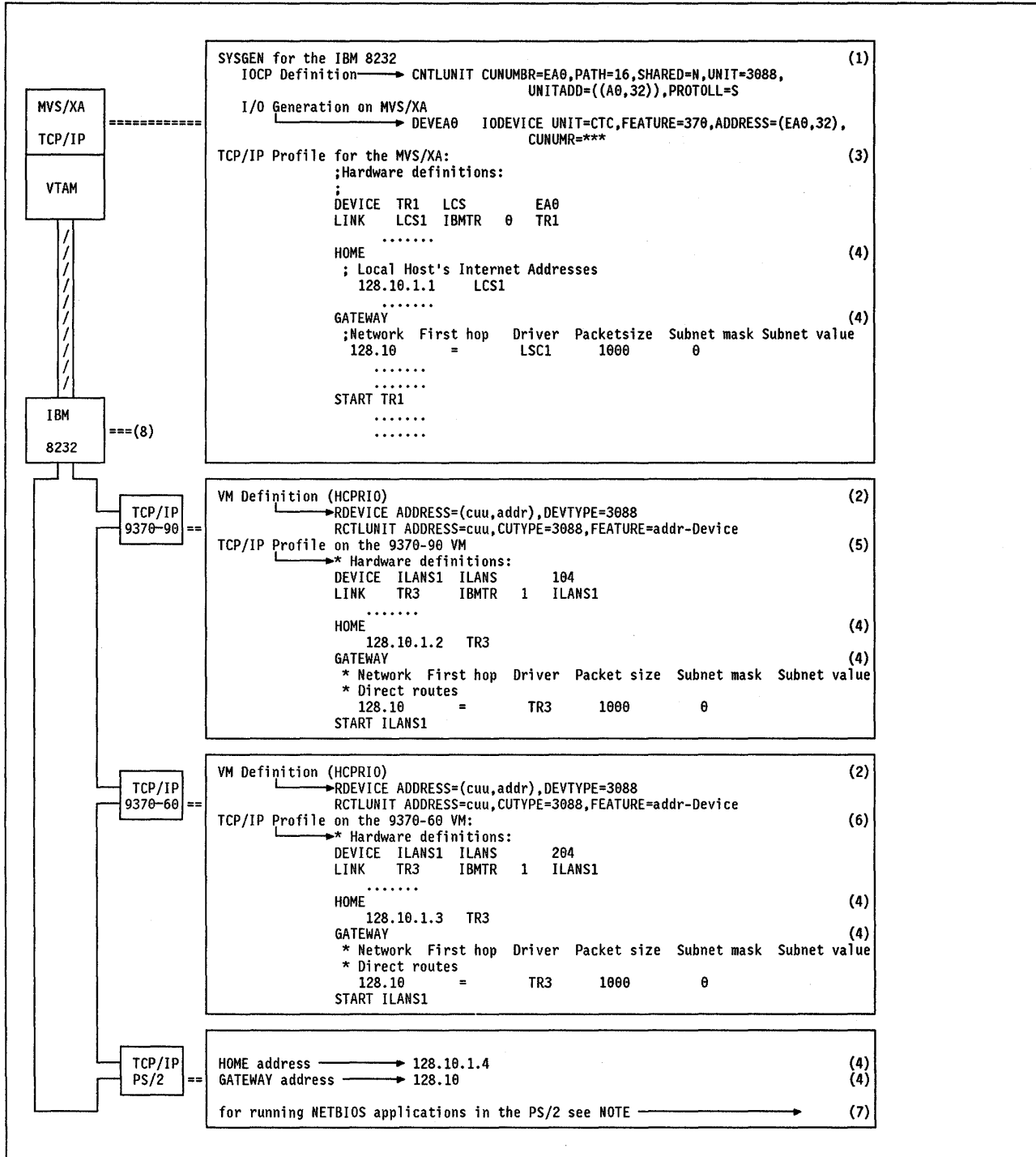


Figure 238. TCP and Token-Ring Network - Key Parameters

## Notes - TCP/IP Token-Ring Test Scenario

1. Each IBM 8232 channel attachment must have a Unit Control Word (UCW) or Input/Output Control Program (IOCP) definition in the host to which the IBM 8232 is attached. A IBM 8232 Model 2 with two IBM 7532's will require two such definitions. The IBM 8232 is defined as a 3088 channel-to-channel (CTC) unit with 32 or 64 subchannel addresses. The IBM 8232 should always be defined with 32 subchannel addresses (64 is an option). Only two subchannels are used (base address and base address+1) for send and receive.
2. The 8232 must be defined to the VM operating system. This definition is accomplished by updating the real I/O configuration file with entries for the 8232 in the RDEVICE and RCTLUNIT macros.
3. Update the TCPIP.PROFILE.TCPIP. configuration data set to define the Token-Ring Network (include DEVICE, LINK and START statements).

These are the Token-Ring definitions from the TCP/IP profile which were used for the Token-Ring test installation. The complete TCP/IP profile can be found in "TCP/IP Common Definitions" on page 558.

The hardware definitions have the following format:

```
DEVICE device-name device-type device-address
LINK link-name link-type link-number device-name
```

4. The Internet addresses which were used for the Token-Ring connection have to be defined by the Home and Gateway statements in the TCPIP.PROFILE.TCPIP data set on each system. On the PS/2 the definitions can be entered with the CUSTOM command.
5. These are the Token-Ring definitions from the TCP/IP profile which were used for the Token-Ring test installation. The complete TCP/IP profile can be found in "PROFILE TCPIP Data Set on the 9370-90 VM System" on page 566.

The hardware definitions have the following format:

```
DEVICE device-name device-type device-address
LINK link-name link-type link-number device-name
```

6. These are the Token-Ring definitions from the TCP/IP profile which were used for the Token-Ring test installation. The complete TCP/IP profile can be found in "PROFILE TCPIP Data Set on the 9370-60 VM System" on page 568.

The hardware definitions have the following format:

```
DEVICE device-name device-type device-address
LINK link-name link-type link-number device-name
```

7. A resident program, OPENMON.COM, is provided to allow the TCP/IP programs to co-exist with other IBM Token-Ring programs such as the LAN Support Program.

If you are using the IBM PC LAN Support program, OPENMON should be loaded before executing a NETBIOS program that causes the network interface to be opened.

8. Installation and customization of the 8232 should be done as described in "Installation Steps" on page 25.



## 65.2 TCP/IP Common Definitions

### 65.2.1 TCPIP Procedure

```
//TCPIP PROC MODULE='TCPIP',PARMS='NOSP/IE/'
//*****
//*
//* TCP/IP for MVS (tm) Release 1
//*
//* 5685-061 Copyright IBM Corp. 1988, 1989
//*
//*****
//MIRIAM EXEC PGM=MVPMAIN,
// PARM='&MODULE,ERRFILE(SYSERR),HEAP(512),&PARMS',
// REGION=7500K,TIME=1440
//STEPLIB DD DSN=TCPIP.D0508.TCPLIB,DISP=SHR
//SYSPRINT DD SYSOUT=L
//SYSERR DD SYSOUT=L
//SYSDEBUG DD SYSOUT=L
//*
//* The configuration parameters for TCPIP will be read
//* from a dataset with name TCPIP.nodename.TCPIP or with
//* name TCPIP.PROFILE.TCPIP. See the chapter on
//* "Configuring the TCPIP Address Space" in the Installation
//* and Maintenance Manual for more information.
//* A sample of such a profile is included in member
//* SAMPPROF of the INSTALL dataset.
//*
```

### 65.2.2 FTPSERVE Procedure

```
//FTPSERVE PROC MODULE='FTPSERVE',PARMS='NOSP/IE/'
//*****
//*
//* TCP/IP for MVS (tm) Release 1
//*
//* 5685-061 Copyright IBM Corp. 1988, 1989
//*
//*****
//MEIKE EXEC PGM=MVPMAIN,
// PARM='&MODULE,ERRFILE(SYSERR),HEAP(512),&PARMS',
// REGION=7500K,TIME=1440
//STEPLIB DD DSN=TCPIP.D0508.TCPLIB,DISP=SHR
//SYSIN DD DUMMY
//OUTPUT DD SYSOUT=*
//SYSPRINT DD SYSOUT=*
//SYSERR DD SYSOUT=*
//SYSDEBUG DD SYSOUT=*
```

### 65.2.3 SMTP Procedure

```
//SMTP PROC MODULE=SMTP,DEBUG=,PARMS='/ ',SYSERR=SYSERR
//*****
//*
//* TCP/IP for MVS (tm) Release 1
//*
//* 5685-061 Copyright IBM Corp. 1988, 1989
//*
//*****
//MAREN EXEC PGM=MVPMMAIN,
// PARM='&MODULE, PARM=&DEBUG,ERRFILE(&SYSERR),&PARMS',
// REGION=8000K,TIME=1440
//STEPLIB DD DSN=TCPIP.D0619.TCPLIB,DISP=SHR
//SYSPRINT DD SYSOUT=*
//SYSERR DD SYSOUT=*
//SYSDEBUG DD SYSOUT=*
//OUTPUT DD SYSOUT=*
//BUGFILE DD DSN=TCPIP.SMTP.BUGFILE,DISP=SHR
//LOGFILE DD DSN=TCPIP.SMTP.LOGFILE,DISP=MOD
//*
//* SMTPNJE is the output of the SMTPNJE command.
//* Before running SMTP you should use the SMTPNJE command
//* to create the dataset and the you may remove the
//* "*" from the following line to activate SMTPNJE.
//*SMTPNJE DD DSN=TCPIP.SMTP.NJE.HOSTINFO,DISP=SHR
//*
//* CONFIG is pointed to a sample configuration member.
//* Before running SMTP you should modify
//* that member to produce a dataset
//* suitable for your installation.
//* Refer to the Chapter "Configuring the SMTP Server"
//* in the Installation and Maintenance Manual.
//CONFIG DD DSN=SMTP.SMTP.CONFIG,DISP=SHR
```

### 65.2.4 TCPIP.PROFILE.TCPIP Data Set on the MVS/XA System

```
; This is a sample configuration file for the TCPIP address space.
; The POOL sizes listed are the default values and need not be
; specified. The device configuration statements MUST be changed
; to match your hardware and software configuration.
; The BEGINVTAM section must be changed to match your VTAM
; configuration. It is recommended that you establish a
; TCP maintenance user-id and all occurrences of TCPMAINT be
; changed to that user-id. For more information about this
; file, see "Configuring the TCPIP Address Space" and
; "Configuring the Telnet Server" in the Installation and
; Maintenance Manual.
;
ACBPPOOLSIZE 1000
CCBPPOOLSIZE 150
DATABUFFERPOOLSIZE 160
ENVELOPEPOOLSIZE 750
LARGENVELOPEPOOLSIZE 50
SCBPPOOLSIZE 256
TCBPPOOLSIZE 256
UCBPPOOLSIZE 30
;
NOTRACE SCREEN
; TRACE ALL NOSCREEN
; MORETRACE ALL NOSCREEN
INFORM WTCR14 FRICK ENDINFORM
OBEY WTCR14 FRICK ENDOBEY
; Set Telnet timeout to 10 minutes
INTERNALCLIENTPARMS TIMEMARK 600 ENDINTERNALCLIENTPARMS
```

```

;
; Hardware definitions:
;
DEVICE TR1 LCS EA0
LINK LCS1 IBMTR 0 TR1
;
DEVICE NPSI1 X25NPSI TCPIPX25
LINK NPSIL1 IUCV 1 NPSI1
;
DEVICE RAKSNAA SNAIUCV SNALINK AD114TC1 SNALINK
LINK SNA1 IUCV 1 RAKSNAA
;
AUTOLOG
; FTPSERVE ; FTP server
; SMTP ; SMTP server
ENDAUTOLOG
;
PORT
; Values from RFC 1010, "Assigned numbers"
21 TCP FTPSERVE ; FTP server
20 TCP FTPSERVE NOAUTOLOG ; FTP default data port
23 TCP INTCLIEN ; Telnet server
25 TCP SMTP ; SMTP server
;
HOME
; Local host's Internet addresses
128.10.1.1 LCS1
128.12.1.1 SNA1
128.13.1.1 NPSIL1
;
GATEWAY
; Network First hop Driver Packet size Subnet mask Subnet value
; direct route
128.10 = LCS1 1000 0
128.12 = SNA1 2000 0
128.13 = NPSIL1 1024 0
; indirect route
128.11 128.12.1.2 SNA1 2000 0
;
; Define the VTAM parameters required for the TELNET server
BEGINVTAM
; Define logon mode tables to be the defaults shipped with the lates
; level of VTAM
LINEMODE IBM3767 ; LINEMODETERMINAL
3277 D4B32702 ; 32 line screen - default of NSX32702 is 24 line screen
3278-2-E NSX32702 ; 48 line screen - default of NSX32702 is 24 line screen
3278-2 D4B32782 ; 48 line screen - default of NSX32702 is 24 line screen
3278-3-E NSX32702 ; 48 line screen - default of NSX32702 is 24 line screen
3278-3 D4B32783 ; 48 line screen - default of NSX32702 is 24 line screen
3278-4-E NSX32702 ; 48 line screen - default of NSX32702 is 24 line screen
3278-4 D4B32784 ; 48 line screen - default of NSX32702 is 24 line screen
3278-5-E NSX32702 ; 48 line screen - default of NSX32702 is 24 line screen
3278-5 D4B32784 ; 48 line screen - default of NSX32702 is 24 line screen
3279-2-E NSX32702 ; 48 line screen - default of NSX32702 is 24 line screen
3279-2 D4B32782 ; 48 line screen - default of NSX32702 is 24 line screen
3279-3-E NSX32702 ; 32 line screen - default of NSX32702 is 24 line screen
3279-3 D4B32783 ; 48 line screen - default of NSX32702 is 24 line screen
3279-4-E NSX32702 ; 32 line screen - default of NSX32702 is 24 line screen
3279-4 D4B32784 ; 48 line screen - default of NSX32702 is 24 line screen
3279-5-E NSX32702 ; 32 line screen - default of NSX32702 is 24 line screen

```

```

3279-5 D4B32785 ; 48 line screen - default of NSX32702 is 24 line screen
;
; Define the LUs to be used for general users
DEFAULTLUS
 TCP00001 TCP00002 TCP00003 TCP00004 TCP00005
 TCP00006 TCP00007 TCP00008 TCP00009 TCP00010
 TCP00011 TCP00012 TCP00013 TCP00014 TCP00015
 TCP00016 TCP00017 TCP00018 TCP00019 TCP00020
 TCP00021 TCP00022 TCP00023 TCP00024 TCP00025
 TCP00026 TCP00027 TCP00028 TCP00029 TCP00030
ENDEFAULTLUS
;
DEFAULTAPPL RAKAA ; Set the default application for all TELNET session
;
ALLOWAPPL RAKAT* DISCONNECTABLE ; Allow all users access to TSO application
 ; TSO is multiple applications all beginning with TSO so use
 ; the * to get them all. If a session is closed, disconnect
 ; the user rather than log off the user.
;
ALLOWAPPL * ; Allow all applications that have not been previously
 ; specified to be accessed
;
ENDVTAM
;
START TR1
START NPSI1
START RAKSNA
;

```

## 65.2.5 TCPIP.DATA Data Set on the MVS/XA System

```

;*****
;
; Name of File: TCPIP.DATA
;
; This data set, TCPIP.DATA, is used to specify configuration
; information required by TCP/IP client programs.
;
; Syntax Rules for the TCPIP.DATA configuration data set:
;
; (a) All characters to the right of and including a ';' will be
; treated as a comment.
;
; (b) Blanks and <end-of-line> are used to delimit tokens.
;
; (c) The format for each configuration statement is:
;
; <SystemName||': '> keyword value
;
; where <SystemName||': '> is an optional label which may be
; specified before a keyword; if present, then the keyword-
; value pair will only be recognized if the SystemName matches
; the node name of the system, as defined in the IEFSSNxx
; PARMLIB member. This optional label permits configuration
; information for multiple systems to be specified in a single
; TCPIP.DATA data set.
;*****
; TCPIPuserid specifies the user-id of the TCPIP address space.
; TCPIP is the default user-id.
;
TCPIP user-id TCPIP

```

```

;
; HostName specifies the TCP host name of this system. If not
; specified, the default HostName will be the node name specified
; in the IEFSSNxx PARMLIB member.
;
; For example, if this TCPIP.DATA data set is shared between two
; systems, MVSXA and MVSESA, then the following two lines will define
; the HostName correctly on each system.
;
RALVSMV6: HostName RALVSMV6
;MVSESA: HostName mvsesa
;
; DomainOrigin specifies the domain origin that will be appended
; to host names passed to the resolver. If a host name contains
; any dots, then the DomainOrigin will not be appended to the
; host name.
;
;DomainOrigin our.edu
;
; NSinterAddr specifies the internet address of the name server.
; Multiple name server addresses may be specified. The name servers
; will be tried in the given order.
; If a name server will not be used, then do not code an NSinterAddr
; statement. This will cause all names to be resolved via host table
; lookup.
;
;NSinterAddr 14.0.0.0
;NSinterAddr 193.0.3.3
;
; NSportAddr specifies the name server port.
; 53 is the default value.
;
;NSportAddr 53
;
; ResolveVia specifies how the resolver is to communicate
; with the Name Server. TCP indicates use of TCP virtual circuits.
; UDP indicates use of UDP datagrams.
; The default is UDP.
;
ResolveVia UDP
;
; ResolverTimeout specifies the time in seconds that therResolver
; will wait while trying to open a TCP connection to the name server,
; or how long it will wait for a response when using UDP.
; Default is 30 seconds.
;
ResolverTimeout 30
;
; ResolverUdpRetries specifies the number of times the resolver should
; retry a query to the name server when using UDP datagrams.
; Default is 1.
;
ResolverUdpRetries 1
;
; End of file.

```

## 65.2.6 TCPIP.HOSTS.LOCAL Data Set on the MVS/XA System

```
HOST : 128.10.1.3, 128.11.1.3, 128.13.1.3 : RAL9360, SYS5 :::
HOST : 128.10.1.2, 128.11.1.2, 128.12.1.2, 128.13.1.2 : RAL9390, SYS7 :::
HOST : 128.10.1.4 : PS2, IBMPS :::
HOST : 128.10.1.1, 128.12.1.1, 128.13.1.1 : RALVSMV6, WTCXA :::
```

## 65.2.7 SMTP.SMTP.CONFIG Data Set on the MVS/XA System

```

;
; Name of File: SMTP CONFIG *
; *
; The SMTP CONFIG file is used to specify runtime options and data *
; to the SMTP virtual machine. *
; *
; Syntax Rules for the SMTP configuration file: *
; *
; (a) All characters to the right of and including a ';' will be *
; treated as a comment. *
; *
; (b) Blanks and <end-of-line> are used to delimit tokens. *
; *

;
; It is recommended that you establish a TCP maintenance user-id
; and put its name in place of TCPMAINT in this file.
;
PORT 25 ; port to accept incoming mail on
POSTMASTER WTCR14 ; where mail addressed to postmaster is spooled
LOOPINGMAIL WTCR14 ; where looping mail is spooled to
LOG ; log all mail delivered in SMTP LOG file
INACTIVE 180 ; timeout for inactive connections
FINISHOPEN 120 ; timeout for opening up TCP connections
RETRYAGE 3 ; keep retrying mail delivery for 3 days
RETRYINT 20 ; retry mail delivery every 20 minutes
MAXMAILBYTES 524288 ; largest mail to accept over a TCP connection
RESOLVERRETRYINT 20 ; Retry pending name resolutions every 20 minutes
RCPTRESPONSEDELAY 60 ; How long to delay RCPT TO: response when waiting
; for an address resolution.
TEMPERORRETRIES 0 ; How many times to retry temporary deliver errors
; default, 0, means retry for RETRYAGE days;
; otherwise the mail is returned after this number
; of deliver attempts.
;
; Configuration for a typical NJE to TCP/IP mail gateway.
;
; GATEWAY ; accept mail from and deliver mail to NJE hosts
; NJEDOMAIN BITNET ; pseudo domain name of associated NJE network
; LOCALFORMAT NETDATA ; local recipients receive mail in Punch format
; LOCALCLASS B ; local recipients mail output class
; NJEFORMAT PUNCH ; NJE recipients receive mail in punch format
; NJECLASS B ; NJE recipients mail output class
;
; Use MAILER option if you run with Columbia Mailer. Specify NEW
; if Columbia Mailer 2.0 or newer; OLD if prior to Version 2.0.
; LOCAL, NJE, and UNKNOWN specify conditions under which mail will
; be forwarded to the MAILER - see the Installation and Maintenance
; manual for further details.
;
;MAILER SMTP@OTHERSYS NEW NOLOCAL NJE NOUNKNOWN
;
;
```

```

; Restriction Lists
;
;RESTRICT RETURN ; return mail from restricted users
;charming@oursys.our.edu; Don't accept any mail from Prince Charming
;charming@oursysb ; via NJE or TCP network.
;charming@oursys* ; This line takes place of previous two lines!
;*@castle ; Don't accept mail from anyone at node: castle
;ENDRESTRICT
;
; These options are MVS specific
;
MAILFILEDSPREFIX SMTP ; Dataset name prefix for files
MAILFILEUNIT SYSDA ; MVS Unit name for new file allocations
;MAILFILEVOLUME VOLSER ; MVS Volume serial name for new file allocations
SPOOLPOLLINTERVAL 30 ; Amount of time in seconds between spool polling
TIMEZONE LCL ; Remember to change for daylight savings time!

```

## 65.2.8 SMTPNOTE CLIST on the MVS/XA System

```

/*****/
/****/
/**** Licensed Materials - Program Property of IBM. ****/
/**** This product contains "Restricted Materials of IBM" ****/
/**** 5685-061 (C) Copyright IBM Corp. 1989 ****/
/**** All rights reserved. ****/
/**** Refer to Copyright Instructions ****/
/**** Form Number G120-2083. ****/
/****/
/**** US Government Users Restricted Rights - ****/
/**** Use, duplication or disclosure restricted ****/
/**** by GSA ADP Schedule Contract with IBM Corp. ****/
/****/
/*****/
/****/
/**** Name: SMTPNOTE ****/
/****/
/**** Function: ****/
/****/
/**** SMTPNOTE allows a user to prepare and send notes over ****/
/**** a TCP/IP network using SMTP. It accepts as arguments ****/
/**** a recipient mail box (TO), a carbon copy mail box (CC), ****/
/**** the subject of the note (SU), the name of a dataset to ****/
/**** import into the note (DA), and a keyword (REUSE) which ****/
/**** lets the user reuse the contents of a note which was ****/
/**** previously cancelled. All the parameters are optional. ****/
/****/
/**** If the user does not specify TO, CC, or SU in the ****/
/**** invocation of the CLIST, SMTPNOTE will prompt for these ****/
/**** parameters. If prompted by SMTPNOTE, the user may enter ****/
/**** a list of recipient mail boxes and/or a list of carbon ****/
/**** copy mail boxes (one on each line) terminated by a blank ****/
/**** line. At least one recipient mail box must be specified, ****/
/**** either in the CLIST invocation (using the TO parameter) ****/
/**** or when prompted by SMTPNOTE. ****/
/****/
/**** SMTPNOTE uses the TSO EDIT command to allow the user ****/
/**** to prepare the text of his or her notes. EDIT is a ****/
/**** line mode editor and all the functions it supports are ****/
/**** available to the user when preparing notes. ****/
/****/
/**** The contents of the note are stored in a temporary ****/
/**** dataset (variable, blocked, sequential) with a block ****/

```

```

/**** size 3120, and a record length of 255. This means that ****/
/**** lines in the note can be up to 243 characters in length. ****/
/**** Lines entered which are longer than 243 characters are ****/
/**** truncated, and lines which are imported (using the DA ****/
/**** parameter) will be truncated if necessary. ****/
/**** ****/
/**** Once the user has completed his or her note, SMTPNOTE ****/
/**** builds an RFC 822 header and inserts it at the top of ****/
/**** the note. It then prefixes the necessary SMTP commands ****/
/**** and transmits the note over NJE to the SMTP address ****/
/**** space on the user's system, to the SMTP address space at ****/
/**** a TCP-NJE gateway host, or the the SMTP virtual machine ****/
/**** at a TCP-RSCS gateway host. ****/
/**** ****/
/*****
PROC 0 TO() CC() SU() DA() REUSE DEBUG
CONTROL NOFLUSH ASIS NOMSG
IF &DEBUG = DEBUG THEN CONTROL MSG CONLIST LIST
/*****
/**** ****/
/**** Customization: ****/
/**** ****/
/**** To install SMTPNOTE, copy it into a PDS where other ****/
/**** common CLISTS are located, for example 'SYS1.CLIST'. ****/
/**** SMTPNOTE can reside in a PDS with either fixed or ****/
/**** variable length records, as long as the record length is ****/
/**** at least 80 characters. Users who wish to use SMTPNOTE ****/
/**** must have this dataset allocated to their 'SYSPROC' ****/
/**** file, probably as a concatenation of several datasets. ****/
/**** ****/
/**** The following lines set five variables which affect the ****/
/**** way SMTPNOTE behaves. The values provided are examples ****/
/**** only and should be changed, where appropriate, to ****/
/**** reflect your particular system. ****/
/**** ****/
/**** ****/
/**** HOSTNAME The name of the system on which this CLIST is ****/
/**** installed (typically the NJE node name of this ****/
/**** system). ****/
/**** ****/
/**** SET HOSTNAME = RALVSMV6 ****/
/**** ****/
/**** ****/
/**** SMTPNODE The NJE node on which the SMTP address space ****/
/**** or virtual machine runs. Typically HOSTNAME ****/
/**** and SMTPNODE will have the same value. In the ****/
/**** case where SMTPNOTE is being used on a NJE ****/
/**** network in conjunction with a TCP-NJE gateway, ****/
/**** the value of SMTPNODE will be the NJE node ****/
/**** name of the TCP-NJE gateway. ****/
/**** ****/
/**** SET SMTPNODE = RALVSMV6 ****/
/**** ****/
/**** ****/
/**** SMTPJOB The name of the address space or virtual ****/
/**** machine in which SMTP runs at SMTPNODE. ****/
/**** Usually this is "SMTP". ****/
/**** ****/
/**** SET SMTPJOB = SMTP ****/
/**** ****/
/**** ****/
/**** TEMPDSN The name of the temporary dataset used to ****/

```



```

/**** store the contents of notes being created. ****/
/**** This can be any arbitrary dataset name but it ****/
/**** must end with '.TEXT'. DO NOT put single ****/
/**** quotes around the name, i.e. use a fully ****/
/**** qualified dataset name, as this will result ****/
/**** in multiple TSO users using the same ****/
/**** temporary dataset. ****/
/****
SET TEMPDSN = SMTPNOTE.TEXT

/****
/****
/**** TIMEZONE The time zone which appears in the "Date:"
/**** stamp of the RFC 822 header.
/****
/****
SET TIMEZONE = LCL

/****
/****
/*****
ERROR DO
 SET ERRCODE = &LASTCC
 IF &DATATYPE(&ERRCODE) = NUM THEN +
 IF &ERRCODE < 16 THEN RETURN
 /**** Catch S913 which is a RACF violation. Want to see ****/
 /**** error and write appropriate message. ****/
 IF &ERRCODE = S913 THEN RETURN
 SET ERRCODE = 999
 GOTO ERREXIT
END
SET ERRCODE = 0
SET RECOVLVL = 0
.....
.....
.....
ELSE WRITE SMTP999S UNKNOWN ERROR CODE '&ERRCODE'
EXIT

```

## 65.2.9 PROFILE TCPIP Data Set on the 9370-90 VM System

- \* Use statements below to alter size of free pools
- \* Refer to section in this manual on TCPIP Configuration
- \* Commands for more detailed information.

```

ACBPOLLSIZE 1000
CCBPOLLSIZE 150
DATABUFFERPOOLSIZ 160
ENVELOPEPOOLSIZ 750
SCBPOLLSIZE 256
TCBPOLLSIZE 256
UCBPOLLSIZE 30
LARGEENVELOPEPOOLSIZ 50

```

```

NOTRACE SCREEN
* TRACE ALL NOSCREEN
* MORETRACE ALL NOSCREEN
INFORM OPERATOR TCPMAINT
OBEY OPERATOR TCPMAINT

```

```
INTERNALCLIENTPARM TIMEMARK 1800 * Set Telnet timeout to 30 minutes
```

- \*
  - \* Hardware definitions:
  - \* DEVICE device-name device-type device-address

\* LINK link-name link-type link-number device-name  
\*

DEVICE ILANS1 ILANS 104  
LINK TR3 IBMTR 1 ILANS1

DEVICE SNALINK1 SNAIUCV SNALINK AD115TC1 SNALNKA  
LINK SNALNK1 IUCV 1 SNALINK1

DEVICE SNALINK2 SNAIUCV SNALINK RAKASNAL SNALNKA  
LINK SNALNK2 IUCV 2 SNALINK2

DEVICE X25A X25ICA 9C0  
LINK X25LA X25ICA 1 X25A

#### AUTOLOG

FTPSERVE 9370TCP \* FTP server  
SMTP 9370TCP \* SMTP virtual machine  
REXECD 9370TCP \* REXEC server  
SNALNKA 9370TCP \* SNALINK MACHINE

#### PORT

\* Values from RFC 900, "Assigned numbers"  
21 TCP FTPSERVE \* FTP server  
20 TCP FTPSERVE NOAUTOLOG \* FTP default data port  
23 TCP INTCLIEN \* Telnet server  
25 TCP SMTP \* SMTP server  
512 TCP REXECD \* REXEC  
514 TCP REXECD \* RSH - Remote Shell Protocol

#### HOME

\* Local host's Internet addresses  
128.10.1.2 TR3  
128.11.1.2 SNALNK1  
128.12.1.2 SNALNK2  
128.13.1.2 X25LA

#### GATEWAY

\* Network First hop Driver Packet size Subnet mask Subnet value

##### \* Direct routes

128.10 = TR3 1000 0  
128.11 = SNALNK1 2000 0  
128.12 = SNALNK2 2000 0  
128.13 = X25LA 128 0

##### \* Indirect routes

\* None

#### TRANSLATE

128.13.1.2 X25ICA 3106001983  
128.13.1.1 X25ICA 3106001984

START ILANS1  
START SNALINK1  
START SNALINK2  
START X25A

## 65.2.10 PROFILE TCPIP Data Set on the 9370-60 VM System

- \* Use statements below to alter size of free pools
- \* Refer to section in this manual on TCPIP Configuration
- \* Commands for more detailed information.

```
ACBPOOLSIZE 1000
CCBPOOLSIZE 150
DATABUFFERPOOLSIZE 160
ENVELOPEPOOLSIZE 750
SCBPOOLSIZE 256
TCBPOOLSIZE 256
UCBPOOLSIZE 30
LARGEENVELOPEPOOLSIZE 50
```

```
NOTRACE SCREEN
INFORM OPERATOR TCPMAINT
OBEY OPERATOR TCPMAINT
```

```
INTERNALCLIENTPARM TIMEMARK 1800 * Set Telnet timeout to 30 minutes
```

```
*
* Hardware definitions:
* DEVICE device-name device-type device-address
* LINK link-name link-type link-number device-name
*
```

```
DEVICE ILANS1 ILANS 204
LINK TR3 IBMTR 1 ILANS1
```

```
DEVICE SNALINK1 SNAIUCV SNALINK AD114TC1 SNALNKA
LINK SNALNK1 IUCV 1 SNALINK1
```

```
DEVICE X25A X25ICA AC0
LINK X25LNK1 X25ICA 1 X25A
```

```
AUTOLOG
FTP SERVE 9370TCP * FTP server
SMTP 9370TCP * SMTP virtual machine
REXEC 9370TCP * REXEC server
SNALNKA 9370TCP * SNALINK MACHINE
```

```
PORT
* Values from RFC 900, "Assigned numbers"
21 TCP FTPSERVE * FTP server
20 TCP FTPSERVE NOAUTOLOG * FTP default data port
23 TCP INTCLIEN * Telnet server
25 TCP SMTP * SMTP server
512 TCP REXECD * REXEC
514 TCP REXECD * RSH - Remote Shell Protocol
```

```
HOME
* Local host's Internet addresses
128.10.1.3 TR3
128.11.1.3 SNALNK1
128.13.1.3 X25LNK1
```

```
GATEWAY
* Network First hop Driver Packet size Subnet mask Subnet value
* Direct routes

128.10 = TR3 1000 0
128.11 = SNALNK1 2000 0
128.13 = X25LNK1 1024 0
```

```
* Indirect routes
 128.12 128.11.1.2 SNALNK1 2000 0
```

```
TRANSLATE
128.13.1.3 X25ICA 800080034
128.13.1.1 X25ICA 800081111
```

```
START ILANS1
START SNALINK1
START X25A
```



---

## **Chapter 66. System/88 Advanced Program-to-Program Communications Scenarios**

The following pages present the parameters and parameter relationship required to set up the communication of a System/88 running APPC to other stations in a Token-Ring Network.

The scenario covered is:

1. System/88 APPC to PS/2 with OS/2 Extended Edition Version 1.2.

## 66.1 System/88 APPC to PS/2 With OS/2 Extended Edition Version 1.2

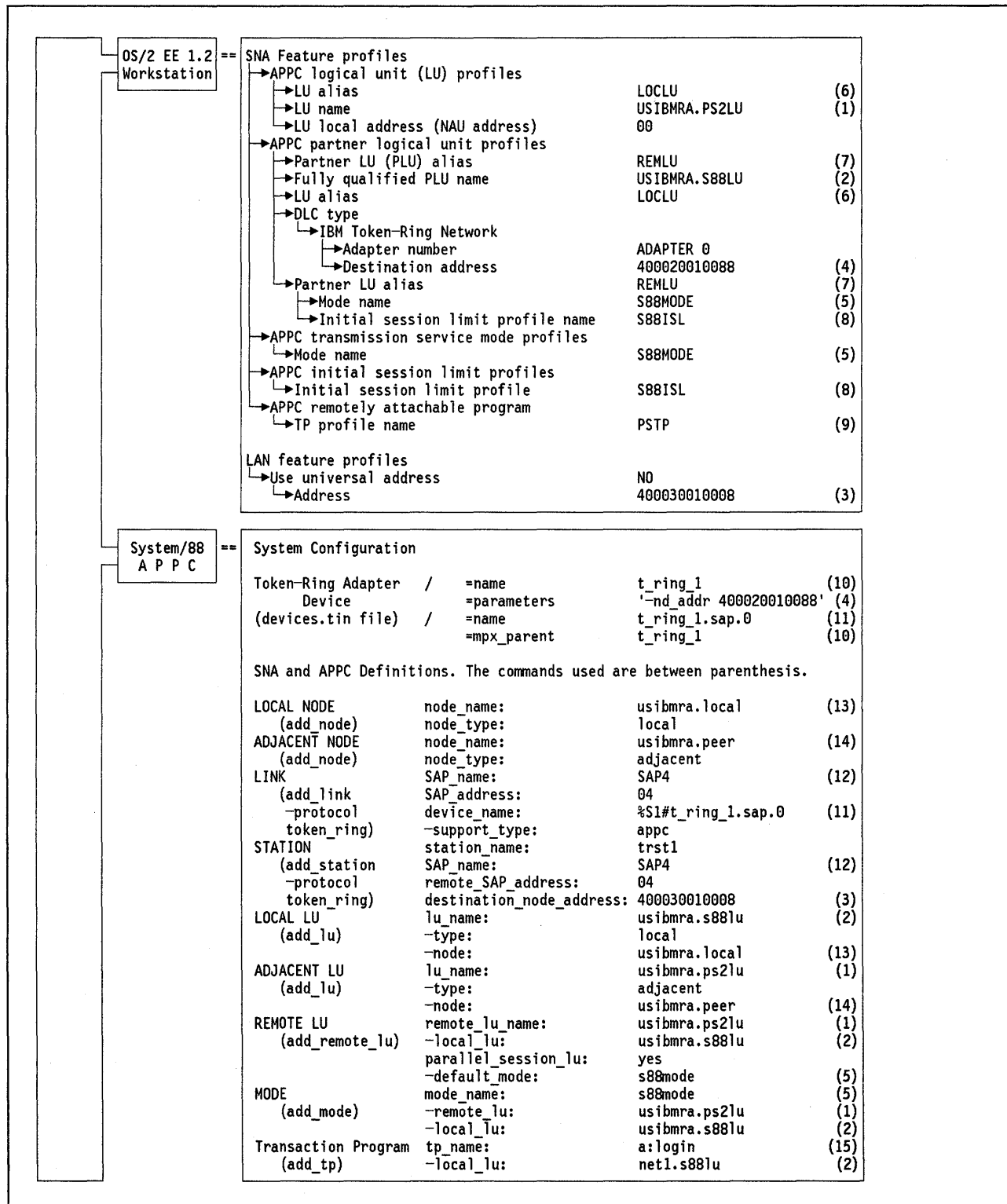


Figure 239. System/88 APPC to PS/2 with OS/2 EE V1.2 - Key Parameters

### Notes - System/88 APPC to PS/2 with OS/2 EE V1.2

1. This is the name assigned to the LU at the PS/2 side. This name must be used at the System/88 to refer to the remote LU (LU at the adjacent node). This name is also used by other System/88 APPC operator commands to completely define the LU-LU communications.
2. This is the name assigned to the LU at the System/88 side. This name must be used at the PS/2 to refer to the remote LU (the partner LU name). This LU name is used by the transaction program which uses this LU communication services. It is also used by other APPC operator commands to completely define the communication with the LU at the PS/2 side.
3. This is the PS/2 Token-Ring adapter address. It must be used as the `destination_node_address` in the System/88. It is a locally administered address.
4. This is the System/88 Token-Ring adapter address. It must be used as the "Destination address" when defining the DLC for the partner LU at the PS/2 side.
5. The mode profile must be defined in both sides (the System/88 and the PS/2) with the same name and the same LU-LU session(s) characteristics.
6. This is a local alias name used at the PS/2 side to refer to the local LU. This name is used when defining the partner LU to link both LUs.
7. This is local alias name used at the PS/2 side to refer to the remote LU (partner LU).
8. A profile name must be created to define the initial session limits for the LU-LU session(s). This name is used when defining the partner LU to set the session(s) characteristics.
9. This is the name assigned to a profile that describes a local application program to be attached by a program at the remote system. Other parameters available when defining this profile, allow you to specify the "real" name of the transaction program and its full path name.
10. This specifies the System/88 Token-Ring device name to be recognized by the operating system. This name must be used as the `mpx_parent` parameter when defining its related subdevices.
11. This is the name of a Token-Ring subdevice. It is always associated with a Token-Ring Link definition (each link definition defines a SAP).
12. This is the Token-Ring Link or SAP name. One or more stations can use it to communicate to another system in the network. The station must specify this name to use the SAP.
13. The System/88 must have a node name assigned. It allows to define other local resources like the local LUs.
14. The system to communicate with (in this case the PS/2 with OS/2 EE V1.2) must have a node name assigned for local purposes. It allows to define other remote resources like the LUs on that system.
15. This is the name used by the application program to link itself to the local LU to begin APPC communications. Other parameters of the `add_tp` command allow you to specify the "real" name of the transaction program and its full path name.





---

## **Chapter 67. System/88 Advanced Program-to-Program Communications Scenarios**

The following pages present the parameters and parameter relationship required to set up the communication of a System/88 running APPC to CICS applications in an SNA host.

The scenario covered is:

1. System/88 APPC to S/370 host CICS.

# 67.1 System/88 APPC to S/370 Host CICS

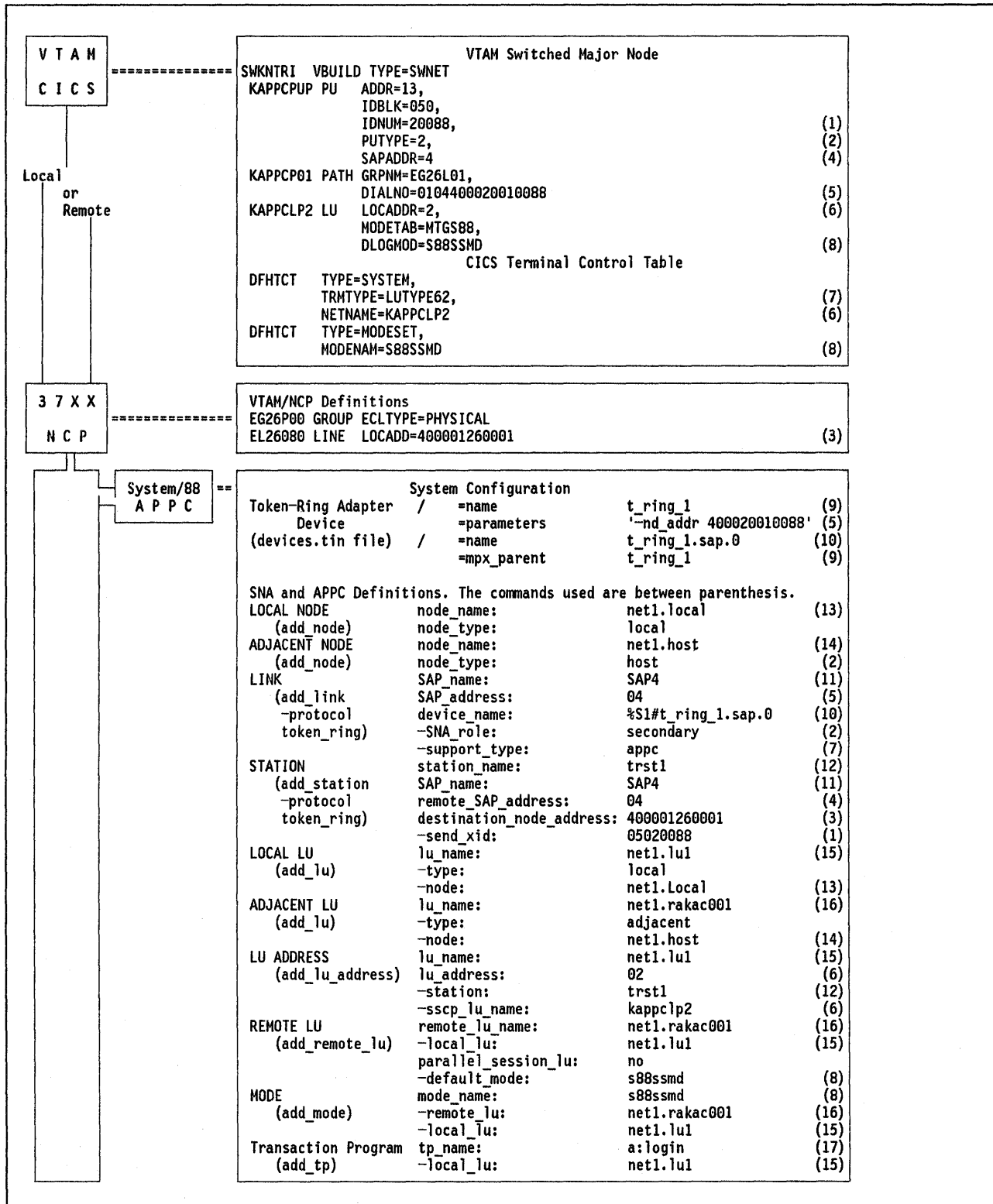


Figure 240. System/88 APPC to S/370 Host CICS - Key Parameters

### Notes - System/88 APPC to S/370 Host CICS

1. The IDBLK and the IDNUM VTAM parameters provide together an XID value which must match the value specified in the -send\_xid parameter of the station definition in the System/88.
2. The APPC connection is defined to work over a PU type 2.0. The VTAM PUTYPE parameter and the node\_type parameter of the adjacent node definition in the System/88, are used to specify the PU type 2.0.
3. This is the Token-Ring adapter address of the 37XX communications controller and it must be used as the destination\_node\_address in the System/88. It is a locally administered address.
4. This is the "Service Access Point" address at the host, used by the System/88 to communicate to the host.
5. The DIALNO parameter needs to be coded only if the host will be attempting to establish sessions with the System/88. The last 12 digits are the System/88 Token-Ring adapter locally administered address specified in the -nd\_addr parameter of the system definitions. The first four digits specify the port address (first two digits) and SAP address to be used in the System/88.
6. The label for the LU macro as well as the LOCADDR specified in VTAM must also be defined in the System/88 side. The label for the LU macro must also be used as the NETNAME parameter in the CICS DFHTCT table to link the terminal to the LU.
7. To indicate that APPC will be used for communication between the systems, CICS and the System/88 link definition must specify it.
8. This is the logmode entry used for APPC. It is overridden by CICS default parameters or by the MODENAM parameter specified in the DFHTCT table. This name must be used in the System/88 as the mode APPC resource for the LU-LU session.
9. This specifies the System/88 Token-Ring Device name to be recognized by the operating system. This name must be used as the mpx\_parent parameter when defining its related subdevices.
10. This is the name of a Token-Ring subdevice. It is always associated with a Token-Ring Link definition (each link definition defines a SAP).
11. This is the Token-Ring Link or SAP name. One or more stations can use it to communicate to another system in the network. The station must specify this name to use the SAP.
12. This is the station name. It must be specified to the LU that needs to communicate to the system identified by that station.
13. The System/88 must have a node name assigned. It allows you to define other local resources such as the local LUs.
14. The system to communicate with (in this case the S/370 host) must have a node name assigned for local purposes. It allows you to define other remote resources like the LUs on that system.
15. This is the name assigned to the local LU. This name is used by the transaction program which uses this LU communication services. This name is also used by other APPC commands to completely define the communication with the LU at the host.

16. This is the name assigned to the LU at the host. This name is also used by other APPC commands to completely define the LU-LU communications.
17. This is the name used by the application program to link itself to the local LU to begin APPC communications. Other parameters of the `add_tp` command allow you to specify the "real" name of the transaction program and its full path name.

---

## Chapter 68. SNA Token-Ring Environment

The following pages refer to VTAM and NCP definitions. The scenarios covered are:

1. Key parameters for a 3174 local gateway supporting a 3174 DSPU.
2. Key parameters for a 3174 remote gateway supporting a 3174 DSPU.
3. Key parameters for a 37XX gateway supporting a 3174 DSPU.
4. Key parameters for a 9370 with INN sessions to another 9370.
5. Key parameters for 37XX NCP supporting INN sessions over a Token-Ring Network.
6. Key parameters for a 9370 and a 37XX supporting INN sessions over a Token-Ring Network.

# 68.1 Key Parameters for a 3174-Local Gateway Supporting a 3174 DSPU

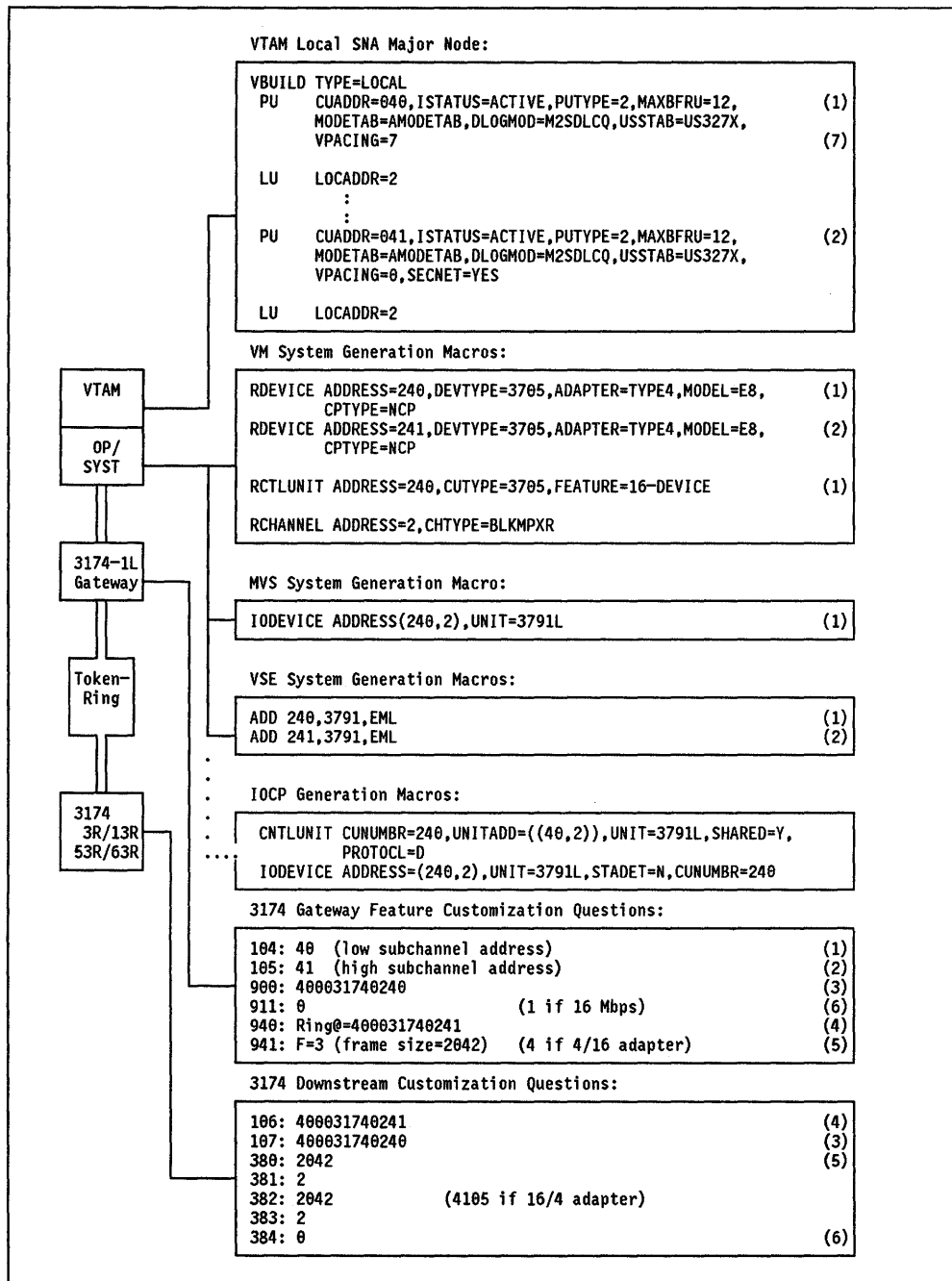


Figure 241. Local Gateway Key Definitions - Scenario. Key parameters for 3174-1L (local) Gateway supporting a 3174 downstream PU (DSPU). If the numbers within brackets appear at two places, that indicates the parameter values must match.

**Notes:**

1. The operating system address defined for the gateway is reflected in Q 104 of 3174-1L.
2. This is the highest address defined in the operating system for DSPUs supported by the gateway. This address is reflected in Q 105 in the gateway.
3. The Token-Ring address of the gateway.
4. The Token-Ring address of the 3174 downstream PU.
5. Frame size transmitted from the gateway to the 3174 downstream PU.
6. Ring speed of the gateway or DSPU. 0 = 4 Mbps.
7. Some devices may require a smaller value



## 68.2 Key Parameters for a 3174-Remote Gateway Supporting a 3174 DSPU

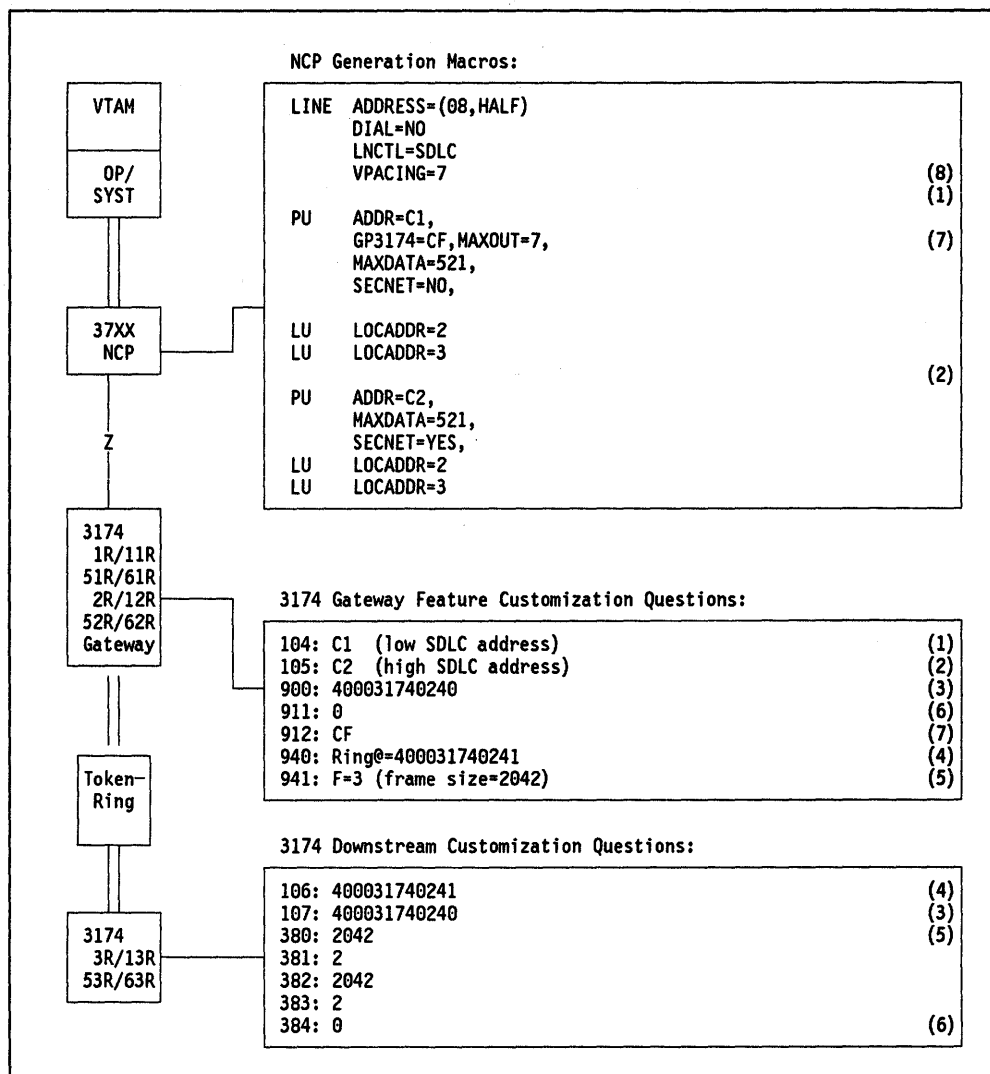


Figure 242. Remote Gateway Key Definitions - Scenario. Key parameters for remote 3174 Gateway supporting a 3174 downstream PU (DSPU). If the numbers within brackets appear at two places, that indicates the parameter values must match.

**Notes:**

1. The SDLC station address, defined by the ADDR parameter in NCP, for the gateway is reflected in Q 104 in the gateway's customization.
2. This is the highest SDLC station address defined for DSPUs supported by the gateway. This address is reflected in Q 105 in the gateway.
3. The Token-Ring address of the gateway.
4. The Token-Ring address of the 3174 downstream PU.
5. Frame size transmitted from the gateway to the 3174 downstream PU.
6. Ring speed of the gateway or DSPU. 0 = 4 Mbps.
7. Group poll address. Should be less than or greater Q 104 and Q105. Configuration support B is required.
8. Some devices may require a smaller value for VPACING.

## 68.3 Key Parameters for a 37XX Gateway Supporting a 3174 DSPU

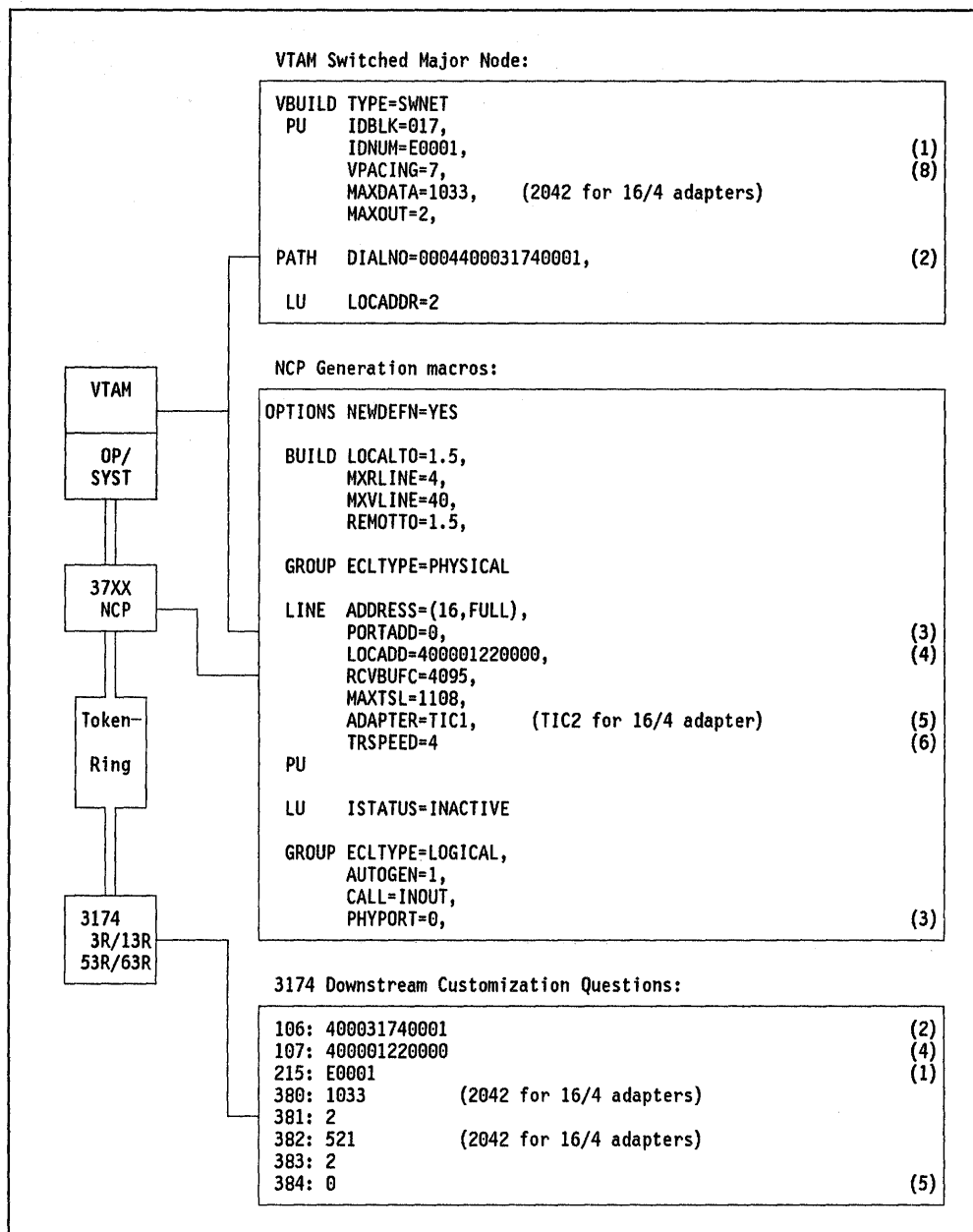


Figure 243. 37XX Gateway Key Definitions - Scenario. Key parameters for 37XX Gateway supporting a 3174 downstream PU (DSPU). If the numbers within brackets appear at two places, that indicates the parameter values must match.

**Notes:**

1. Identifies this particular PU to VTAM. This number must match Q 215 in 3174.
2. TIC number (first two digits), SAP address (following two digits), and Token-Ring Network address (last 12 digits), used for outgoing calls to the 3174. The last 12 digits must match Q 106 in 3174.
3. Connects a logical group to a certain TIC (also the two first digits in note 2).
4. The Token-Ring address of the TIC in the 37XX.
5. Ring speed of the gateway or DSPU. 0 = 4 Mbps.
6. Adapter type 1 (4Mbps) or adapter type 2 (16/4 Mbps) 3745 only.
7. Speed of the ring. 16 indicates Early Token Release with 16 Mbps.
8. Some devices may require smaller values.

## 68.4 9370-to-9370 INN Session Scenario

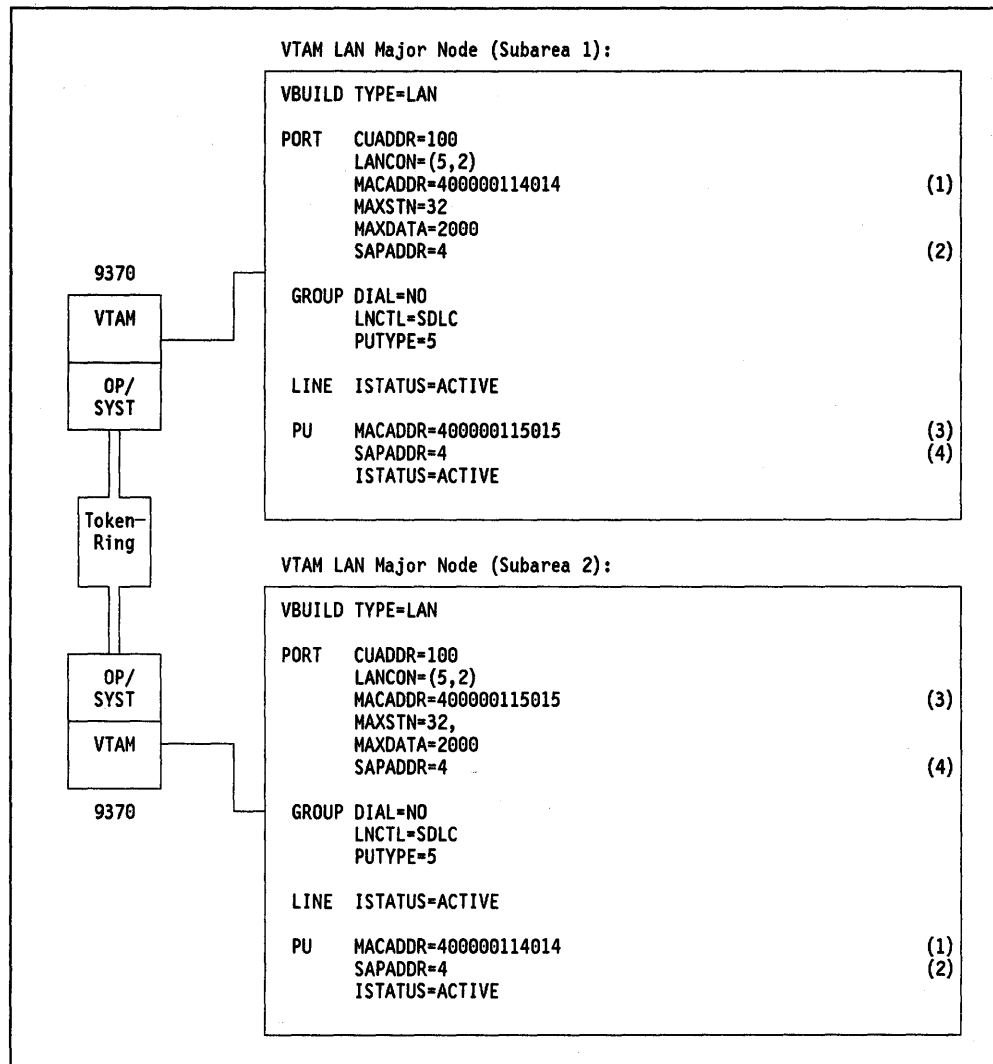


Figure 244. 9370 INN Sessions Key Definition - Scenario. Key parameters for a 9370 with INN session to another 9370. If the numbers within brackets appear at two places, that indicates the parameter values must match.

**Notes:**

1. Token-Ring address of Token-Ring Network adapter in subarea 1. The MACADDR parameter value in the PU macro in subarea 2 must match this address.
2. SAP address of Token-Ring Network adapter in subarea 1. The SAPADDR parameter value in the PU macro in subarea 2 must match this address.
3. Token-Ring address of Token-Ring Network adapter in subarea 2. The MACADDR parameter value in the PU macro in subarea 1 must match this address.
4. SAP address of Token-Ring Network adapter in subarea 2. The SAPADDR parameter value in the PU macro in subarea 1 must match this address.

## 68.5 37XX-to-37XX INN Session Scenario

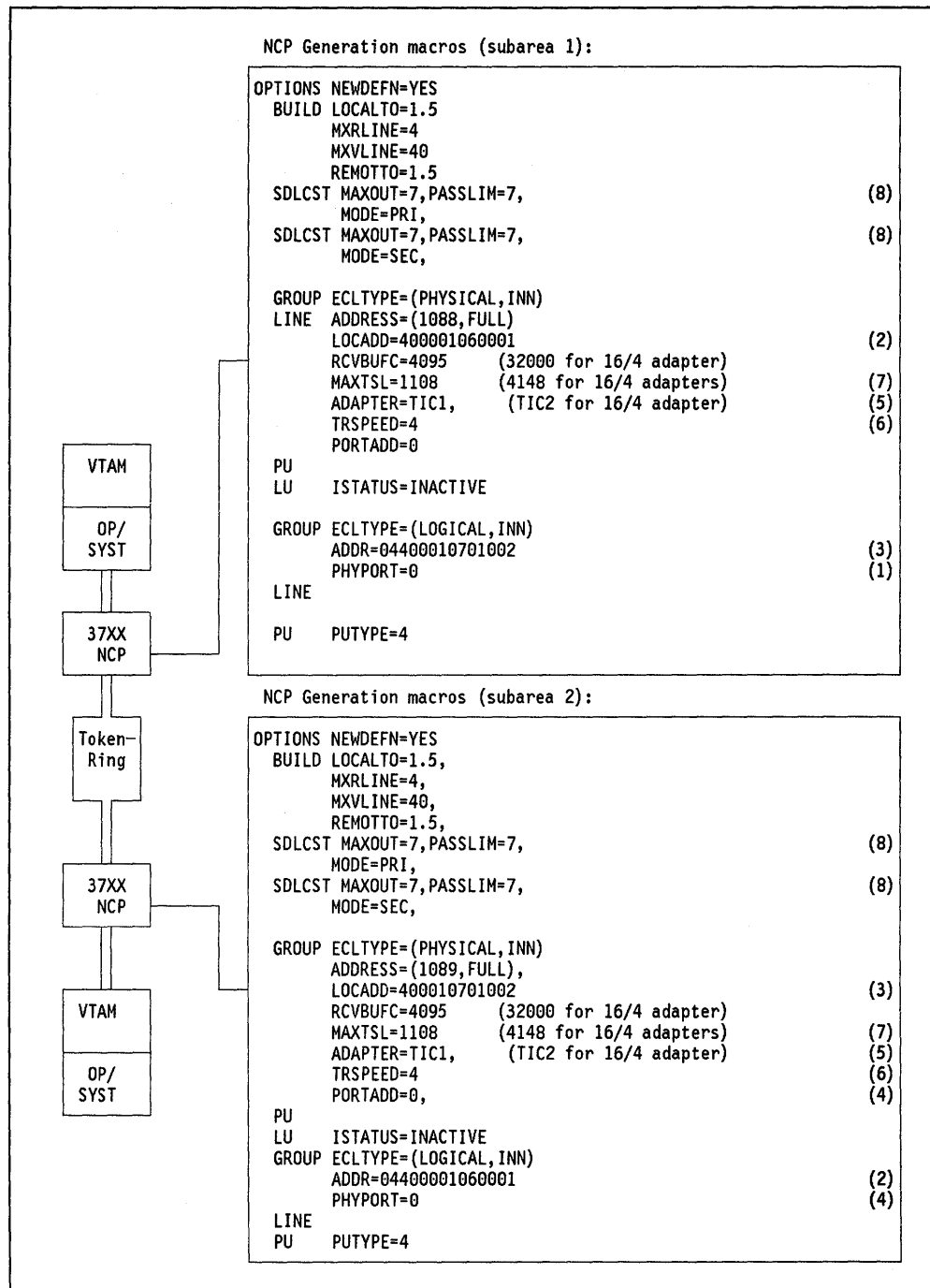


Figure 245. 37XX INN Sessions Key Definitions - Scenario. Key parameters for 37XX NCP supporting INN sessions over a Token-Ring Network. If the numbers within brackets appear at two places, that indicates the parameter values must match.

**Notes:**

1. Connects a logical group to a certain TIC.
2. The Token-Ring address of the TIC in subarea 1.
3. The Token-Ring address of the TIC in subarea 2.
4. Connects a logical group to a certain TIC.
5. Adapter type 1 (4 Mbps) or adapter type 2 (16/4 Mbps). 3745 only.
6. Speed of the ring. 16 is required for Early Token Release with 16 Mbps.
7. If more than one INN session is required, MAXTSL should be 692.
8. Use 7 to start but check for congestion.



## 68.6 9370-to-37XX INN Session Scenario

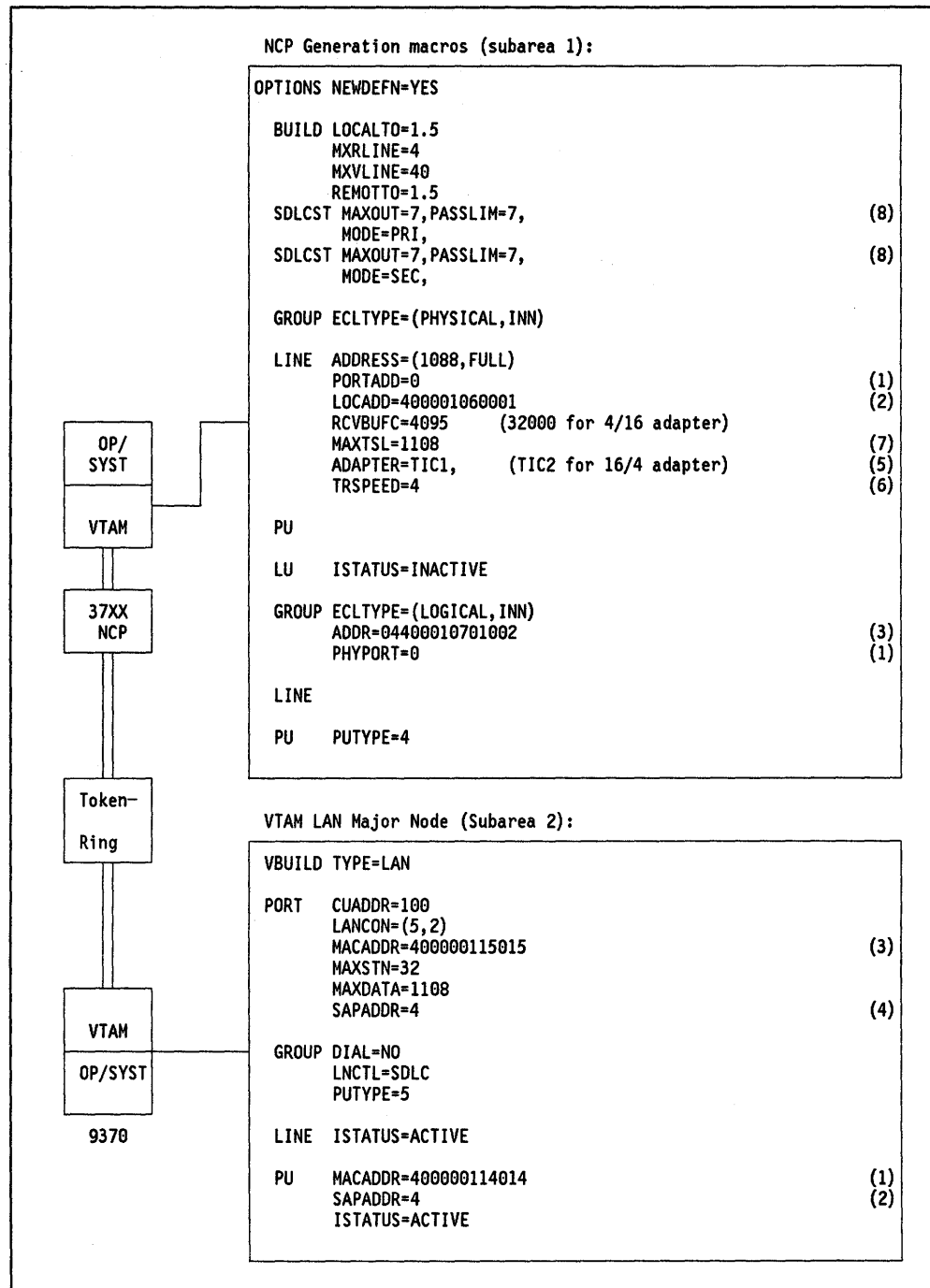


Figure 246. 9370/VTAM/NCP INN Sessions Key Definition - Scenario. Key parameters for a 9370 and a 37XX supporting INN sessions over a Token-Ring Network. If the numbers within brackets appear at two places, that indicates the parameter values must match.

**Notes:**

1. Connects a logical group to a certain TIC.
2. The Token-Ring address of the TIC in subarea 1.
3. The Token-Ring address of the TIC in subarea 2.
4. Connects a logical group to a certain TIC.
5. Adapter type 1 (4 Mbps) or adapter type 2 (16/4 Mbps). 3745 only.
6. Speed of the ring. 16 is required for Early Token Release with 16 Mbps.
7. If more than one INN session is required, MAXTSL should be 692.
8. Use 7 to start but check for congestion.



# Chapter 69. Workstations Accessing a 9370 SNA Host Scenario

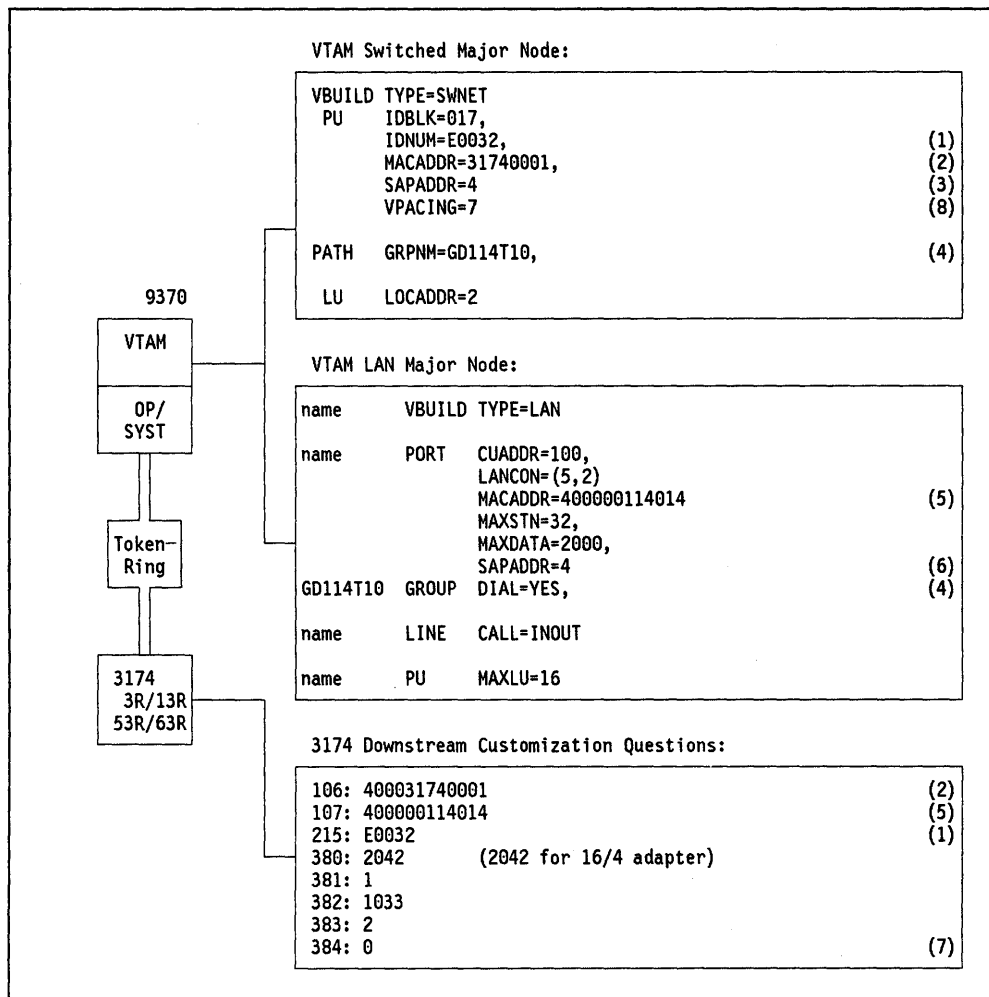


Figure 247. 9370 Token-Ring Subsystem Key Definitions - Scenario. Key parameters for a 9370 supporting a 3174 Downstream PU (DSPU). If the numbers within brackets appear at two places, that indicates the parameter values must match.

**Notes:**

1. Identifies this particular PU to VTAM.
2. Token-Ring address of 3174.
3. SAP address of the 3174 (always 4).
4. The name of the GROUP macro in the LAN major node must match the name in the GRPNM= parameter in the switched major node. This name is used to relate a PU to a group of lines in the 9370.
5. The Token-Ring address of the 9370.
6. The SAP address of the 9370.
7. Speed of the gateway or DSPU. 0 = 4 Mbps.
8. Some stations may require a smaller value.



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# Appendix A. Abbreviations

**ABBREVIATION      MEANING**



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# Glossary





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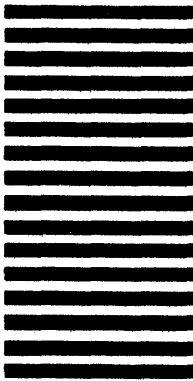
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