



**IBM**

## **International Technical Support Centers**

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

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

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## **FIRST EDITION (September 1988)**

This edition applies to the IBM LAN products available at the time this bulletin is published and to all subsequent releases until otherwise indicated in new editions or Technical Newsletters, for use with the IBM Token-Ring Network.

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## **Abstract**

This document is a guide for the successful implementation of the IBM products in a 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 Token-Ring Network LAN capabilities, and for those who need to define these capabilities for communication networks.

WS CSYS

(438 pages)



# Preface

## *Document Purpose and Scope*

The purpose of this document is to:

1. Guide the reader in installing hardware devices onto 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.

These sections provides the reader with a step-by-step guide to the installation of hardware products on the Token-Ring Network. It covers the necessary hardware and any supporting software.

- Part B

Application Installation on 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.

## *Related Publications*

- *IBM Token-Ring Network Architecture Reference* (SC30-3374)
- *SNA Technical Overview* (SC30-3073)
- *IBM LAN Administrator's Guide* (GA27-3748)

- *IBM Cabling System Planning and Installation Guide (GA27-3361)*
- *IBM Cabling System Technical Interface Specification (GA27-3773)*
- *IBM Token-Ring Network Installation Guide (GA27-3678)*
- *IBM Token-Ring Network Introduction and Planning Guide (GA27-3677)*
- *IBM Token-Ring Network Telephone Twisted-Pair Media Guide (GA27-3714)*
- *IBM Token-Ring Network Telephone Twisted-Pair Media Guide (EMEA version) (GA27-3733)*
- *IBM Token-Ring Network Optical Fiber Cable Options (GA27-3747)*
- *IBM Token-Ring Network Problem Determination Guide (SX27-3710)*
- *IBM PC Network Baseband Planning Guide (S68X-2269)*
- *IBM PC Network Baseband Adapter Installation Instructions*  
Packaged with Adapter
- *IBM PC Network Baseband Adapter/A Installation Instructions*  
Packaged with Adapter
- *IBM PC Network Baseband Extender Technical Reference (S68X-2266)*
- *IBM PC Network Broadband Planning Guide (S68X-2268)*
- *IBM PC Network Hardware Maintenance and Service (S68X-2240)*
- *IBM PC Network Adapter II - Frequency 1 Installation Instructions*  
Packaged with Adapter
- *IBM PC Network Adapter II - Frequency 2 Installation Instructions*  
Packaged with Adapter
- *IBM PC Network Adapter II - Frequency 3 Installation Instructions*  
Packaged with Adapter
- *IBM PC Network Adapter II/A - Frequency 1 Installation Instructions*  
Packaged with Adapter
- *IBM PC Network Adapter II/A - Frequency 2 Installation Instructions*  
Packaged with Adapter
- *IBM PC Network Adapter II/A - Frequency 3 Installation Instructions*  
Packaged with Adapter
- *IBM PC Network Adapters Technical Reference (GA27-xxxx)*
- *IBM PC Network Adapter II - Frequency 2 Technical Reference (SC30-3490)*
- *IBM PC Network Adapter II - Frequency 3 Technical Reference (SC30-3491)*
- *IBM PC Network Adapter II/A - Frequency 2 Technical Reference (SC30-3492)*
- *IBM PC Network Adapter II/A - Frequency 3 Technical Reference (SC30-3493)*
- *IBM Token-Ring Network Starter Kit Guide, Version 1.1 (SK2T-0303)*
- *IBM RT PC Technical Reference Token-Ring Adapter (SK2T-0291)*
- *IBM Token-Ring Network Adapter/A Installation and Testing Instructions (GA27-3784)*  
Packaged with Adapter
- *IBM Token-Ring Network PC Adapter Guide to Operations*  
Packaged with Adapter

- *IBM Token-Ring Network 16/4 Adapter Guide to Operations*  
Packaged with Adapter
- *IBM Token-Ring Network 16/4 Adapter/A Installation and Testing Instructions*  
Packaged with Adapter
- *IBM 8220 Customer Setup Instructions (GA27-3817)*  
Packaged with 8220 Optical Fiber Converter
- *IBM Token-Ring Network Trace and Performance Program User's Guide*  
Packaged with Program Product
- *IBM Token-Ring Network Remote Program Load User's Guide (GA27-3763)*  
Packaged with the Remote Program Load feature, not separately orderable
- *IBM Local Area Network Host Information (GC30-3479)*
- *IBM Local Area Network Technical Reference (SC30-3383)*
- *IBM Local Area Network Support Program User's Guide, Version 1.1*  
Packaged with Program Product
- *IBM Token-Ring Network NETBIOS Program User's Guide*  
Packaged with Program Product
- *IBM Token-Ring Network PC Adapter Support Program for the 3270-PC*  
Packaged with Program Product
- *IBM PC Network Bridge Program User's Guide, Version 1.1 (SC30-3402-1)*  
Packaged with Program Product, not separately orderable
- *IBM PC Network Bridge Program User's Guide, Version 2.0 (SC30-3402-2)*  
Packaged with Program Product, not separately orderable
- *IBM Token-Ring Network Manager User's Guide, Version 1.1 (LY30-5595-1)*  
Packaged with Program Product, not separately orderable
- *IBM LAN Manager User's Guide, Version 1.0 (LY30-5595-2)*  
Packaged with Program Product, not separately orderable
- *IBM LAN Manager User's Guide, Version 2.0 (LY30-5595-3)*  
Packaged with Program Product, not separately orderable
- *IBM LAN Manager Entry User's Guide, Version 1.0*  
Packaged with Program Product
- *IBM PC 3270 Emulation LAN Management Program User's Guide, Version 1.0 (SC30-3456)*  
Packaged with Program Product
- *IBM PC 3270 Emulation Memory Management Enhancement*  
Packaged with Product (P/N 8575345)
- *IBM Remote NETBIOS Access Facility Program User's Guide, Version 1.0 (SK2T-0314)*
- *IBM Remote NETBIOS Access Facility Program Installation and Configuration Guide, Version 2.1 (SK2T-0323)*
- *IBM Asynchronous Communications Server Program User's Guide, Version 1.0 (SC30-3464)*
- *IBM LAN Asynchronous Connection Server Program Installation and Configuration Guide, Version 1.0 (SC30-3509)*  
Packaged with Program Product, not separately orderable
- *IBM 8232 LAN Channel Station Installation and Testing (GA27-3796)*
- *IBM 8232 LAN Channel Station Operator's Guide (GA27-3785)*

- *IBM 8232 LAN Channel Station Safety Notices (GA27-3833)*
- *IBM LAN Channel Support Program User's Guide (SC30-3458)*
- *IBM Token-Ring Network Manager and NetView/PC Planning and Installation (GG24-3128)*
- *IBM Token-Ring Network Bridges and Management (GG24-3062)*
- *NetView/PC Primer (GG24-3115)*
- *IBM 3725 Network Control Program Token-Ring Interface Planning and Implementation (GG24-3110)*
- *An Introduction To Programming For APPC/PC (GG24-3034)*
- *IBM Enhanced Connectivity Facilities SRPI Guide (GG24-3086)*
- *Connectivity In 1986 (GG24-3079)*
- *IBM Local Area Networks In An Office Systems Environment (GG24-3071)*
- *IEEE 802.3 Local Area Network Considerations (GG22-9422)*

## ***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 :

**GENERAL CONCEPTS**

**GG24-3178-1**

**LAN Concepts  
and  
Products**

**PRODUCT PLANNING AND INSTALLATION**

**GG24-3291  
Installation  
Guidelines  
for Token-  
Ring Network  
Products**

**GG24-3110-1  
3725 NTRI  
Planning  
and  
Implemen-  
tation**

**GG24-3061-1  
IBM 3174  
Subsystem  
Control Unit  
Installation  
Guide**

**GG24-3420  
9370 LAN  
Vol. 1  
Token-Ring  
Support**

**GG24-3227  
9370 LAN  
Vol. 2  
IEEE 802.3  
Support**

**GG24-3207  
S/36  
Token-Ring  
Attachment-  
INS Environ.**

**NETWORK DESIGN AND MANAGEMENT**

**GG24-3128  
IBM LAN  
Manager and  
NetView/PC  
for Token-  
Ring Network**

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# 1.0 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 ETHERNET<sup>1</sup>, 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 IBM 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 four million bits per second together with the Token-Passing protocol offers the best performance of current international LAN standards<sup>2</sup>, 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 four 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 56K bps line.

- 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.

---

<sup>1</sup> ETHERNET is a Trade Mark of The XEROX Corporation.

<sup>2</sup> See W. Bux, 'Local Area Networks: A Performance Comparison' *IEEE Transactions on Communications Vol 29*, pp 1465-1473, 1981.

- **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.

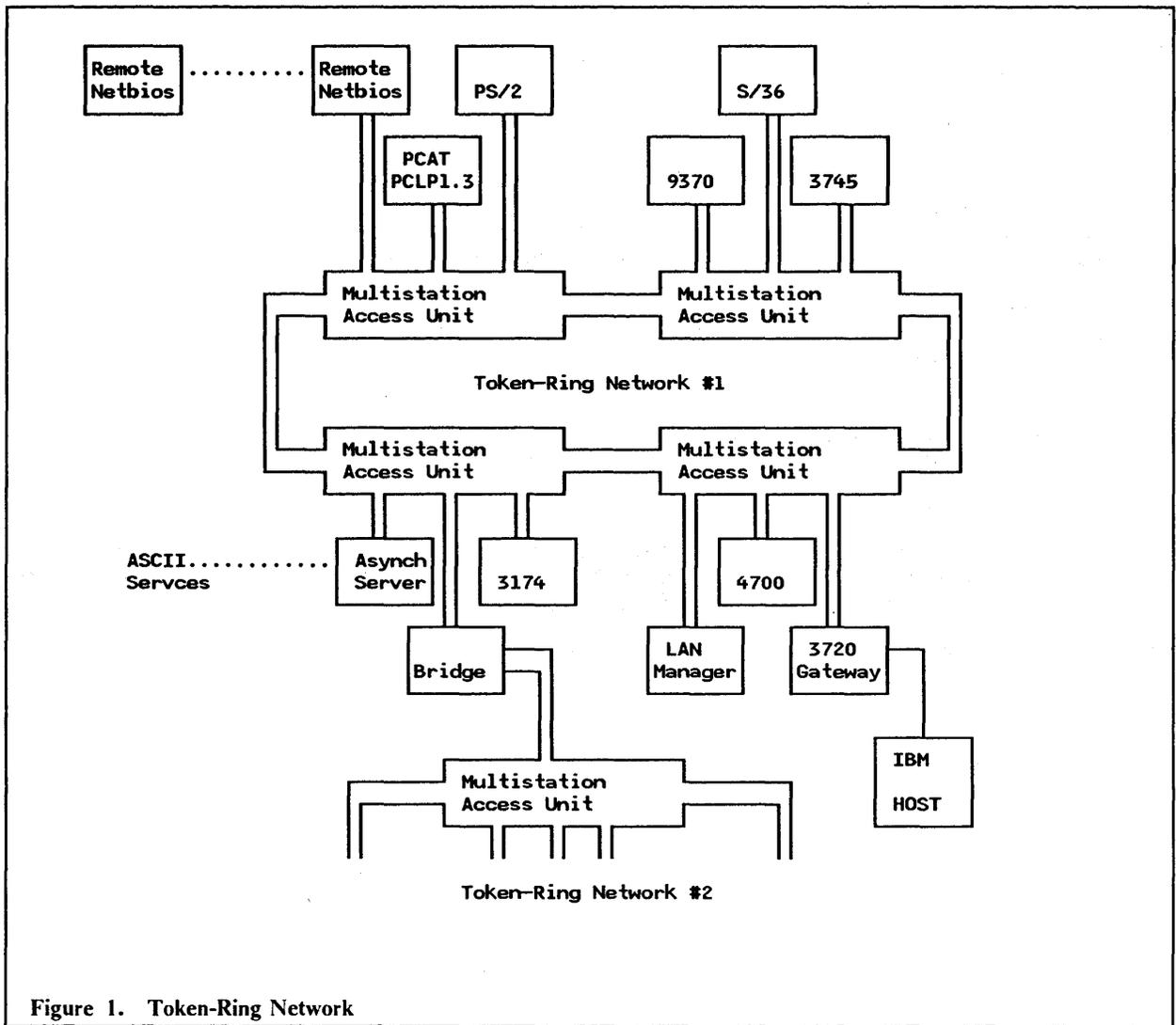


Figure 1. Token-Ring Network



## 2.0 Quick Reference Guide

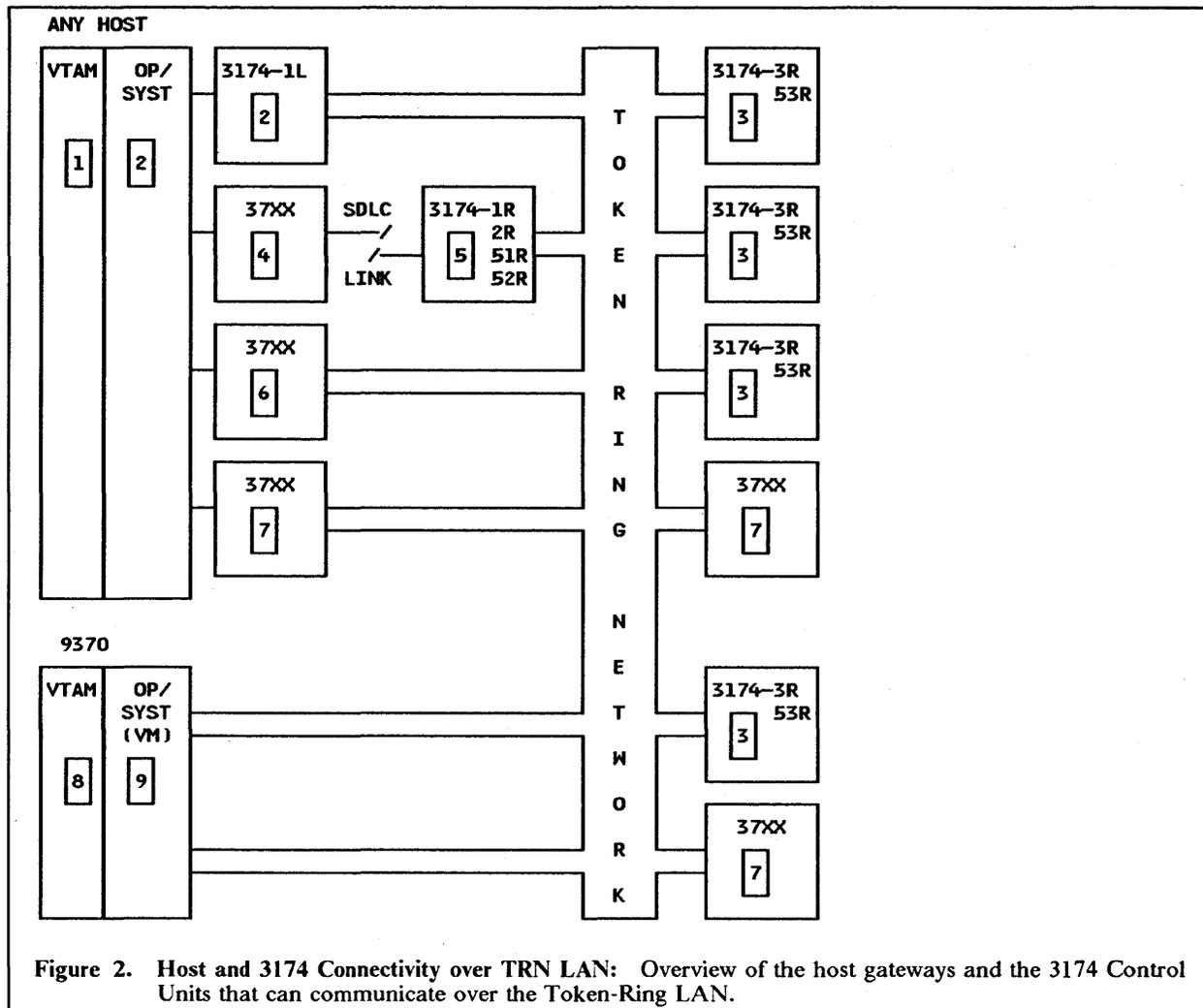
This quick reference is intended to help you navigate through this guide and locate the sections that you require for your installation.

The Quick Reference is made up of three scenarios as follows:

1. System/370 Host scenarios, Figure 2 on page 6
2. System/3X scenarios, Figure 3 on page 8
3. PC and PS/2 scenarios, Figure 4 on page 10

The boxes with a number indicate where new or updated definitions are required. The numbers within the boxes refer to the section in this publication where the definitions are described according to the following table:

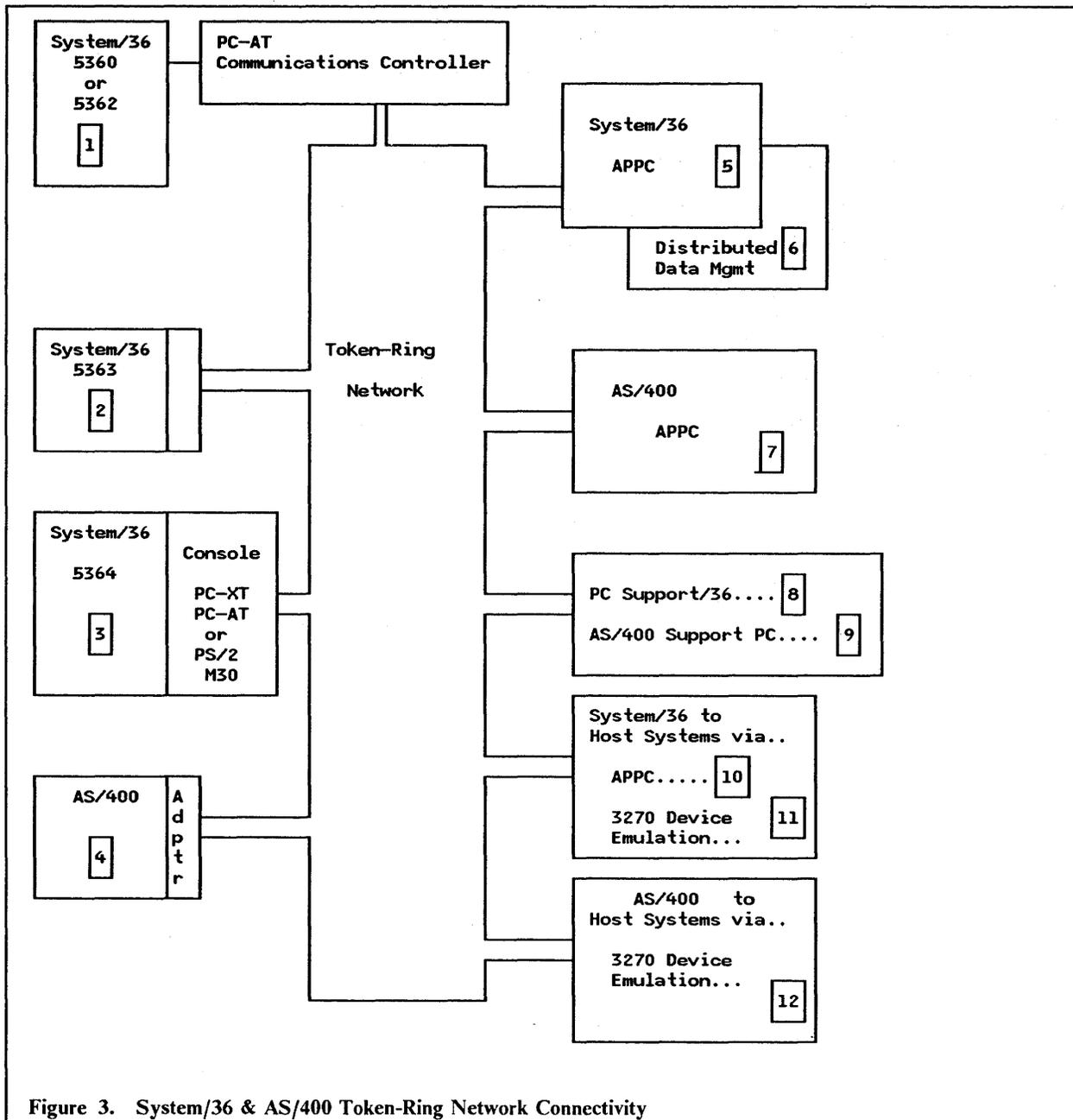
## 2.1 System/370 Host References



**Ref. Section**

- 1 "3174 Local Gateway and Downstream PUs" on page 259.
- 2 "3174 Local Gateway" on page 47.
- 3 "3174 Downstream" on page 61.
- 4 "3174 Remote Gateway and Downstream PUs" on page 262.
- 5 "3174 Remote Gateway" on page 55.
- 6 "37XX Gateway and Downstream PUs" on page 265.
- 7 "INN Sessions over Token-Ring" on page 275.
- 8 "VTAM Support for 9370 LAN" on page 247.
- 9 "9370 Hardware" on page 27.

## 2.2 System/36 And AS/400 References



**Ref. Section**

- 1 "Attaching The System/36 To A Token-Ring Network" and " 5360 and 5362 System Units" on page 70.
- 2 "Attaching The System/36 To A Token-Ring Network" and " 5363 System Unit" on page 72.
- 3 "Attaching The System/36 To A Token-Ring Network" and " 5364 System Unit" on page 72.
- 4 "Attaching The AS/400 To A Token-Ring Network" on page 77.
- 5 "APPC Peer Communication" on page 297.
- 6 "System/36 Distributed Data Management (DDM)" on page 315.
- 7 "AS/400 To PEER Systems Communication (APPC)" on page 347.
- 8 "System/36 Communicating With The PC and PS/2" on page 285.
- 9 "AS/400 Communicating with Personal Computers" on page 333.
- 10 "APPC Host Communication" on page 306.
- 11 "System/36 3270 Device Emulation" on page 321.
- 12 "AS/400 3270 Device Emulation" on page 357.

## 2.3 PC and PS/2 References

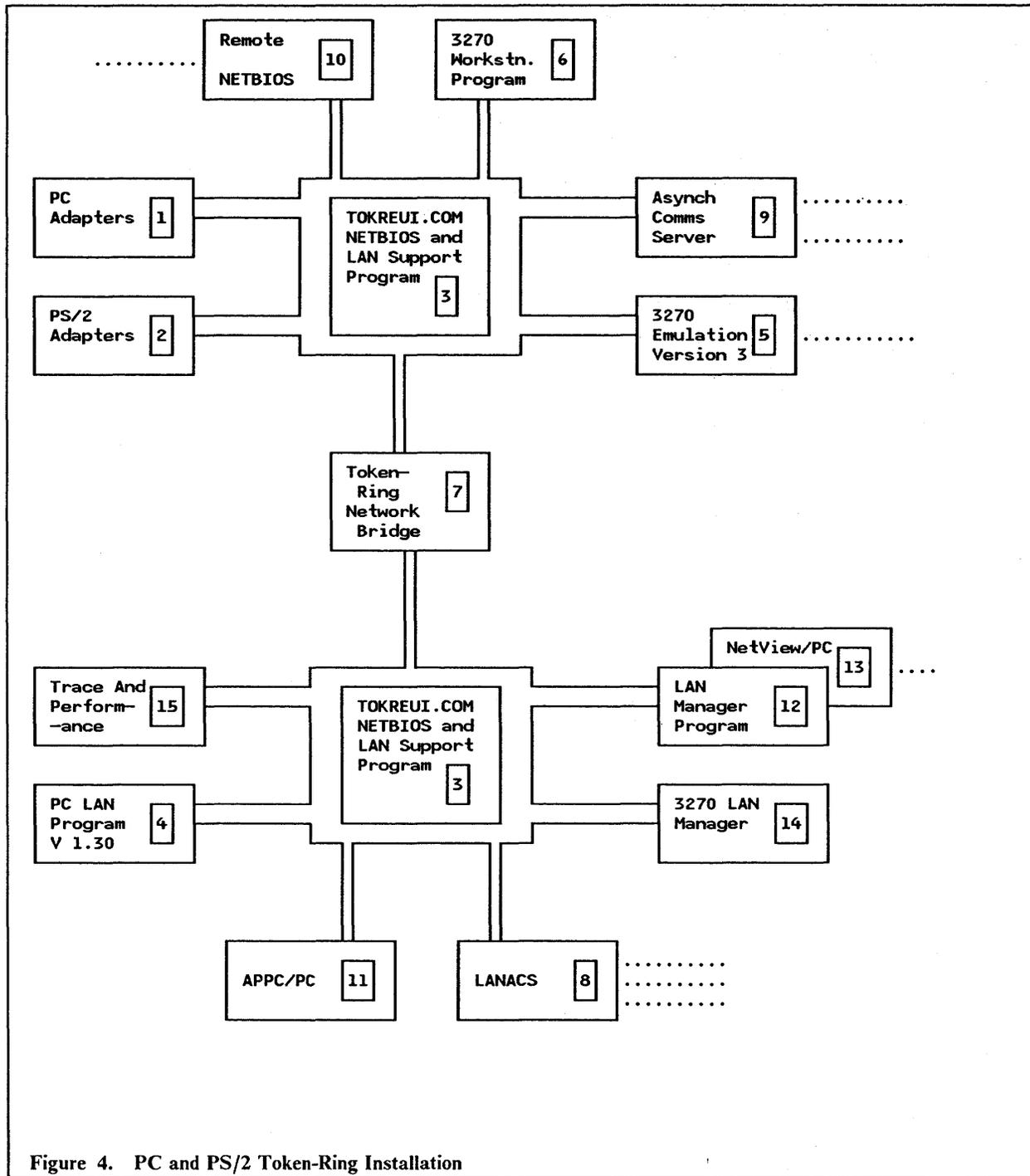


Figure 4. PC and PS/2 Token-Ring Installation

**Ref. Section**

- 1 "PC Token-Ring Network Adapter Installation" on page 15.
- 2 "PS/2 Token-Ring Adapter/A Installation" on page 21.
- 3 "LAN Support Program" on page 83.
- 4 "PC LAN Program V1.3" on page 103.
- 5 "PC 3270 Emulation Program Version 3" on page 141.
- 6 "3270 Workstation Program Version 1.1" on page 169.
- 7 "Token-Ring Network Bridge Program V1.1" on page 179.
- 8 "LAN Asynchronous Connection Server (LANACS)" on page 221.
- 9 "Asynchronous Communications Server" on page 189.
- 10 "Remote NETBIOS Access Facility Version 2" on page 201.
- 11 "APPC/PC" on page 235.
- 12 "LAN Manager Version 1.0" on page 399.
- 13 "NetView/PC" on page 387.
- 14 "3270 Emulation LAN Manager Program" on page 419.
- 15 "Trace and Performance Program" on page 421.

## 2.4 Banking System References

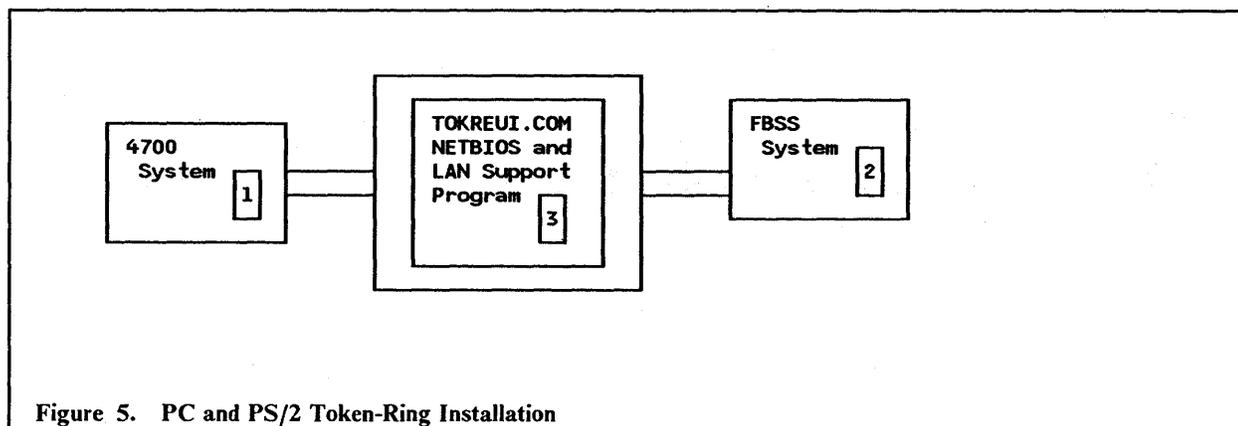


Figure 5. PC and PS/2 Token-Ring Installation

### *Ref. Section*

- 1 "4702 Finance Control Unit" on page 377.
- 2 "Financial Branch System Services Version 2" on page 361.
- 3 "LAN Support Program" on page 83.

***PART A. Hardware Installation of Token-Ring Network  
Products***



## **3.0 PC Token-Ring Network Adapter Installation**

### **3.1 Overview**

The IBM Token-Ring Network Adapter is a full-length feature card supporting attachment of the PC to the Token-Ring Network (TRN). The adapter operates at a data rate of 4 Megabits per second.

There are currently two kinds of the adapter for the PC; the Adapter I and Adapter II which has 8 Kb more RAM than the Adapter I giving a total of 16 Kb. The Adapter II is necessary for certain applications such as the Token-Ring Network Bridge Program. The Adapter II may also offer an advantage where it resides in a server and 15 or more stations are defined to the server. It is also more efficient in some application areas.

The PC Token-Ring Network Adapters I and II are also used in the PS/2 Models 25 and 30.

The adapter is connected to the Multistation Access Unit (MAU) with an adapter cable where the IBM Cabling System Type-1 (or casual cabling) 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, with a combination filter and 'D' connector on one end and a standard telephone connector on the other.

The adapter is shipped with a diskette containing diagnostics programs and, in the case of earlier Adapter I and II cards, an Adapter Interface Handler program. There is also an easy-to-read installation guide included.

### **3.2 Planning Checklist**

#### **3.2.1 Prerequisites - Hardware**

- One of the following: PC, PC-AT, PC-XT, Portable PC, PS/2 Mdl25, PS/2 Mdl30 (non-micro-channel models)
- PC Token-Ring Adapter I or II
- Full-length adapter slot
- 256 KB of memory
- At least one diskette drive.

#### **3.2.2 Prerequisites - Software**

- DOS Version 3.1 or later
- DOS Version 3.3 if you have a PS/2.

### 3.2.3 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 or 4
Secnd Asynch. Comms Adapter	3 ONLY
Token-Ring Adapter	2 or 3 or 7
Serial Port	3 or 4
Parallel Port	5 or 6

Figure 6. 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.

### 3.3 Installation Steps

#### 1. Set Switches

The PC Adapters I and II have two switch blocks.

Switch block-1-is at the bottom of the Adapter and block-2 is in the middle. Each block is labelled in very tiny white writing on the adapter below the block.

- Block-1 (Shared RAM Address and Interrupt Level)

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

- If this is the first, primary or only Token-Ring Network adapter card to be installed in this PC then set as in Figure 7:

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

Figure 7. Switch-Block-1 - Primary Adapter Settings for Token-Ring Network Adapter

- 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 card<sup>3</sup> then

<sup>3</sup> If you are installing a Token-Ring Network adapter with a PC Network adapter, the Token-Ring Adapter MUST be the alternate adapter.

set one card as in "a" above and set the other to be the alternate adapter as in Figure 8 on page 17.

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

Figure 8. Switch-Block-1 - Alternate Adapter Settings 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 9 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 9. Switch-Block-1 - Interrupt Levels

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

- Block-2 (primary/alternate, Adapter I or II)

Easily identifiable, as switches 3,5,6,7,8 are glued to the ON position.

To identify the adapter as an Adapter I or II, switch-1 should be set as follows:

ADAPTER	SWITCH-1
I	OFF
II	ON

Figure 10. Switch-Block-2 - Adapter I or II

To identify the adapter as either primary or alternate, set switch-2 as in Figure 11 on page 18:

ADAPTER	SWITCH-2
Primary	OFF
Alternate	ON

Figure 11. Switch-Block-2 - Primary and Alternate Settings

The rest of the block should be as in Figure 12:

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

Figure 12. Switch-Block-2

## 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 & 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 MSAU.
- 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.

Typical problems include:

- Adapter cable not connected properly

- If not initialized, but 'COMMAND' is typed, make sure that TOKREUI or equivalent is loaded first (see "LAN Support Program" on page 83).

The diagnostics program will also tell you the Universally administered 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 the Adapter Handler Interface program. See "LAN Support Program" on page 83.

### ***3.4 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 Handler Interface Program has failed to load - see "LAN Support Program" on page 83.

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.

### ***3.5 Where To Go For More Information***

- *SA27-3710 Token-Ring Network PC Adapter Guide to Operations* - included in the adapter package
- *IBM Token-Ring Network PC Adapter Technical Reference P/N 6165876*
- *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.



## **4.0 PS/2 Token-Ring Adapter/A Installation**

### **4.1 Overview**

The PS/2 Microchannel 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 PC Token-Ring Network Adapter II with modifications for the PS/2. Reference to a PS/2 in this section will mean a microchannel model unless otherwise stated.

The PS/2 Models 25 and 30 are NOT microchannel models and therefore use PC Token-Ring Network Adapter II cards. The installation of Token-Ring Network Adapter Cards 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 15.

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.

### **4.2 Planning Checklist**

#### **4.2.1 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.

#### **4.2.2 Prerequisites - Software**

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

#### **4.2.3 Coexistence and Compatibility**

Check with Figure 6 on page 16 for details of compatibilities with other adapters. The same rules apply, but in this case parameters are set by using the reference diskette.

### **4.3 Installation Steps**

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

If you do not have a backup system reference diskette, you will need to make one - you will require a 2.0MB 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 system reference diskette and follow instructions under Option-5, Copy an Option Diskette, from the main menu. See Figure 15 on page 23.

**DO NOT USE DOS COPY TO PERFORM THIS FUNCTION.**

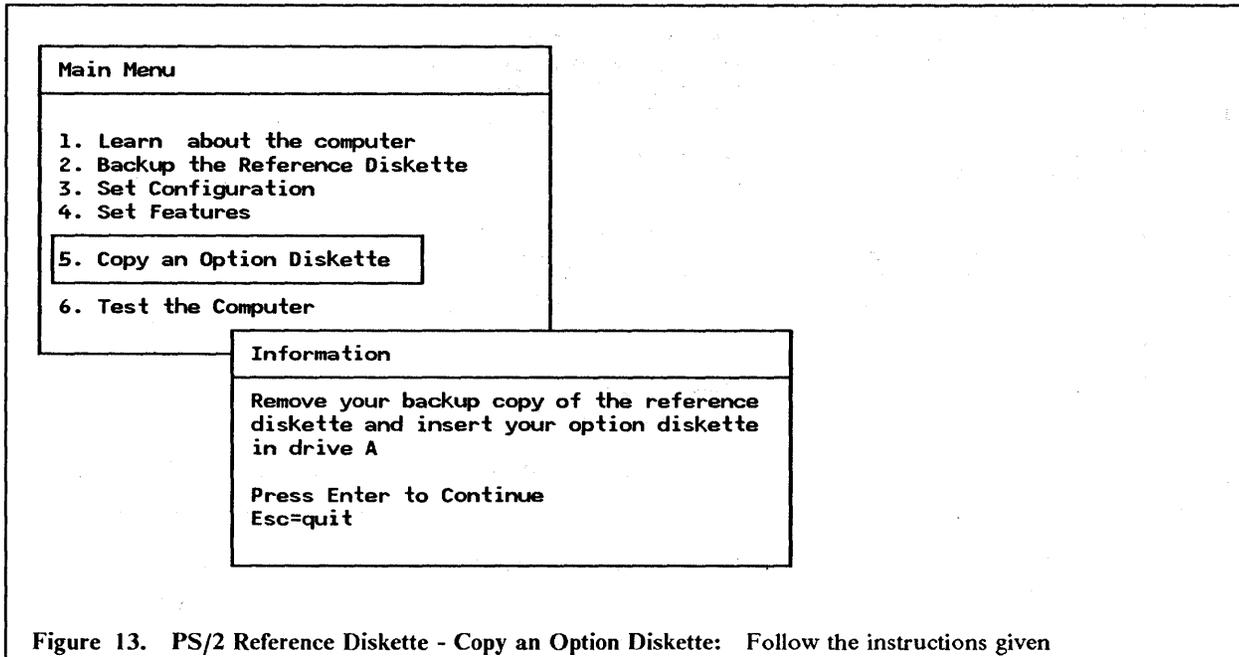


Figure 13. PS/2 Reference Diskette - Copy an Option Diskette: Follow the instructions given

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 system reference diskette. After the IBM copyright panel you will see the initial error screen<sup>4</sup> which you respond to by typing 'Y' from page 2 and the system will be automatically configured. See Figure 14 on page 23 below.

<sup>4</sup> This is caused by having a hardware configuration which does not match the system's set configuration.

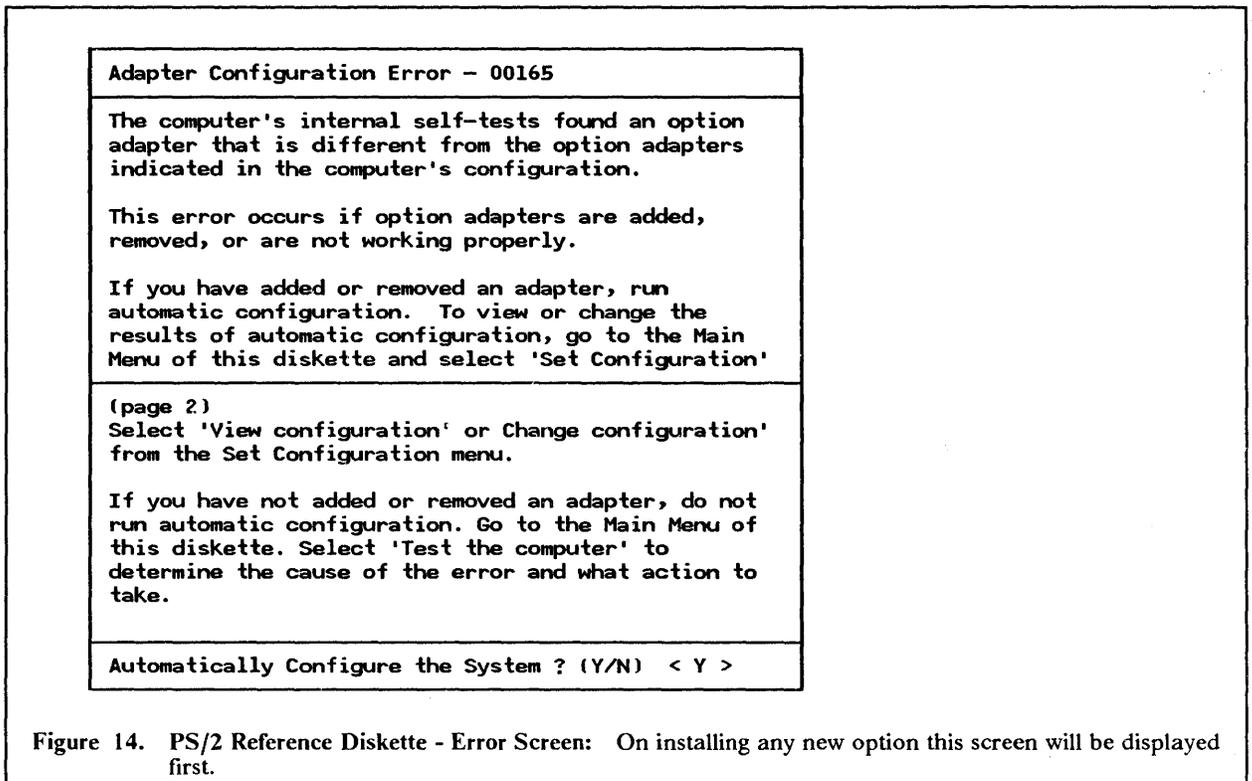


Figure 14. PS/2 Reference Diskette - Error Screen: On installing any new option this screen will be displayed first.

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

This time, after the IBM copyright panel, you will see the main menu. See Figure 15.

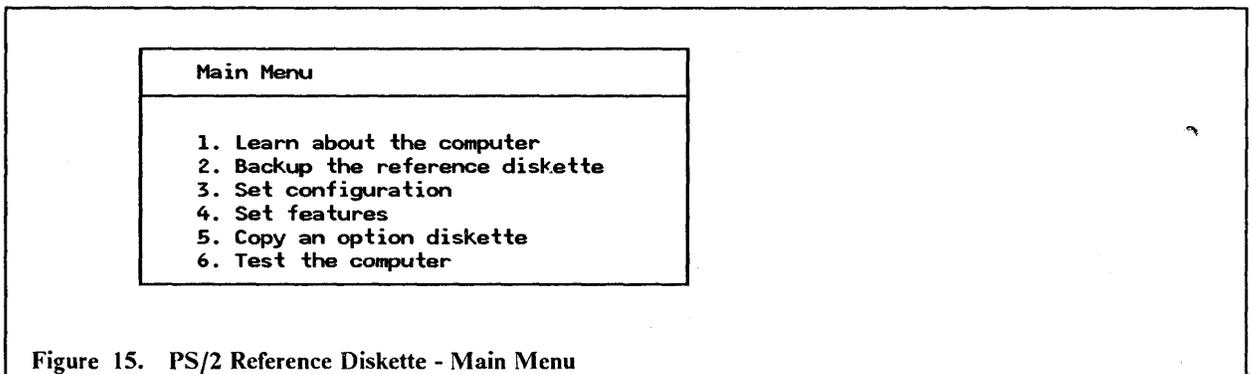


Figure 15. PS/2 Reference Diskette - Main Menu

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.

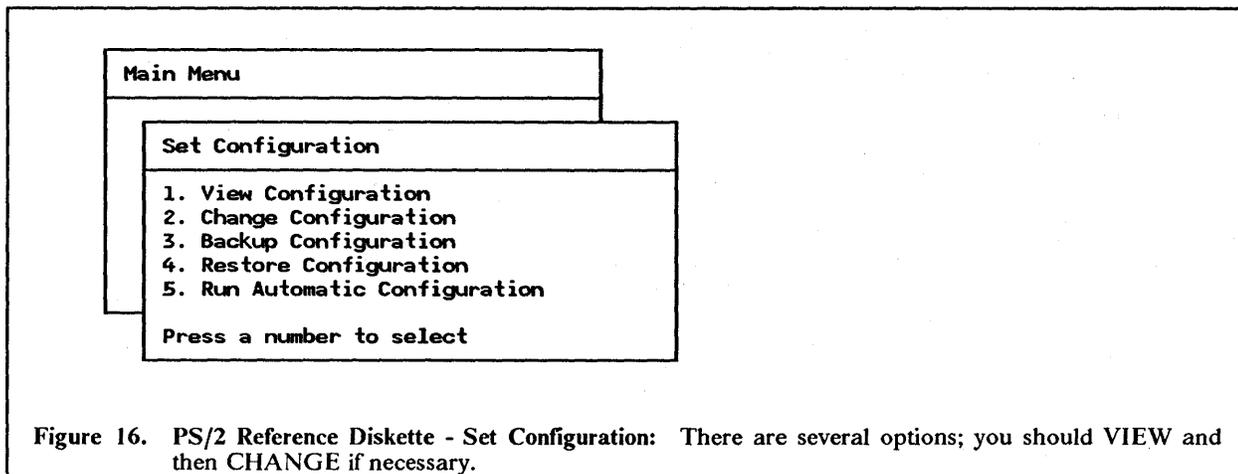


Figure 16. PS/2 Reference Diskette - Set Configuration: There are several options; you should VIEW and then CHANGE if necessary.

10. To view the configuration, choose Option 1. See Figure 17 on page 25. 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 Coprocessor .....NOT INSTALLED
  Serial Port .....SERIAL_1
  Parallel Port .....PARALLEL_1

Slot1 - EMPTY

Slot2 - EMPTY

Slot3 - EMPTY

(Page 2)

Slot4 - EMPTY

Slot5 - EMPTY

Slot6 - EMPTY

Slot7 - IBM Token-Ring Network Adapter/A
  Primary or Alternate adapter.....Primary
  ROM Address range .....CC000 - 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 17. PS/2 Reference Diskette - View Configuration: This is covered on two screens. The CHANGE menu is similar.

This menu is very similar to the View menu; 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.

## 4.4 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 system 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.

## 4.5 *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:

- *ZZ20-5588 IBM Token-Ring Network Implementation Topics*
- *GG24-IBM Token-Ring Network PC Products Description*.

## 5.0 9370 Hardware

### 5.1 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 via the IBM Token-Ring Local Area Network 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).

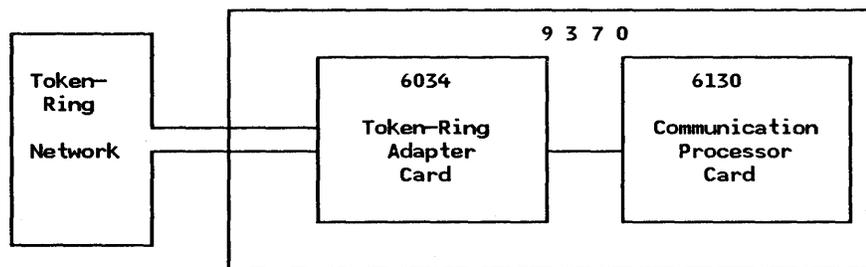


Figure 18. 9370 Token-Ring LAN Subsystem Controller

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

### 5.2 Planning Checklist

- The 9370 Token-Ring Subsystem 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:
  - Upgrade the 9370 with the 6130 and 6034 cards.
  - 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 in the 9370 to reflect the new I/O configuration.
  - Update the DMKRIO definitions for the VM operating systems I/O configuration.

## 5.2.1 Prerequisites - Hardware

- The 6130 card requires one free slot in the 9370.
- The 6034 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.

## 5.2.2 Prerequisites - Software

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

- VM/SP4
- VM/SP5
- For VSE the support for the Token-Ring Network will be included in VSE/VTAM, which will be available in the fourth quarter of 1988. 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
- Transparent Services Facilities - (TSAF), a no-charge feature of VM/SP5.
- TCP/IP Program Offering, supporting the TCP/IP protocol.

All these products will be covered in "9370 Software" on page 247.

## 5.2.3 Coexistence and Compatibility

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

## 5.2.4 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
- VM DMKRIO
  - RDEVICE macro
    - ▲ ADDRESS
    - ▲ DEVTYPE
  - RCTLUNIT macro
    - ▲ ADDRESS
    - ▲ CUTYPE
    - ▲ FEATURE
  - RCHANNEL macro

- ▲ ADDRESS
- ▲ CHTYPE

### 5.3 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 6034 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 Type 3 media (telephone twisted pair) is also supported. 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.

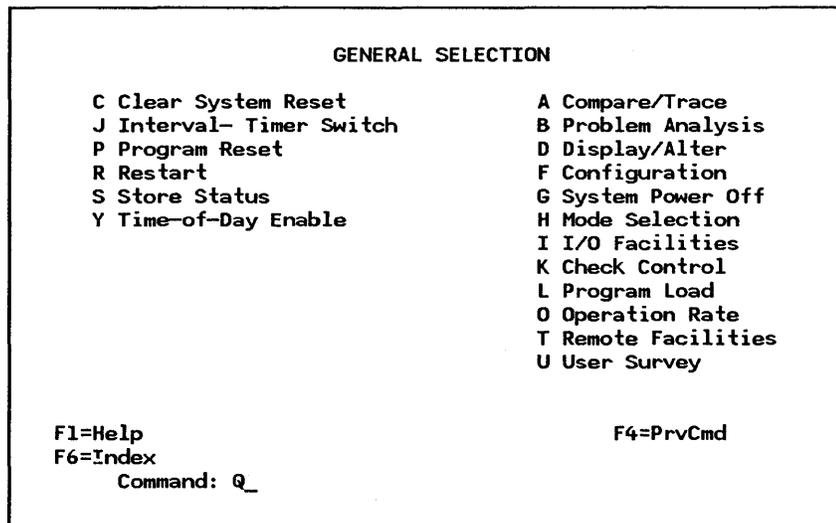


Figure 19. General Selection Screen

- b. From this screen add the letters 'FI' 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          I/O          RACK
CHANNEL        FEATURE        - UNIT
ADDRESS        - 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: 88/02/25 04:13:45

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

```

Figure 20. Next I/O Screen

The Token-Ring subsystem is displayed as '6130-0030' 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 '6130-0030' 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 1, then the DMKRIO definitions have to be like this:

- RDEVICE ADDRESS=(100,12)
- RCTLUNIT ADDRESS=100
- RCHANNEL ADDRESS=1

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

- c. Type in the number of the channel corresponding to the 6130-0030 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:

Configuration	6130-0030	page 1	
Next I/O	Rack B Unit 01A Card 07	of 2	
S/370 ADDRESS	IOA FEATURE	CARD	COMMENT
1__ - 1__	6034	08	_____
NUMBER OF USERS			
-			
F1=Help	F2=MainMenu	F4=Prvcmd	F5=PrvMenu
F6=Index	F8=PgFwd		F10=Alter
Command: QFI1_			

Figure 21. 6130-0030 Configuration Screen, Page 1

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 100, the range would be 100-10B. In this case the 12 addresses 100-10B 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 6130-0030 configuration screen will be displayed. It looks like this:

```

Configuration                               6130-0030                               Page 2
Next I/O                                     of 2

Node Address (hexadecimal).....0000 0000 0000
DMA SCB/SSB Mode (0=Cycle 1=Burst).....1
DMA List Mode (0=Cycle 1=Burst).....1
DMA list Status Mode (0=Cycle 1=Burst).....1
DMA Receive Data Mode (0=Cycle 1=Burst).....1
DMA Transmit Data Mode (0=Cycle 1=Burst).....1
DMA Receive Burst Size (0=65534, even).....128
DMA Transmit Burst Size (0=65534, even).....128
DMA Bus Retry Threshold (1-255).....1
DMA Parity Retry Threshold (1-255).....1
Inactivity Timer (30-32767, 100 ms units)....30
Enable Ring Error Monitor (0=No 1=Yes).....0

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

Command: QF11_

```

Figure 22. 6130-0030 Configuration Screen, Page 2

Only three parameters on this screen should be changed; all the others regarding the DMA specifications should be left with their default values. (Future releases of 9370 microcode will not include the DMA specifications in the "Next I/O configuration" panel). The three 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 Burned in Universal Address will be used.

**Note:** VTAM is able to specify this address at adapter open time, overriding 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 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 437.

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. VM DMKRIO Definitions

The Token-Ring subsystem has to be defined to VM operating system in order to get functional. The 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 100-10B, and "Number Of Users" as 3 in the 9370 I/O Configuration, the RDEVICE macro should look like this:

```
RDEVICE ADDRESS=(100,12),DEVTYPE=3088
```

This specifies 12 consecutive addresses starting at 100 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=100,CUTYPE=3088,FEATURE=32-DEVICE
```

This specifies that the subchannel addresses start at 100, 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=1,CHTYPE=BLKMPXR
```

This specifies that the channel address is 1, and that the channel is a block multiplexor channel.

## ***5.4 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.*



## 6.0 37XX Communication Controllers

### 6.1 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 LAN.

---

Communication Controller Hardware	Token-Ring Functionality		
	PU T2.0 sessions	PU T2.1 sessions	PU T4 and PU T5 sessions
3720	V4 Subset V4R2 V4R3 V4R3.1 V5 all rels	V4R3 V4R3.1 V5R2 V5R2.1	V4R3.1 V5R2.1
3725	V4R2 V4R3 V4R3.1	V4R3 V4R3.1	V4R3.1
3745	V5 all rels	V5R2 V5R2.1	V5R2.1

Figure 23. 37XX and NCP Token-Ring Support

---

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

Each PU communication from the ring via NCP to 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 and the NCP/NTRI is transparent to VTAM and application subsystems that uses VTAM.

The installation procedures for general (PU T2) support is 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" on page 275.

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 Figure 208 on page 274.

Definitions for a 37XX communicating to another 37XX over a Token-Ring Network are shown in Figure 211 on page 278.

## 7.0 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.

### 7.1 Overview

The 3720 attaches to the Token-Ring LAN 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 model 1 and 2 to model 11 and 12 respectively are available.

This is an overview picture of the TRA:

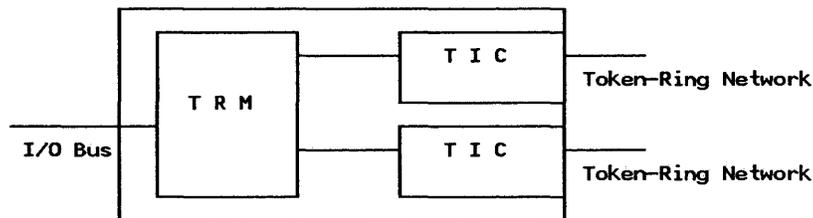


Figure 24. Token-Ring Adapter for IBM 3720 (maximum of one TRA and two TICs)

---

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

- NCP V4 Subset (Not in VSE Host Operating System environment)
- NCP V4R2
- NCP V4R3
- NCP V4R3.1
- NCP V5R1
- NCP V5R2
- NCP V5R2.1

For information on the differences in Token-Ring Network support between these versions, see "37XX Communication Controllers" on page 35.

## 7.2 *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 to a 8228 Multistation Access Unit on the Ring
  - Add and update a number of NCP generation macros.

### 7.2.1 Prerequisites - Hardware

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

### 7.2.2 Prerequisites - Software

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

### 7.2.3 Coexistence and Compatibility

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

## 7.3 *Installation Steps*

1. Upgrade the 3720 with the TIC (#4991), and you should also have one cable group #1666 per TIC.  
The TIC is installed by the customer. Follow 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 is 16 or 17.
3. Generate new NCP.

For VTAM/NCP specifications and considerations see "37XX Gateway and Downstream PUs" on page 265.

## 7.4 *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.*

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 Interface Planning and Implementation.*

## 8.0 3745

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

### 8.1 Overview

The 3745 attaches to the Token-Ring LAN through the Token-Ring Network Attachment Subsystem (TRSS). The TRSS consists of a maximum of four Token-Ring Adapters (TRA). The TRA consists of a Token-Ring Multiplexor (TRM) and two Token-Ring Interface Couplers (TIC). The TRA is a special feature of the 3745 and has feature code #4760. This is an overview picture of the TRA:

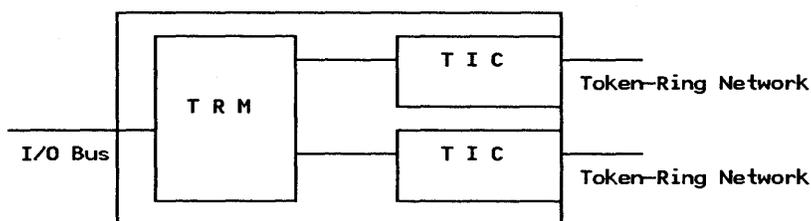


Figure 25. Token-Ring Adapter for IBM 3745 (maximum of four TRAs and eight TICs)

The TRSS allows a host computer to attach to the Token-Ring Network through a 3745 running NCP V5R1, NCP V5R2 or NCP V5R2.1. The 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 35.

### 8.2 Planning Checklist

- Check that NCP, SSP and VTAM are at compatible levels.
- The 3745 TRA can support a maximum of eight rings and a total of 1500 PUs.
- To attach the 3745 to a Token-Ring and get it operational, you must do the following things:
  - Upgrade the 3745 with the TRA (#4760) and two cable groups #1666 per TRA.
  - Connect the TRA to a 8228 Multistation Access Unit on the Ring.
  - Add and update a number of NCP generation macros.

#### 8.2.1 Prerequisites - Hardware

The 3745 must have the Option Code 9763 (TRA-Option) specified to support the installation of the TRA (#4760) adapter. If it is configured with the 9723 (NO TRA-Option) specify code it will not support the TRA. Changing from No TRA-Option to TRA-Option may require reconfiguration of 3745.

## 8.2.2 Prerequisites - Software

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

## 8.2.3 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.

## 8.3 Installation Steps

1. Upgrade the 3745 with the Token-Ring Adapter (#4760) and if necessary with TRA-Option (#9763).
2. Connect the outlet on the TRA to a 8228 Multistation Access Unit. The TRA is located in the rear "Customer Access Area" of the baseframe. 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 265.

## 8.4 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.*

## 9.0 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.

### 9.1 Overview

The 3725 attaches to the Token-Ring LAN 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:

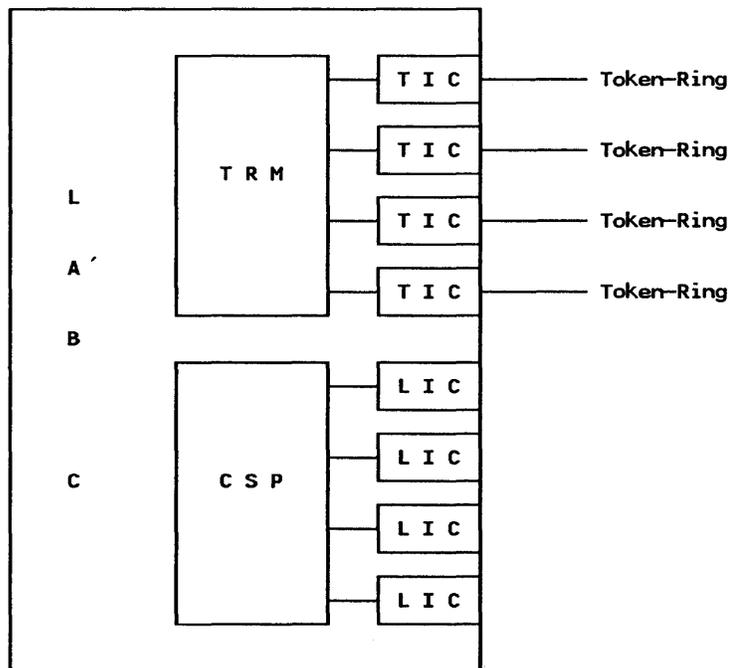


Figure 26. IBM 3725 Token-Ring Adapter

---

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 35.

## ***9.2 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.

### **9.2.1 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 memory in the 3725, and each logical connection requires 276 bytes memory.

### **9.2.2 Prerequisites - Software**

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

### **9.2.3 Coexistence and Compatibility**

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

## ***9.3 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 265.

## ***9.4 Where To Go For More Information***

For more information on installing 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.*

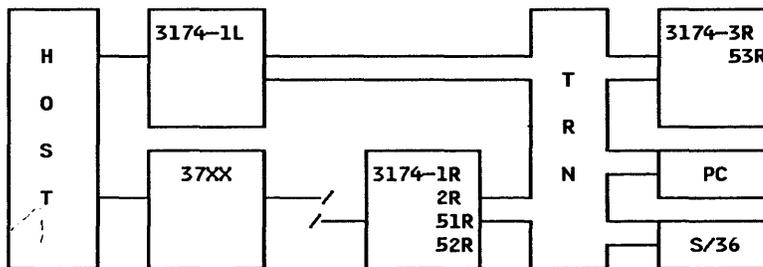


## 10.0 3174 Control Unit

### 10.1 General Overview

The IBM 3174 Subsystem Control Unit support for Token-Ring Networks can be divided in three categories:

1. Local Gateway  
An SNA channel-attached 3174-1L 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, 51R, 2R or 52R 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 or 53R can attach directly to the Token-Ring Network and communicate to a VTAM host through either an NCP gateway or 3174 gateway.



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

Figure 27. 3174 and The Token-Ring Network

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



## 11.0 3174 Local Gateway

This section describes the installation of a 3174-1L as a local gateway in a Token-Ring Network environment.

### 11.1 Overview

The IBM 3174 Subsystem Control Unit Model 1L with the IBM Token-Ring Network 3270 Gateway feature (#3025) 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 Local Gateway supports a maximum of 140 Downstream PUs (DSPUs). 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 and 53R
- 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 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
- IBM PC or PS/2 or 3270 PC using 3270 Workstation Program Version 1.1

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

The Token-Ring 3270 Gateway feature is only operable on a 3174 working in SNA mode. The 3174 Gateway is defined to VTAM and the host operating system as any SNA channel-attached control unit. Each Token-Ring attached node (for example, a 3174 model 3R) 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.

### 11.2 Planning Checklist

- Order the hardware
  - Feature code #3025
  - Additional memory, based on the number of PUs that will be attached (feature codes #1011 or #1012)
- 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 gateway has a special addressing requirement. The address defined in the host operating system for the 3174-1L gateway must end with '0'. That means that the address defined in IOCP, VM, MVS or VSE must 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 3.1.2 or later for NetView support.
- Install and customize the 3174 hardware and microcode.
  - Microcode level S1.1 will work, but S2.0 is strongly recommended.

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 Figure 196 on page 261.

### 11.2.1 Prerequisites - Hardware

At least one Storage Expansion feature (#1011 or #1012) is required. The amount of storage required is determined by the number of DSPUs defined in the 3174 customization. This is a table showing the storage requirements:

up to 28 DSPU	0.5M
up to 72 DSPU	1.0M
up to 116 DSPU	1.5M
up to 140 DSPU	2.0M

Figure 28. 3174 Gateway Storage Requirements

The storage expansion could be a combination of 0.5M cards (#1011) and 1.0M cards (#1012). The 3174 has only two slots for storage expansion, so its recommended that you install only the 1.0M cards.

### 11.2.2 Prerequisites - Software

The 3174 gateway is supported by VTAM V2R1 and later.

## 11.3 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
  - Additional memory (#1011 or #1012) based on number DSPUs
  - Standard IBM Cabling System cable to connect the 3174 to the Multistation Access Unit (MAU) or special wiring filters if you are using twisted-pair (IBM type 3) wiring.

The feature #3025 consists of the following:

- A Token-Ring Network Adapter card
- S level microcode (Utility and Control diskettes)

- 8 ft. cable to attach the TR Network adapter to the MAU
- Setup instructions

When you install the hardware, carefully follow the setup instructions that come with feature #3025. Installing the TR Network Adapter in the wrong slot in the 3174 can cause severe problems.

2. Customize the 3174 microcode.

If you are currently using A-level microcode, you should be aware that the S-level microcode 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 01L
  - 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 was 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 gateways-supported PUs. 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's address. The addresses 241 to 245 will be used by the gateway-supported PUs. For the example above, the answer to this question would be 45. The address range for gateway and supported PUs must be contiguous.
  - Question 223: Attention Delay Value  
Not used with Token-Ring Gateway feature. Response entered will have no effect.
- Token-Ring Gateway Menu
  - Question 900: Token-Ring Network Address for the gateway  
Token-Ring Address for the 3174 gateway feature. Must be a locally administered (soft) address. The address must be unique in the Token-Ring Network and have the following format:  
  
4000 abbb bbbb  
  
where 4000 is a fixed part,  
a is a hexadecimal digit 0-7  
bb..b are hexadecimal digits 0-F  
  
Values outside this range may be incompatible with other products on the network.  
  
**IMPORTANT:** If you use, or plan to use, PC 3270 Emulation Program or Workstation Program V1.1, the bb..b digits should only be 0-9.
  - 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 "Ring Error" 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, repond with a 0. For a description of the REM function see "Ring Error Monitor Function" on page 437.

- 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.
- Question 940: Ring Address Assignment Menu  
This question consist 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 29. 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 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 aocally administered address 4000 3330 1004, you should enter this address here, or if you have 3174-3R on the ring, you should enter the address you defined in question 106 at the 3R, here.
  - SAP@** This column defines the Service Access Point (SAP) of the Token-Ring 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 Emulation Program Version 3, and 1 for 3174, S/36 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 30. Ring Transmission Definition

The only columns you can change are the F and W. The value of W is always defaulted to 2; the recommendation is to use this value (for performance reasons). The default for F is based on your entries in the preceding 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 31. 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 32. 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 33. 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 34. 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 35. IOCP Definitions for 3174 Gateway**

VTAM specifications and considerations concerning the 3174-1L Gateway is described in "3174 Local Gateway and Downstream PUs" on page 259.

## ***11.4 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.*



## 12.0 3174 Remote Gateway

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

### 12.1 Overview

The IBM 3174 Subsystem Control Unit Models 1R, 2R, 51R and 52R with the IBM Token-Ring Network 3270 Gateway feature (#3025) 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 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 only type of DSPU supported is SNA PU T2.0. Any combination of the following Token-Ring attached devices is supported by the gateway:

- IBM 3174-3R and 53R
- 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 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
- IBM PC or PS/2 or 3270 PC using 3270 Workstation Program Version 1.1

The terminals attached directly to the 3174 are not affected by the gateway feature. For performance reasons it is recommended to 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 and X.21 connections or X.25 are **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.

### 12.2 Planning Checklist

- Order the Hardware
  - Feature code #3025
  - Additional memory, based on the number of PUs that will be attached (feature codes #1011 or #1012)
- 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 3174 hardware and microcode.
  - Microcode level S1.1 will work, but S2.0 is strongly recommended.

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 Figure 199 on page 265.

### 12.2.1 Prerequisites - Hardware

At least one Storage Expansion feature (#1011 or #1012) is required. The amount of storage required is determined by the number of DSPUs defined in the 3174 customization. This is a table showing the storage requirements:

up to 72 DSPU	0.5M
up to 140 DSPU	1.0M

Figure 36. 3174 Remote Gateway Storage Requirements

The storage expansion could be a combination of 0.5M cards (#1011) and 1.0M cards (#1012). The 3174 has only two slots for storage expansion, so it's recommended that you install only the 1.0M cards.

## 12.3 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
- Additional memory (#1011 or #1012) based on number DSPUs
- Standard IBM Cabling System cable to connect the 3174 to the Multistation Access Unit (MAU) or special wiring filters if you are using twisted-pair (IBM type 3) wiring.

The feature #3025 consists of the following:

- A Token-Ring Network Adapter card
- S level microcode (Utility and Control diskettes)
- Eight-foot cable to attach TR Network Adapter to the MAU
- Setup instructions

When you install the hardware, carefully follow the setup instructions that come with feature #3025. Installing the Token-Ring Network adapter in the wrong slot of the 3174 can cause severe problems.

### 2. Customize the 3174 microcode.

If you are currently using A-level microcode, you should be aware that the S-level microcode 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 01R, 02R, 51R or 52R.
- 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 900: Token Ring Network Address for the Gateway  
Token-Ring Address for the 3174 Gateway feature. Must be a locally administrated (soft) address. The address must be unique in the Token-Ring Network and have the following format:  
  
4000 abbb bbbb  
  
where 4000 is a fixed part,  
a is a hexadecimal digit 0-7  
bb..b are hexadecimal digits 0-F  
  
Values outside this range may be incompatible with other products on the network.  
  
**IMPORTANT:** If you use, or plan to use, PC 3270 Emulation Program or Workstation Program V1.1, the bb..b digits should only be 0-9.
  - Question 905: Ring Error Monitor (REM)  
REM is a function in the 3174 Gateway that detects certain error conditions on the ring and forwards the information to the host (NetView). If you want this information forwarded to host, reply with a 1. If you don't want this information forwarded, respond with a 0.
  - 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.
- 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 37. 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 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 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 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 38. Ring Transmission Definition

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

### 3. 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 262.

## 12.4 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.*



## 13.0 3174 Downstream

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

When the RPQ 8Q0575 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 3174 model 1R, 2R, 51R or 52R and the other configured as a 3R or 53R control diskette.

### 13.1 Overview

The IBM 3174 Subsystem Control Unit Models 3R and 53R 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 3174-3R supports both Multiple Logical Terminals (MLT) and an asynchronous Emulation Adapter (AEA). The 3174-53R supports only MLT. AEA and MLT requires extra hardware features. The AEA support is restricted to support only ASCII terminals communicating to an SNA host over the Token-Ring.

A model conversion for the controllers is available.

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

### 13.2 Planning Checklist

- Microcode
  - The 3R and 53R use standard microcode at level A2.0 or later.
  - The AEA and MLT support requires level A3.0 or later.
  - The current level A3.1 is recommended.
  - The 1R, 2R, 51R, and 52R with RPQ 8Q0575 use microcode at level A3.0 or higher.

### 13.3 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 the 3174. If you are using twisted-pair (IBM type 3) wiring you need special wiring filters.
2. Customize 3174 microcode.  
Following is a description of the customizing questions that are involved only in the Token-Ring attachment of the 3174:
  - Host Attachment menu
    - Question 100: 3174 Model Designation  
Respond with 03R or 53R.

- Question 101: Host Attachment  
Respond with 7 for Token-Ring Network.

- Token-Ring Network Menu

- Question 106: Token-Ring Network Address of 3174  
Respond with the Token-Ring Address of the 3174 you are customizing. The address must be unique on the Token-Ring Network. Although it is not necessary in all cases to use a locally administered address, it is recommended to use an address with this format:

4000 abbb bbbb

where 4000 is a fixed part,  
a is a hexadecimal digit 0-7  
bb..b are hexadecimal digits 0-F

Values outside this range may be incompatible with other products on the network.

**IMPORTANT:** If you use, or plan to use PC 3270 Emulation Program, the bb..b digits should only be 0-9.

- 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.
- 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 to 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.
- 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 remote 3174 Gateway, respond with 1801.
- 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.

### 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 47 and "3174 Remote Gateway" on page 55, for local and remote gateway respectively.

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

## 13.4 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.*



## **14.0 Attaching The System/36 To A Token-Ring Network**

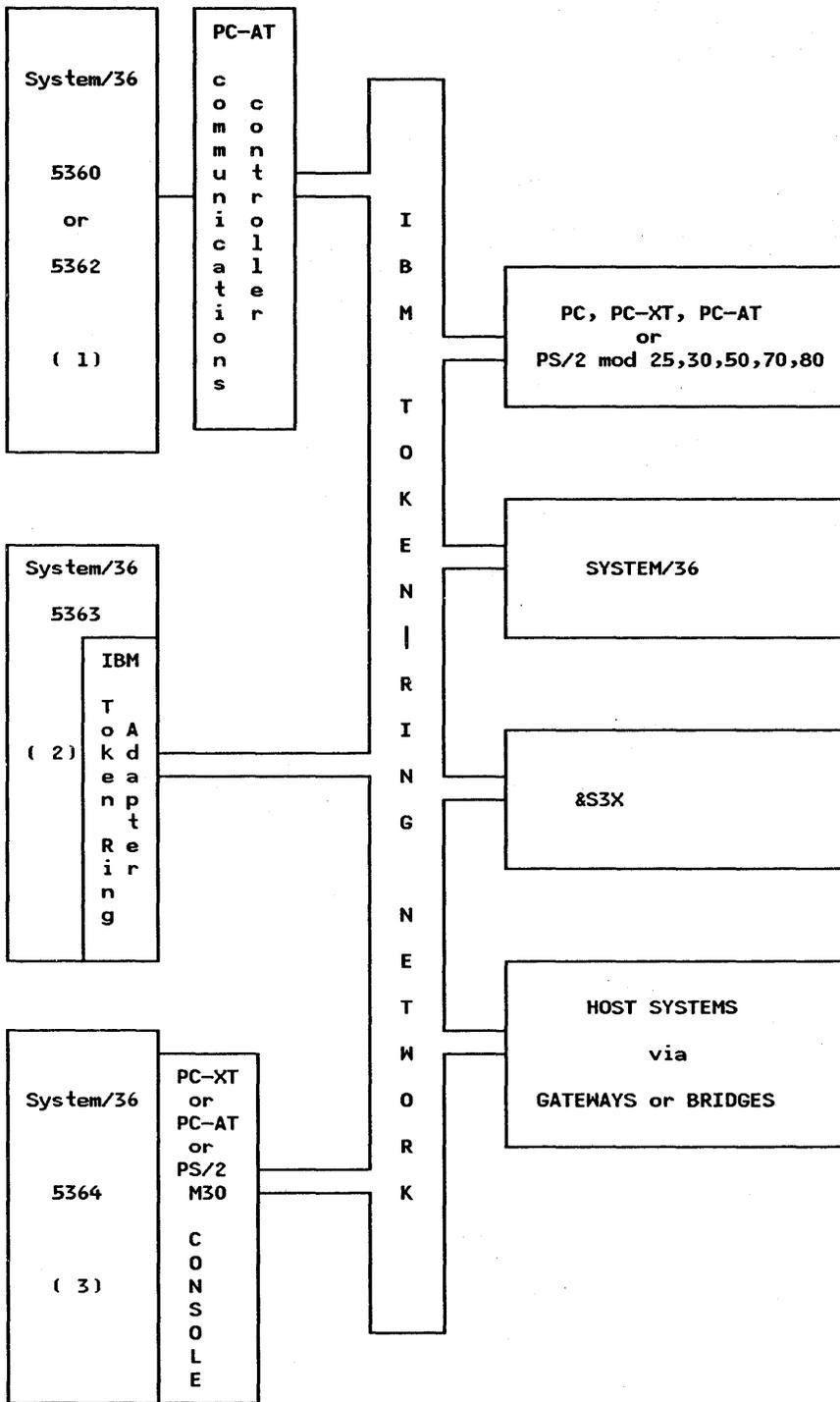


Figure 39. Attaching the System/36 to the IBM Token-Ring Network

Key to Figure

1. See section "5360 and 5362 System Units" on page 70.

2. See section “ 5363 System Unit” on page 72.
3. See section “ 5364 System Unit” on page 72.

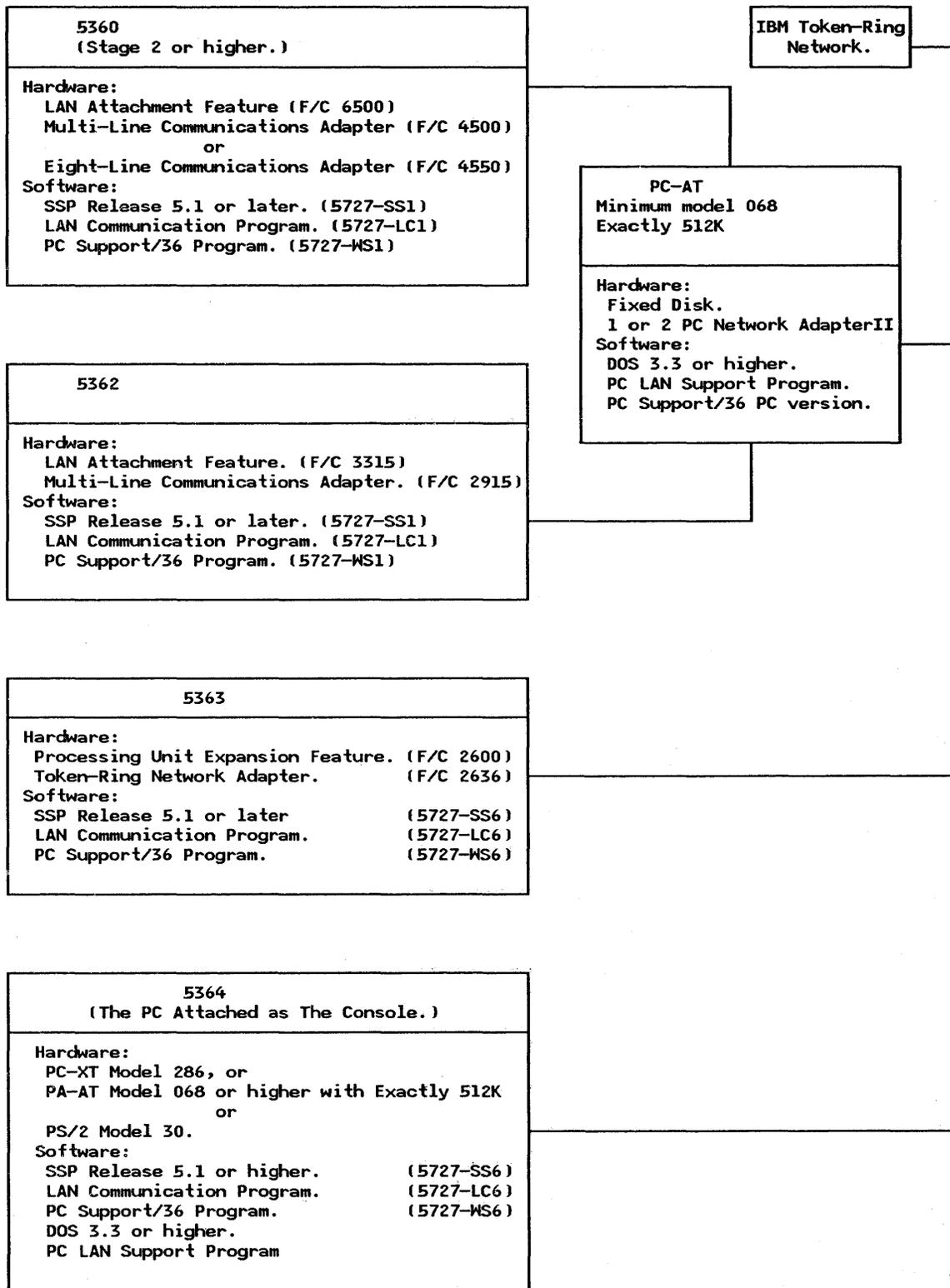


Figure 40. System/36 Attachment to the IBM Token-Ring Network

## 14.1 Overview

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

The S/36 attaches to a Token-Ring Local Area Network (LAN) either directly as is the case with the 5363, through the console of the 5364, or via a dedicated PC-AT acting as a "LAN Communication Controller" for the 5360/5362. 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.

## 14.2 Planning Checklist

### 14.2.1 Prerequisites - Hardware

SYSTEM/36 (5360/5362, 5363 and 5364).

- System/36 LAN Attachment feature (#6500 on the 5360 and #3315 on the 5362).
  - This feature contains two adapter cards; one is to be installed in System/36 and the other is to be installed in the PC-AT that forms the "communication controller" to the LAN. It also includes a connecting cable and a PC installation diskette.
- On the PC-AT "communication controller" (for 5360 & 5362)
  - A PC-AT (minimum model 068) with exactly 512K of memory.
  - One or two Token-Ring PC Network Adapter II cards
- On the 5363
  - Processing Unit Expansion feature #2600
  - Token-Ring Network Adapter feature #2635
- On the 5364
  - A PC-XT model 286,
  - Or a PC-AT (minimum model 068) with 512K or more of memory,
  - Or a PS/2 Model 30
  - One or two Token-Ring PC Network Adapter II cards (Only one is supported in the PS/2 Model 30).
- A Multistation Access Unit (MAU)

### 14.2.2 Prerequisites - Software

- System/36 SSP Release 5.1 or higher (5727-SS1 on the 5360/5362 and 5727-SS6 on the 5363/5364)
- System/36 LAN Communication Program (5727-LC1 on the 5360/5362 and 5727-LC6 on the 5363/5364)
- PC Support/36 Program (5727-WS1 on the 5360/5362 and 5727-WS6 on the 5363/5364)
  - 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

- PC LAN Support Program

### 14.2.3 Prerequisites - Other

#### 1. 5360/5362 SYSTEM UNITS

- The 5360 System Unit **MUST** be Stage 2 or higher.
- Multiple Line Communications Adapter (MLCA) on the 5360/5362 or the Eight Line Communications Adapter (ELCA) on 5360 must be installed.

#### 2. 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.

#### 3. 5364 SYSTEM UNIT

- The 5364 attaches to the LAN via its console. This can be either a PC-XT model 286, a PC-AT model 068 or higher with exactly 512K of memory or a PS/2 model 30. The Token-Ring PC Network Adapter II must be installed in the console.

### 14.2.4 Coexistence and Compatibility

1. The System/36 LAN Attachment feature (#6500), 6157 Tape Attachment feature (#7950) and SLCA Communications feature (#2550) cannot co-reside.
2. The 5360 or 5362 does not act as a bridge when the dedicated PC-AT is connected to two separate Token-Ring Networks.
3. 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.
4. The Token-Ring Network Attachment cannot be used concurrently with BSC or Asynchronous Communications support.
5. 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.

## 14.3 Installation Steps

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

### 14.3.1 Hardware Installation

#### 14.3.1.1 5360 and 5362 System Units

Attaching these system units to the Token-Ring Network requires the installation of the System/36 LAN Attachment Feature (#6500 on the 5360 and #3315 on the 5362). You should ask your IBM CE/CSR to

assist you in the performance of this task as the reconfiguration of the microcode is an integral part of the installation and system verification process.

The PC-AT LAN controller: Follow the steps in the *Guide to Operations* manual, to install the PC-AT. Install the PC Token-Ring Adapter II card(s) as per the instructions that follow. Since this PC-AT is to function in a dedicated mode, it is assumed that no other adapter cards are to be installed.

- One or two Token-Ring Network Adapter II cards may be installed. Set the switches on the cards as shown below.
- On the first adapter card:

	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
OFF		XXX		XXX				

Switch Block #2

- Second adapter card (optional);

	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

This setting means that this is the secondary or alternate adapter, the interrupt level is '3' and the ROM starting address is 'C4000'

- Install the cards and run the diagnostics for Token-Ring Network Adapter. This is to verify that the adapter(s) is working and also to find out the address of the adapter(s). This data will be required to set up the other PCs in the Token-Ring Network.
  - A 12-digit user-defined address can be given to this adapter by performing the SETCOMM command. The advantage of this is that should the adapter card be changed, it will not affect the configuration of the PCs and PS/2s communicating with the System/36 on the network.
- Install the System/36 Token-Ring Network Attachment Adapter. This is the card that will link the PC-AT to the System/36. Set the switches on the adapter card as shown below.

	1	2	3	4
ON	XXX			
OFF		XXX	XXX	XXX

Switch Block #1

**Note:** The System/36 Token-Ring Network Attachment Adapter assumes control of the DOS session; therefore you will NOT see the DOS prompt when the PC-AT is booted up. If for any reason you should want to return to normal DOS operation, you can either remove the Network Attachment Adapter or change the setting of switch 1 on the adapter card to OFF.

- 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 the IBM 8228 Multistation Access Unit (MAU) connected in the network.

### 14.3.1.2 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 the IBM 8228 Multistation Access Unit (MAU) connected in the network.

### 14.3.1.3 5364 System Unit

The 5364 System unit attaches to the Token-Ring Network through the directly attached PC serving as its console. This can be either a PC-XT (286), a PC-AT or a PS/2 model 30. The memory requirement of the PC (console) is exactly 512K. As was the case in the other system units, up to two Token-Ring Network Adapter II cards may be installed (except in the PS/2 model 30, where only one adapter can be installed). If however the SDLC communications adapter is also to be installed in the PC-XT or the AT, then only

one Token-Ring Network Adapter card can be installed. Set the switches on the adapter card(s) as per 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
OFF		XXX		XXX				

**Switch Block #2**

- Install the card(s) and customize the system as you would for any other new feature added. Run the diagnostics for the Token-Ring Adapter to ensure that it is properly installed as well as to find out the address of the adapter. Note this address; it will be needed to install other 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 the 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 15. 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, 60 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 chapter "PS/2 Token-Ring Adapter/A Installation" on page 21. Refer to the *LAN Support Program User's Guide* for additional information.

This completes the hardware installation.

### 14.3.2 Software Installation

There are certain software products that are essential for the System/36 to communicate across a Token-Ring Local Area 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      25
  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 (50 for the 5360/5362 and 15 for the 5363/5364) 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.

## 14.4 Basic Troubleshooting

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

- 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, make sure you have noted the specific problem indication and report it to the IBM service representative.

## ***14.5 Where to Go for More Information***

Added information can be obtained from the following sources:

- **INSTALLATION**
  - SA21-9430 Setting Up Your Computer*
  - SA21-9486 Installing Your New Features (5362)*
  - 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.*

## ***14.6 Migration Issues***

Migration issues and a brief user's guide are included in chapter "Using The System/36 on The LAN" on page 283.

## **15.0 Attaching The AS/400 To A Token-Ring Network**

### ***15.1 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 the 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.

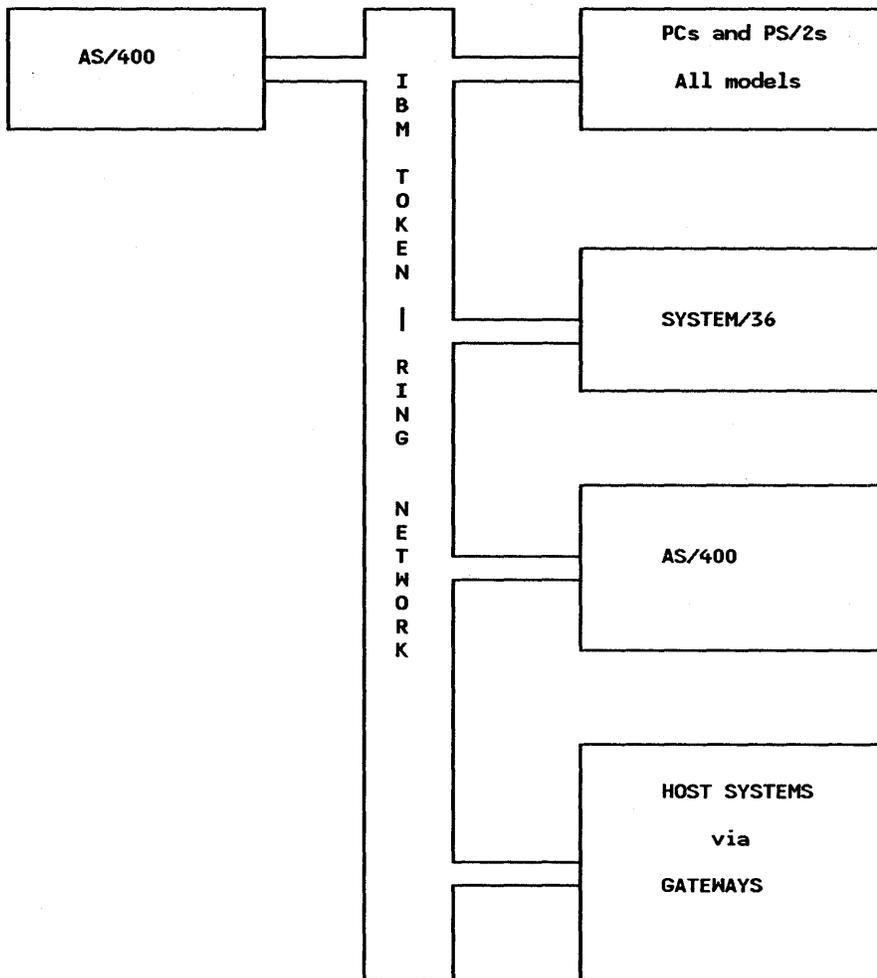


Figure 41. Attaching the AS/400 on the IBM Token-Ring Network

## 15.2 Planning Checklist

### 15.2.1 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.

### 15.2.2 Prerequisites - Software

- AS/400 System Support Program
- AS/400 PC Support Program

## 15.3 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.

## 15.4 Installation Steps

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

### 15.4.1 Hardware Installation

The AS/400 attaches directly to the 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.

### 15.4.2 Software Installation

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.
5. Specify network attributes.
  - These attributes identify your system and the network to which it is attached. You should use the same name for system name (SYSNAME), local control point name (LCLCPNAME) and local location name (LCLLOCNAME). These attributes will become effective after the next IPL.
  - Use the CL command CHGNETA to specify these attributes. The format of this command is:

**CHGNETA**    **SYSNAME(value1)**    **LCLCPNAME(value1)**    **LCLLOCNAME(value1)**  
                  **LCLNETID(value2)**

Where:

- Value1 is the local name assigned to your AS/400
- Value2 is the assigned net ID

These values will become effective after the next IPL.

## ***15.5 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.

## ***15.6 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.*

***PART B. Software Installation for Token-Ring Network  
Products***



## 16.0 LAN Support Program

### 16.1 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 103.

Prior to the announcement of the LAN Support Program, these functions were provided for the Token-Ring Network by the NETBIOS Program Product (NETBEUI.COM) and by the Adapter Handler Interface program (TOKREUI.COM) that came on the diagnostics diskette with the adapter.

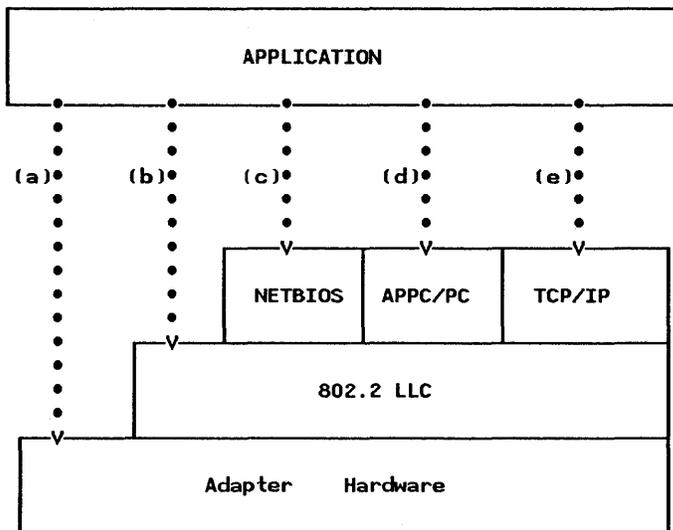
The PC Network was originally supported through microcode on the adapter which provided the NETBIOS Interface. Later, the PC Network Protocol Driver program provided this function for the PC Network Adapter II cards.

Interfaces in general are very important; they protect applications from the different network hardwares 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 (do not confuse this with the LAN Support Program) which can be used both on a Token-Ring Network and a PC Baseband or Broadband Network.

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 42 on page 84.



**Figure 42. LAN Interfaces:** Applications can use the network through several different protocols. Examples of each are:

- (a) Token-Ring Network Bridge Program
- (b) Workstation Program or 3270 Emulation 'Standalone' configuration; in both cases the device communicates directly with the host gateway.
- (c) PC LAN Program or 3270 Emulation using a PC Gateway.
- (d) APPC/PC
- (e) TCP/IP Applications

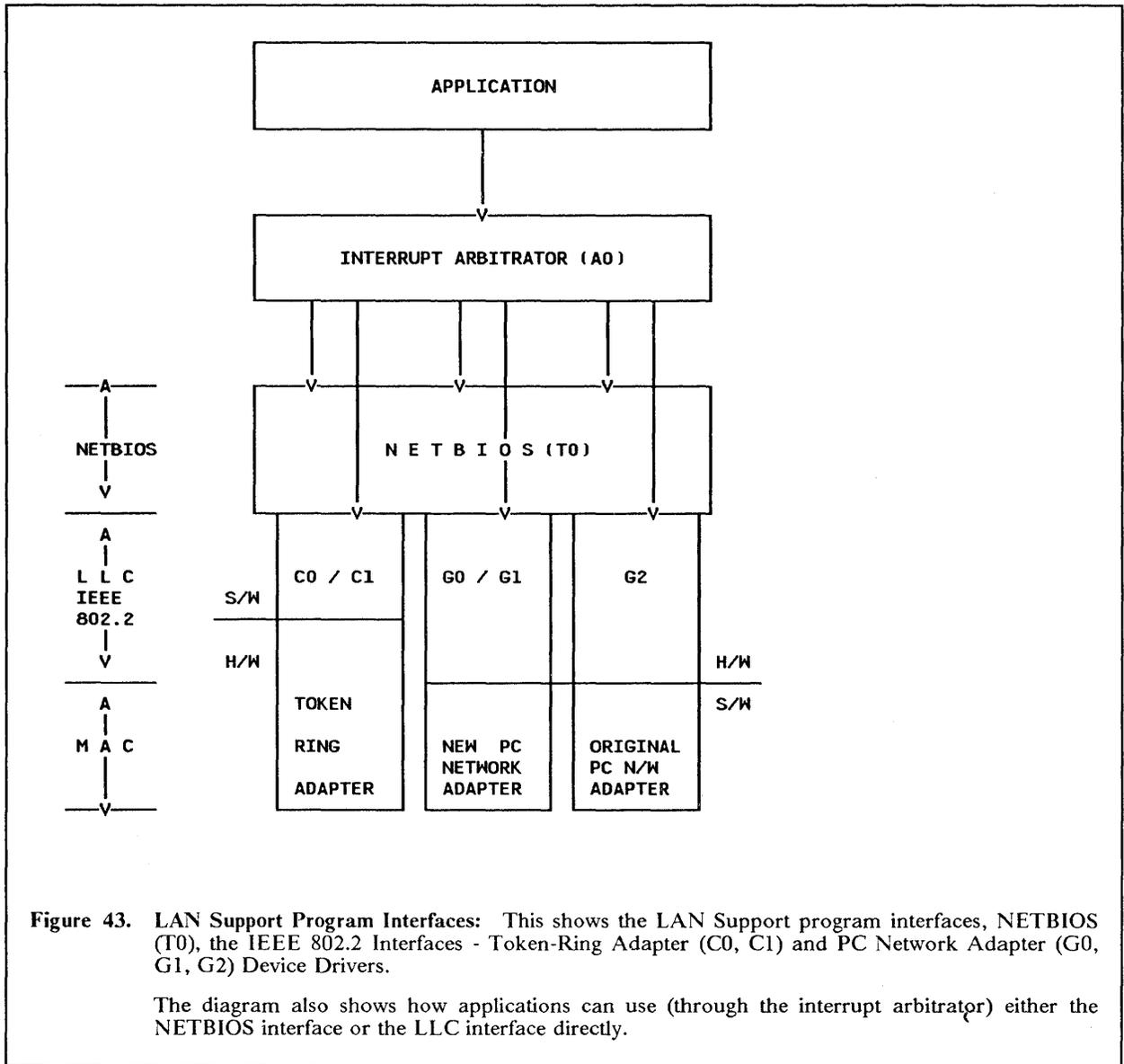
The LAN Support Program provides some of these interfaces; its structure and relationship to different adapters is shown in Figure 43 on page 85.

## 16.2 Planning Checklist

### 16.2.1 Prerequisites - Hardware

- One of PC, PC-XT, PC-AT, Industrial Computer, 3270-PC 3270-PC, PS/2
- With at least 128KB of memory<sup>5</sup>
- A diskette drive
- A display
- Attachment to an IBM Local Area Network using one or two of the following adapters:  
Token-Ring Adapter - I, II, /A

<sup>5</sup> If the configuration aid will be used to configure the computer, it will need at least 256KB of memory.



**Figure 43. 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.

PC Network Adapters - original<sup>6</sup>, and new adapters<sup>7</sup>

PC Baseband Adapters - Adapter, Adapter/A

## 16.2.2 Prerequisites - Software

- DOS 3.3 or higher

<sup>6</sup> 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, 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.

<sup>7</sup> References to new PC Network Adapters will mean the following: II, II/A, II-freq2, II/A-freq2, II-freq3, II/A-freq3.

## 16.2.3 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)<sup>6</sup> (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 PCN Protocol Driver is designed to run on a PS/2 or a PC with a new PCN Adapter card<sup>7</sup>. It is the equivalent of the NETBIOS Interface that exists in the ROM of the original PCN Adapters. It is a device driver similar to the LSP and is loaded by a statement in the CONFIG.SYS. For more information see FLASH 8747 on HONE.

### *Using Old NETBIOS Parameters with LSP*

If 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 9K. 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*

The LAN Support Program, when used with Token-Ring Adapters, provides compatibility with all versions of NETBIOS and TOKREUI 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.

## 16.3 LAN Support Program Structure

The LAN Support program files are a group of device drivers.<sup>8</sup> 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 (less than 1KB)  
This device driver is required in **all** installations.
- dxmC0mod.sys** Supports the Token-Ring Adapters I, II and /A (8KB)
- dxmC1mod.sys** Use instead of C0 when the 3270 Workstation Program is to be used (14KB)
- dxmG0mod.sys** Supports the new PC network adapters <sup>7</sup> and the PC Network BASEBAND adapters too (34KB)
- dxmG1mod.sys** Use instead of G0 when the 3270 Workstation Program is to be used (35KB)

---

<sup>8</sup> A device driver provides a software interface for a device, such as printer, keyboard or adapter.

**dxmG2mod.sys** Supports the ORIGINAL PC Network Adapter (34KB) <sup>6</sup>

**dxmT0mod.sys** This is the NETBIOS interface driver (23KB)

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

There are two 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 parameter<sup>9</sup>.

#### 2. Shared RAM

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. If Adapter/A is used, these parameters are ignored - they are specified during installation of the adapter. See "PS/2 Token-Ring Adapter/A Installation" on page 21.

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.

The CONFIG.SYS statement for C0 and C1 would look like this<sup>9</sup>.

'DEVICE = DXMCnMOD.SYS addr0, mem0, addr1, mem1' ..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

**addr1** Replace with the locally administered address for the secondary adapter

**mem0** Replace with the RAM location for the secondary adapter

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 ',' must be used to denote omitted parameters.

### 16.3.2 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 adapter<sup>9</sup>.

#### 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:

---

<sup>9</sup> 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.

Requirements for Adapter	Work Space
Default	8K
upto 16 Sessions	8K
16 - 23 Sessions	16K
23 - 32 Sessions	32K

For more sessions, increase the workspace required.

The CONFIG.SYS statement for G0, G1, G2 would look like this<sup>10</sup>

'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 ',' must be used to denote omitted parameters.

### 16.3.3 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.

## 16.4 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

<sup>10</sup> Driver 'G2' supports only ONE adapter.

- 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. What this section will try to do is introduce the major parameters, explain their function, how they related and give some suggested values<sup>11</sup>. There are some worksheets at the end to help you calculate the T0 parameters you require.

### 16.4.1 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 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 T0, then when, for example, the 'NET START' command is issued, this will request control of some (or all) resources from T0 (NETBIOS) as specified in 'NET START' 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.

### 16.4.2 Terminology

NETBIOS parameters refer to some fundamental characteristics of LAN communications. Some of the terminology is explained below. See also Figure 44 on page 90.

**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. ie, implies implementation of a buffer capability.

---

<sup>11</sup> 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.

**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 STATION 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!

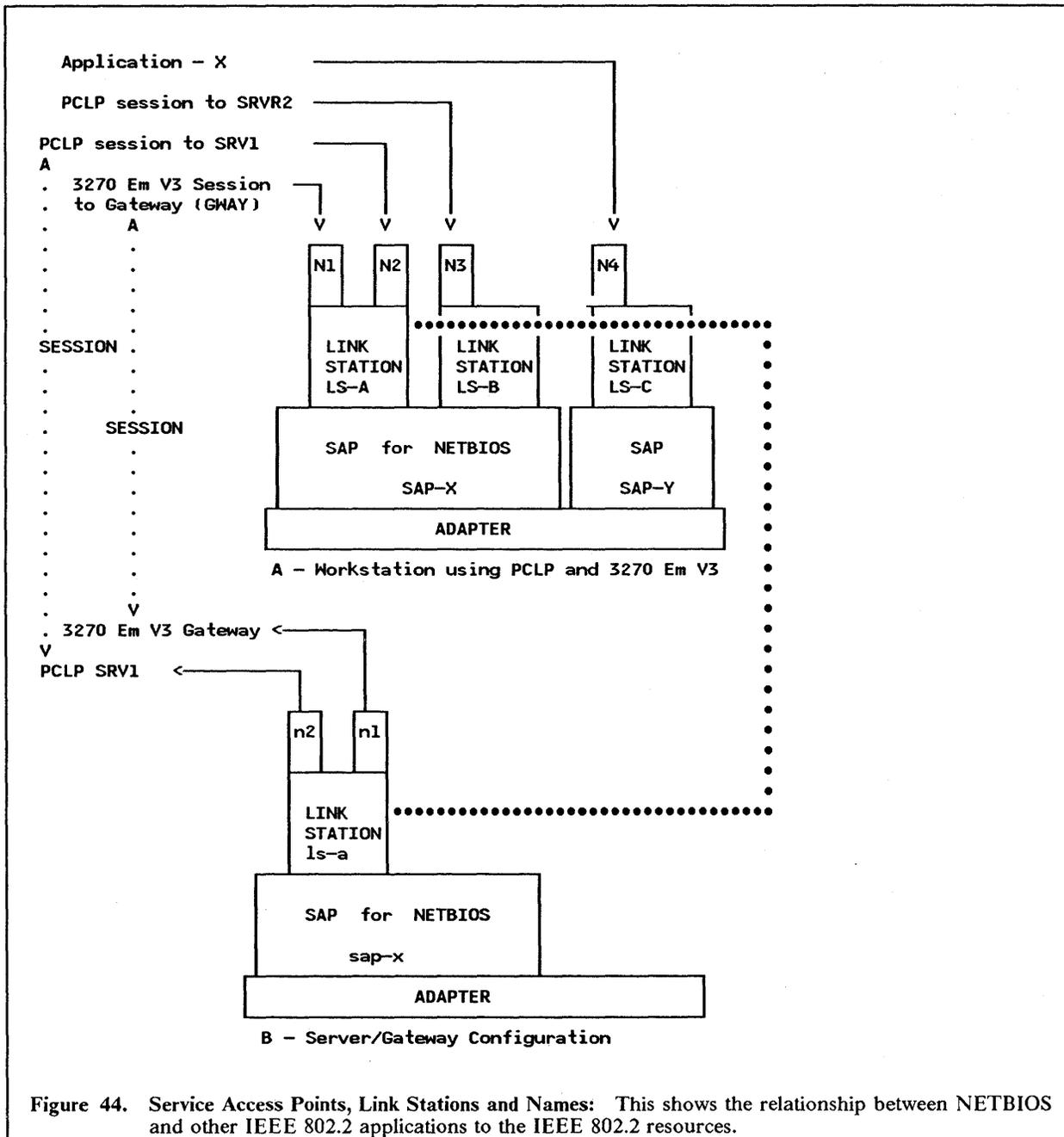


Figure 44 illustrates the resources and connections made. Workstation-A is running PCLP and 3270 Emulation to workstation-B which is BOTH the Server and the 3270 Gateway. NETBIOS has been allocated a SAP (SAP-X). Both these applications are NETBIOS applications and both use the NETBIOS SAP.

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 wished 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-lsa).

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 STATION (LS-C) defined.

As you can see in Figure 44 on page 90, 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 and 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 (see below). 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, all 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.

### 16.4.3 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	6
SESSIONS	S	0 - 254	1	6 (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

Figure 45. NETBIOS Device Driver Keyword Table (DXMT0MOD.SYS)

NOTES

- (a) If this value is too large, the adapter open will fail with error 31E. 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.

## 16.5 Setting Parameters

This section will assist in coding only the parameters given in the table in Figure 45. 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 setting<sup>9</sup>.

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.

### 16.5.1 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.

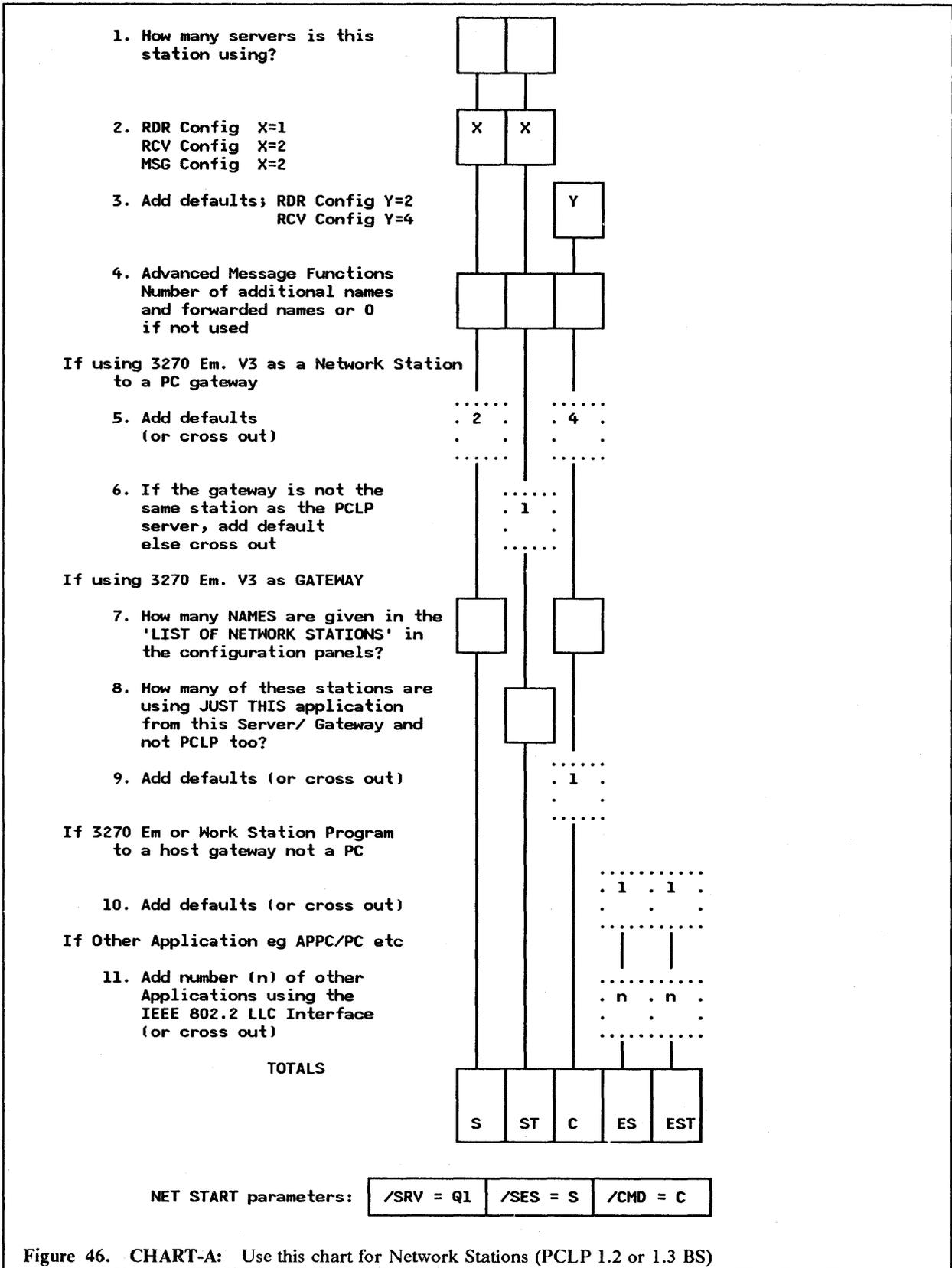


Figure 46. CHART-A: Use this chart for Network Stations (PCLP 1.2 or 1.3 BS)

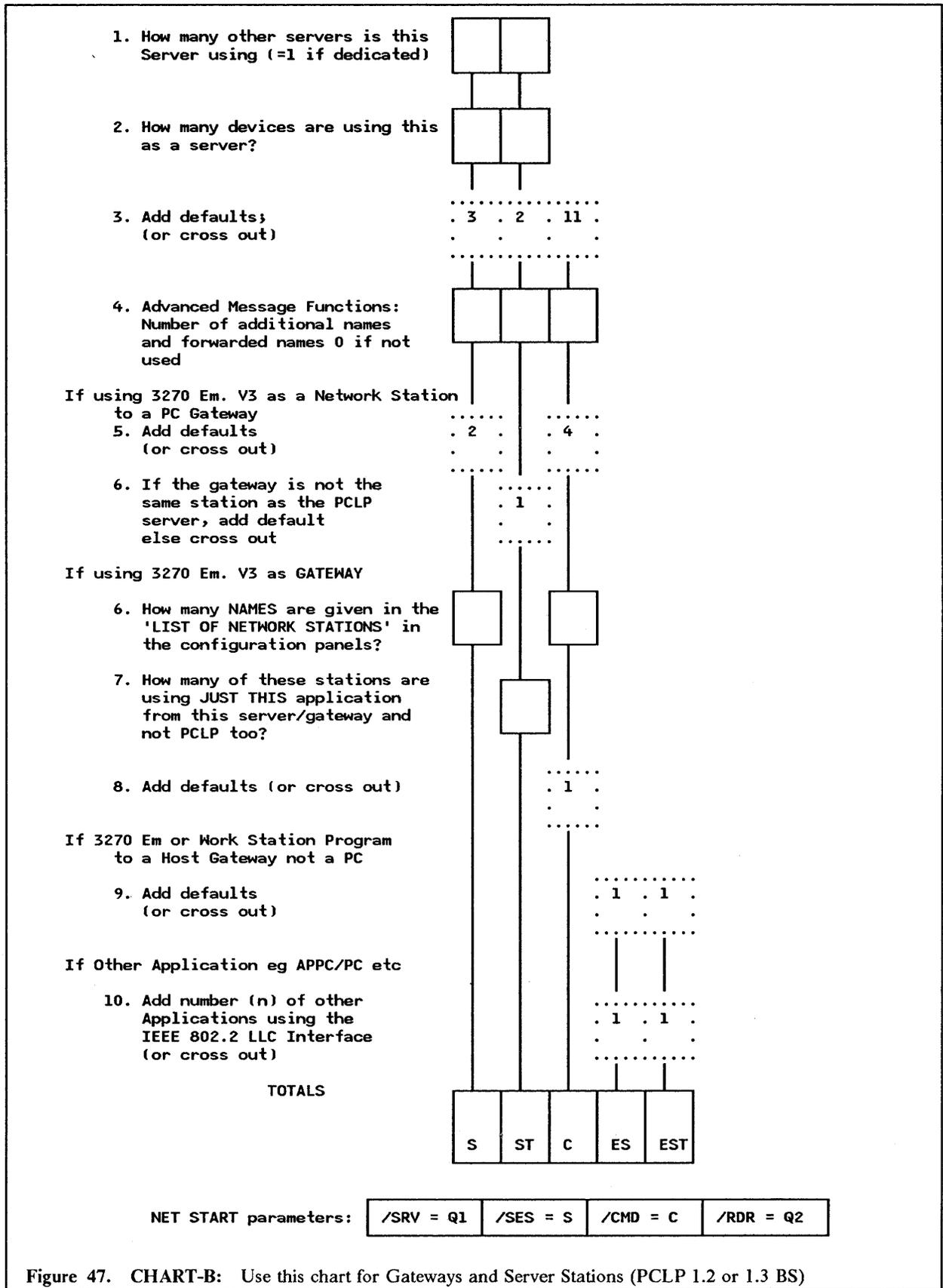


Figure 47. CHART-B: Use this chart for Gateways and Server Stations (PCLP 1.2 or 1.3 BS)

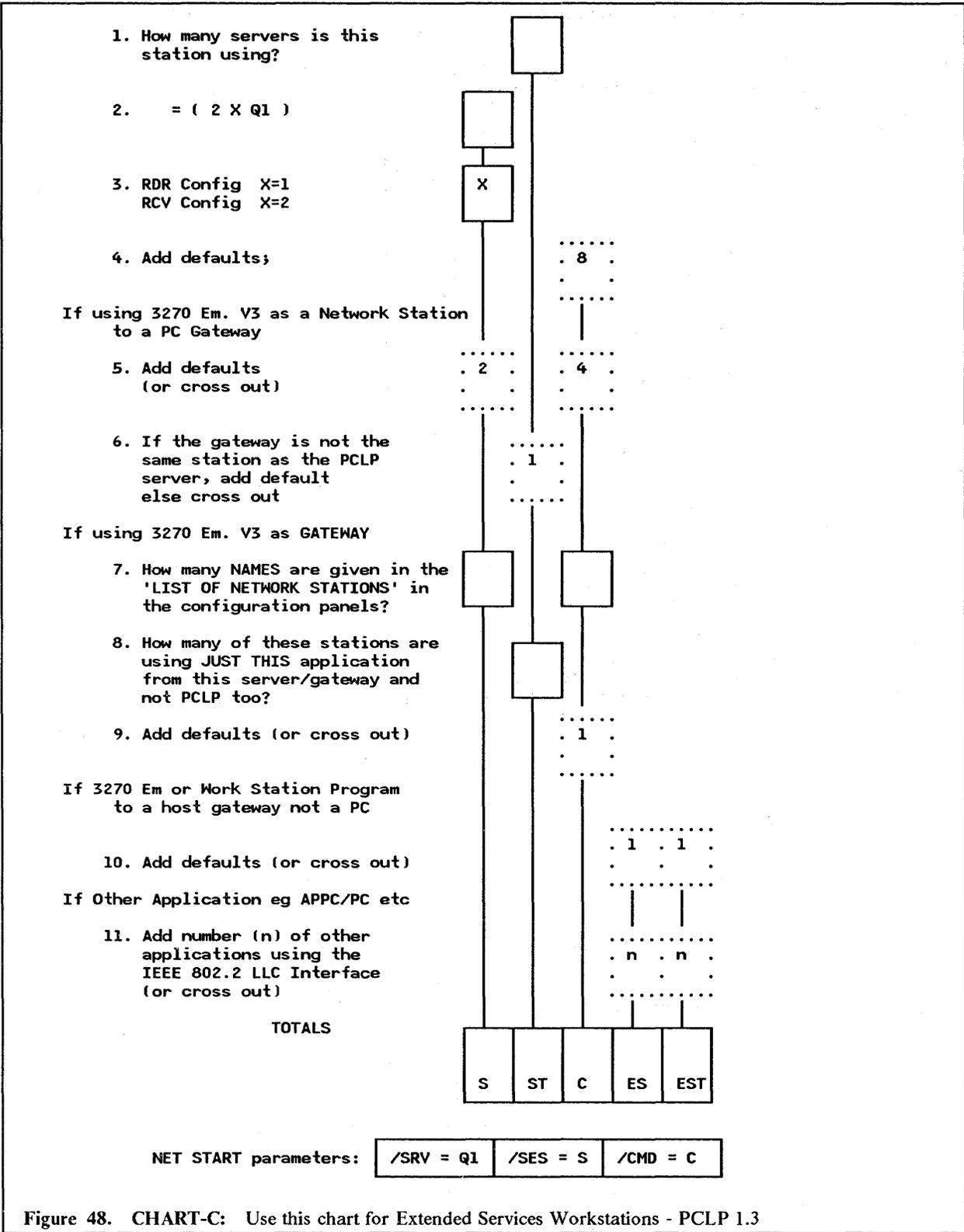


Figure 48. CHART-C: Use this chart for Extended Services Workstations - PCLP 1.3

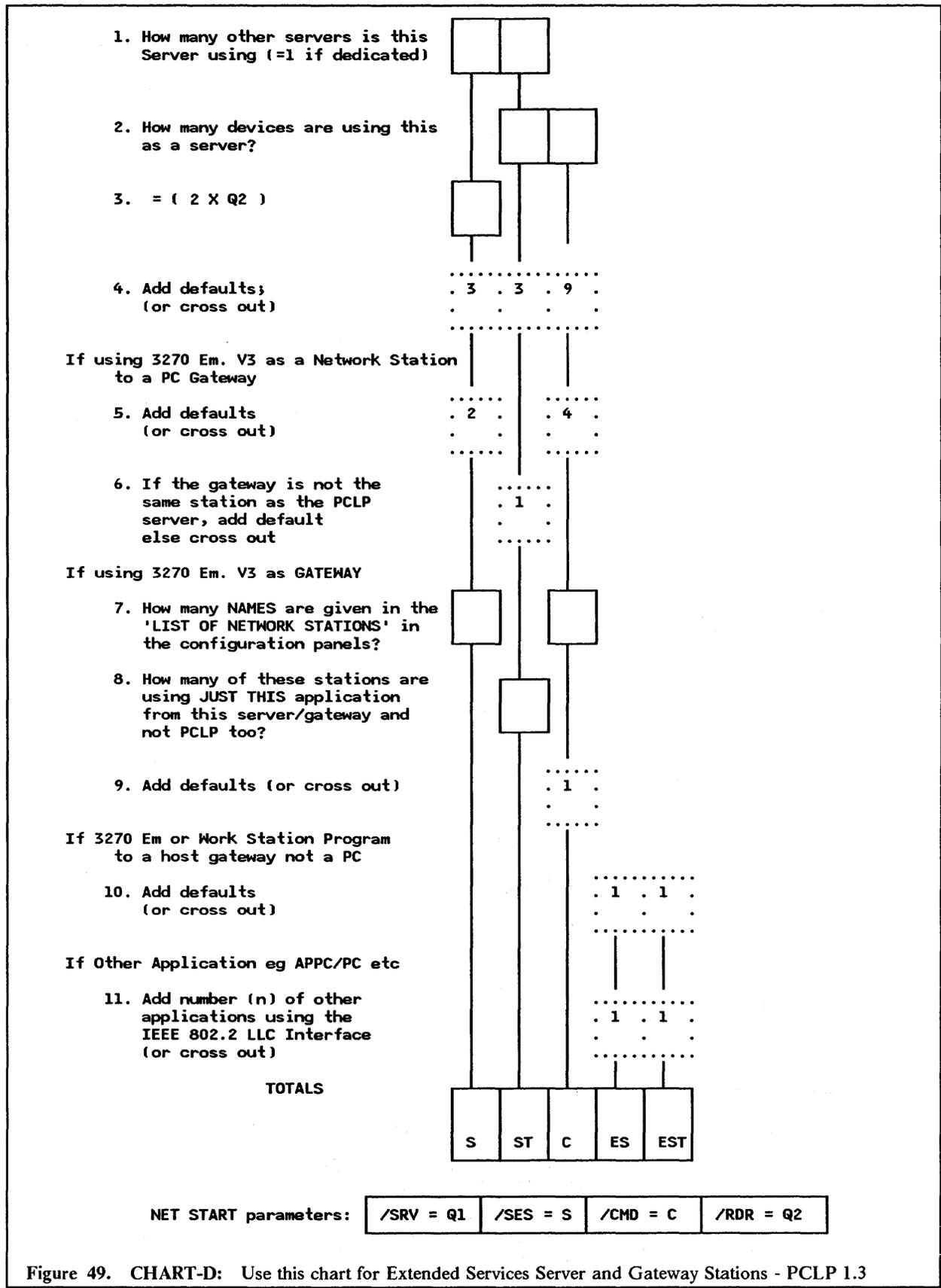


Figure 49. CHART-D: Use this chart for Extended Services Server and Gateway Stations - PCLP 1.3

## 16.6 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

---

NSTC		Where the Support Program Will Be Used	
<p>The IBM Local Area Network Support Program provides an interface that allows network application programs to access the IBM Token-Ring Network and the IBM PC Network.</p>			
<p>This Configuration Aid will ask you questions to determine what configuration of the Local Area Network (LAN) Support Program is needed. It will alter or create a configuration file called CONFIG.SYS. It will then copy the LAN Support Program files onto a fixed disk or system diskette. When you restart the computer, the CONFIG.SYS file will cause DOS to automatically load the LAN Support Program device drivers into memory.</p>			
<p>For a complete description of the Configuration Aid and the Support Program, see the Local Area Network Support Program User's Guide.</p>			
<p>You can use this Configuration Aid in two ways:</p>			
<ul style="list-style-type: none"><li>- To configure for use in this computer</li><li>- To configure for use in another computer</li></ul>			
<p>Will this copy of the program be used in THIS computer? [N]</p>			
Enter	F1=Help		F3=End/No Save

Figure 50. LSP Configuration Aid - 1

2. Figure 50: After the copyright statement, this first question asks if you are going to install the code on this machine. If you install on this machine, then the configuration aid will not ask you about the adapters you are to use as it can determine those present in your system. It is possible to configure the LSP for use in another PC. In this case, the following questions will be asked.

NSSO		Support for the Original PC Network Adapter	
<p>Support for the original PC Network Adapter will be supplied if "yes" is selected. If you select support for this adapter, then this must be the only communication adapter in the computer. A communication adapter allows the computer to be connected to a network or another computer. (Examples include: local area network adapters, binary synchronous, asynchronous, and modem adapters.)</p> <p>NO OTHER COMMUNICATION ADAPTERS MAY BE USED IN THE COMPUTER WHEN SUPPORT FOR THE ORIGINAL PC NETWORK ADAPTER IS SELECTED.</p>			
<div style="border: 1px solid black; padding: 5px; display: inline-block;">           Do you want program support for the original PC Network Adapter? (Y/N) [N]         </div>			
Enter	F1=Help	F7=Previous Panel	F3=End/No Save

Figure 51. LSP Configuration Aid - 2

- Figure 51: If you answer 'yes' here, then dxmG2mod.sys is used.

NSCP		3270 Workstation Program	
<p>The LAN Support Program can be configured for a computer that is using the 3270 Workstation Program. The 3270 Workstation Program, when used with the LAN Support Program, allows multiple application programs to be run simultaneously.</p> <p>If you answer "yes" to this question, you should make sure that this configuration of the LAN Support Program will be copied onto the same disk or diskette that is used to load the 3270 Workstation Program.</p>			
<div style="border: 1px solid black; padding: 5px; display: inline-block;">           Will the 3270 Workstation Program be used (Y/N) [N]         </div>			
Enter	F1=Help	F7=Previous Panel	F3=End/No Save

Figure 52. LSP Configuration Aid - 3

- Figure 52: If you are using the 3270 Workstation Program across the Token-Ring Network then you must choose this option.

NSNI	NETBIOS Interface
<p>Some programs (such as the PC Local Area Network Program) require the NETBIOS (Network Basic Input/Output System) interface. See the documentation for the application programs you plan to use on the network to see if they require NETBIOS.</p> <p>If you are not sure how to answer this question, you should answer "yes" to select the NETBIOS interface, so that you will be able to use any network application programs written for NETBIOS.</p>	
<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">             Will programs that need the NETBIOS interface be used? (Y/N) [Y]           </div>	
Enter	F1=Help
	F7=Previous Panel
	F3=End/No Save

Figure 53. LSP Configuration Aid - 4

5. Figure 53: Programs such as PC LAN Program V1.2, V1.3, 3270 Emulation Program V3 in network or gateway mode use the NETBIOS interface.

NSDI	Where to Copy the LAN Support Program
<p>The LAN Support Program should be copied onto the disk or system diskette used to start the computer. If you use sub-directories to organize your files, press F1 and read the related help information.</p> <ul style="list-style-type: none"> <li>- If you plan to start the computer from a fixed disk, type the letter of that disk. Then press Enter.</li> <li>- If you plan to start the computer from a diskette, you should use a diskette that has been formatted as a system diskette with DOS 3.3 or higher. This system diskette can then be used to start the computer. Type the letter of the drive that will contain the system diskette.</li> </ul> <p>DO NOT insert the diskette now; you will be prompted later to insert the diskette.</p>	
<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">             What drive do you want the Support Program copied onto? (A,B,C, ...) [A]           </div>	
Enter	F1=Help
	F7=Previous Panel
	F3=End/No Save

Figure 54. LSP Configuration Aid - 5

6. Figure 54: If this configuration is for this system 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.

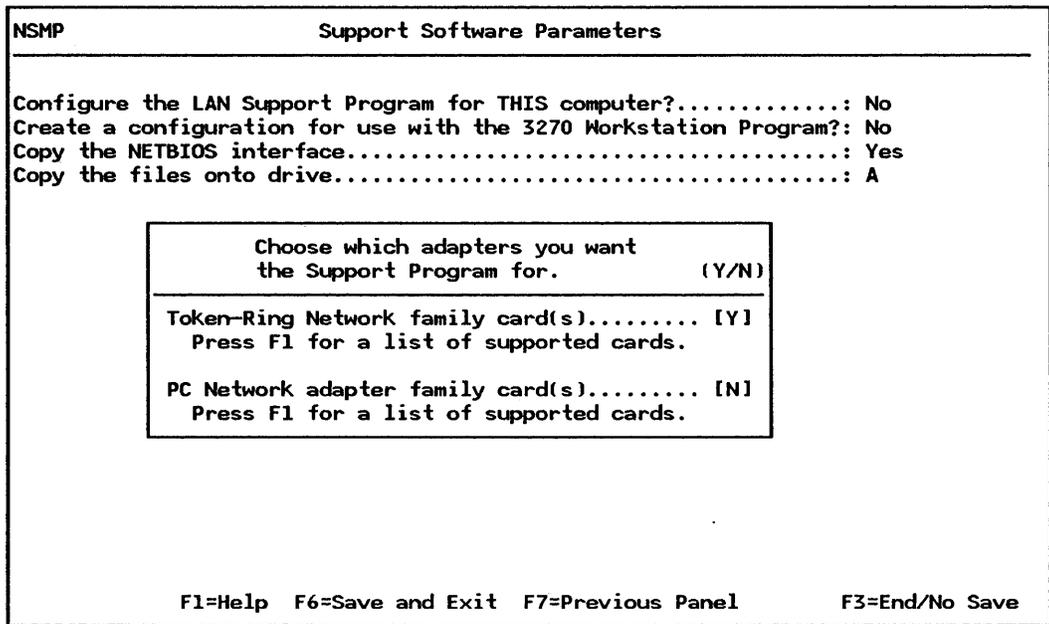


Figure 55. LSP Configuration Aid - 6

7. Figure 55: You must now specify which cards you are going to use. Of course if you have both adapters installed, then both these options will be chosen.

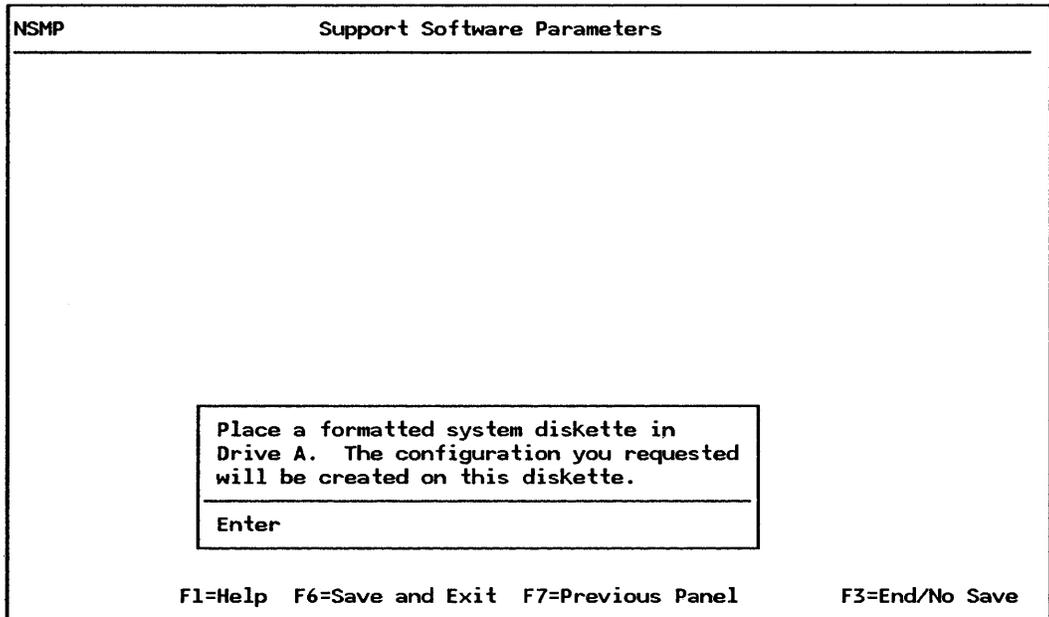


Figure 56. LSP Configuration Aid - 7

8. Figure 56: If a drive other than C is chosen, then you will be prompted to insert a diskette to the correct drive.
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 sub directory; if you do you must change the CONFIG.SYS statement to include the new path, for example:

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

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

## ***16.7 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.

## ***16.8 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.*

## 17.0 PC LAN Program V1.3

### 17.1 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).

#### 17.1.1 Base Services

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

#### 17.1.2 Extended Services

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

The 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 concepts with which you will be working. These are:

- Domain
- Domain Controller
- Servers
- Workstations
- Remote Program Load Workstations
- System Administrator
- Users and User IDs
- Passwords
- Internal and External Resources
- Filesets
- Application Selector

**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 sign on to a Domain Controller, but an administrator can sign 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 booting 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 logon to 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 logon 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 "start-up" 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 their special administrator status, this person defines which users can log on to 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 their own user tasks.

The administrator can log on to 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" signs on to 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 sign on to 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 on to 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 logon, while dynamic ones are only assigned on request.

**Application Selector** When you sign on to 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.

## **17.2 Planning**

### **17.2.1 Prerequisites - Hardware**

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

#### **17.2.1.1 Base Services**

- One of PC, PC-XT, PC-AT, AT/370, AT/G, AT/GX, PS/2 mdls 30, 50, 60, 70, 80
- A Diskette Drive
- Optionally printers, optical disks, additional fixed disks
- For the server
  - Fixed Disk
  - 350KB of RAM
- LAN Adapter Cables, etc

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

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

### **17.2.1.2 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 mdl 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 RIPL if required)

### **17.2.2 Prerequisites - Software**

- LAN Support Program V1.02 or the PCN Protocol Driver Program
- DOS V3.3 or higher

### **17.2.3 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 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.

### **17.2.4 Migration To OS/2**

LAN Support for OS/2 is included with OS/2 Extended Edition V1.1 (there is no equivalent of PCLP for OS/2 Standard Edition, where there is no LAN support at all). In this environment, workstations will be

configured as LAN Workstations, using the resources of a server. The server function is provided by either OS/2 LAN Server Version 1.0 Program or by PCLP 1.3 servers which will be compatible.

## 17.2.5 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 remote IPL support?
- Which machines must be remote IPLed?
- 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?
- The unique ID of each user, machine, printer and fileset?

## 17.3 Installation Steps

There are several different machine options you can install with PCLP 1.3; these are:

1. Domain controller
2. Extended Services additional server
3. Extended Services workstation
4. Installing administrative 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 the step-by-step installation of 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 a lot of similar steps that need to be done for all options and in this case reference will be made to where these steps have previously been covered in this guide.

The section below covers the general screens that begin all installations.

### 17.3.1 General

The example in this section shows specific responses taken to install the code as a Domain Controller configuration, but these screens are common for server and workstation installations, too.

PCLP 1.3 comes on eleven 5.25" diskettes, or five 3.5 inch 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" on page 83.
- 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 DOS3.3<sup>12</sup> 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 screen is displayed.

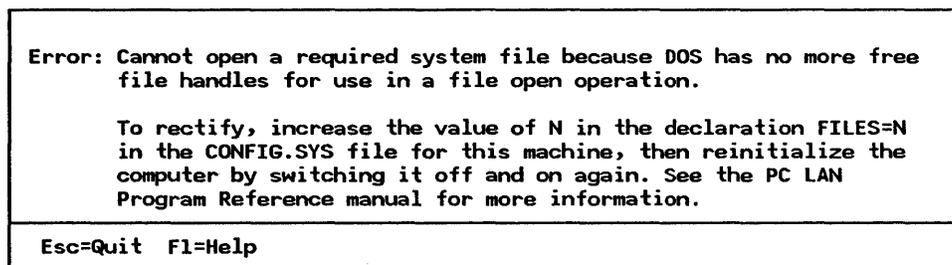


Figure 57. PCLP 1.3 Error Screen

---

<sup>12</sup> You must ensure that all the DOS files are installed. If there are some missing then an error message will be displayed.

PC LAN Program - Installation Utility

The PC LAN Program Installation Utility is used to install one of the following levels of function provided by the IBM PC LAN Program:

Base Services:

Equivalent functions to those provided by previous versions of the IBM PC LAN Program and IBM PC Network Program.

Extended Services provides in addition:

- \* An improved user interface
- \* An Application Selector to invoke applications or DOS functions
- \* Additional commands for managing network resources
- \* Online documentation and help for Extended Services.

To continue, Enter.

Enter Esc=Quit

PC LAN Program - Installation Utility

The output of this utility is put on a disk. The term disk means a fixed disk or diskette. The following assumptions are made about the disk:

1. You have formatted it as a system disk using IBM PC DOS 3.30 or a later release.
2. You have fully installed IBM PC DOS 3.30 or a later release on your fixed disk.
3. You have installed the IBM PC LAN Support Program on the disk, if necessary.

In addition to the PC LAN Program diskettes, if you are installing Extended Services and this machine is to be a Server, you may also need the IBM PC LAN Support Program diskette.

To continue, Enter.

Enter Esc=Quit

Figure 58. PC LAN 1.3 - Installation Utility

3. Figure 58: 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.

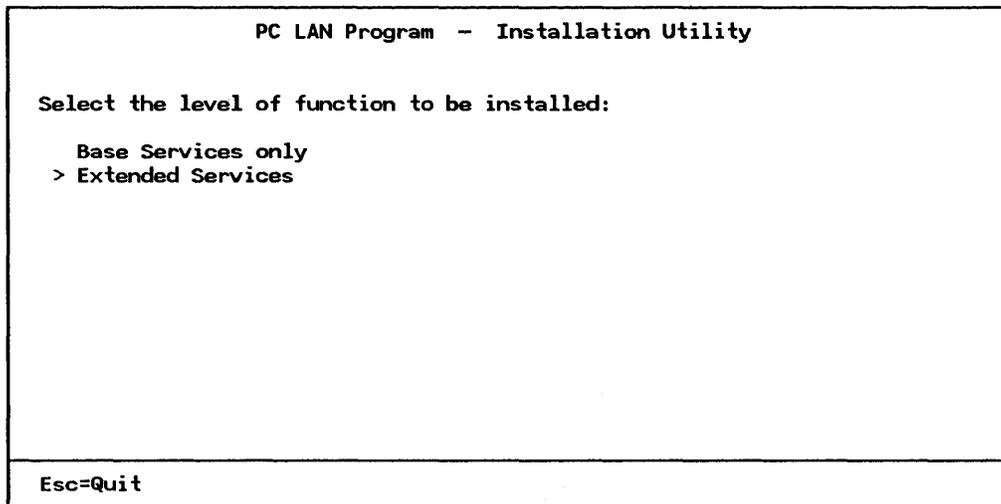


Figure 59. PC LAN 1.3 - Level Of Function

4. Figure 59: This screen, presents you with a choice you have to make: do you want base or Extended Services?

In this instance we are installing Extended Services.

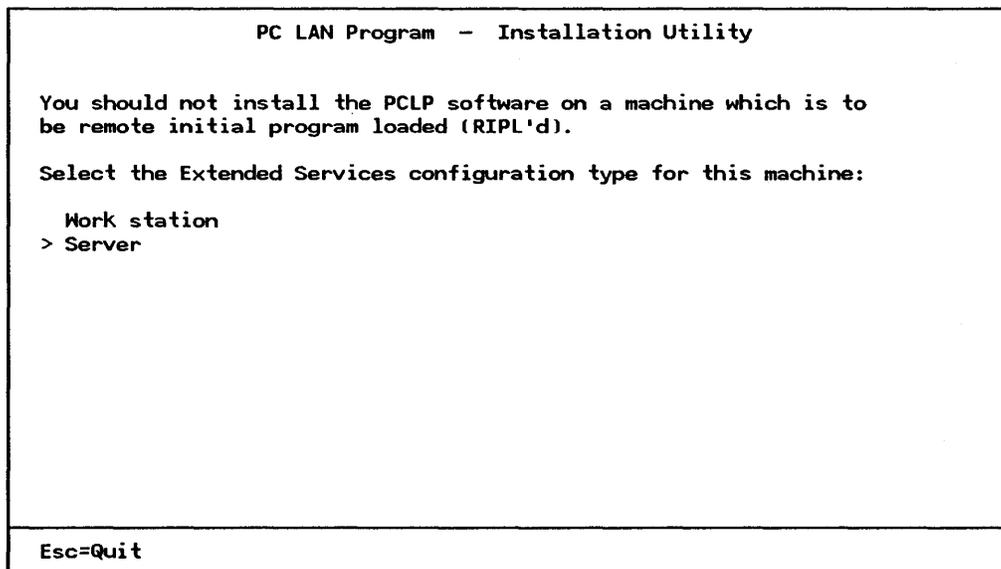


Figure 60. PC LAN 1.3 - Station Type

5. Figure 60: Having chosen Extended Services, we are then asked to select a configuration for this device. Is it to 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.<sup>13</sup>

Do not install PCLP Version 1.3 onto a workstation that is to be remote IPLed.

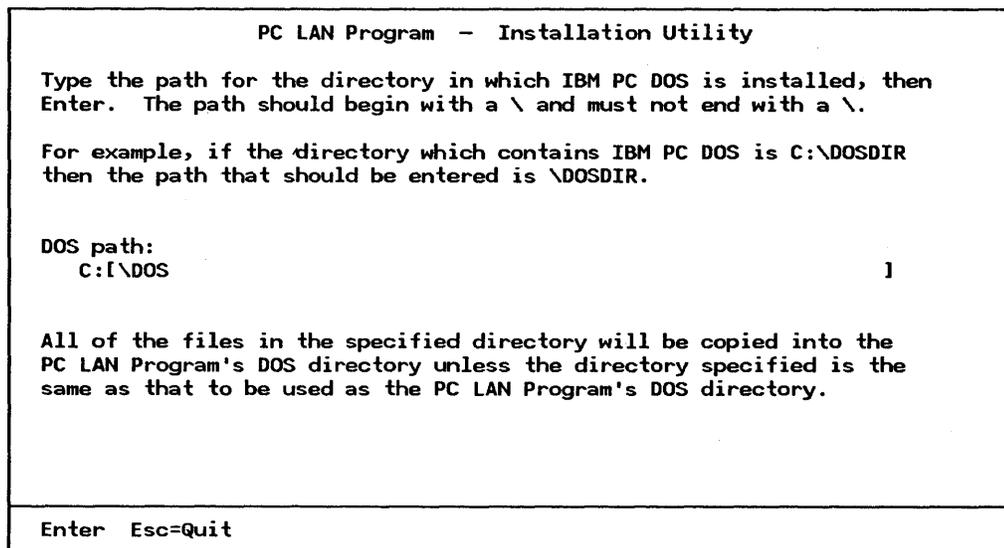


Figure 61. PC LAN 1.3 - DOS Path

6. Figure 61: You are then prompted to give the path to the DOS directory.

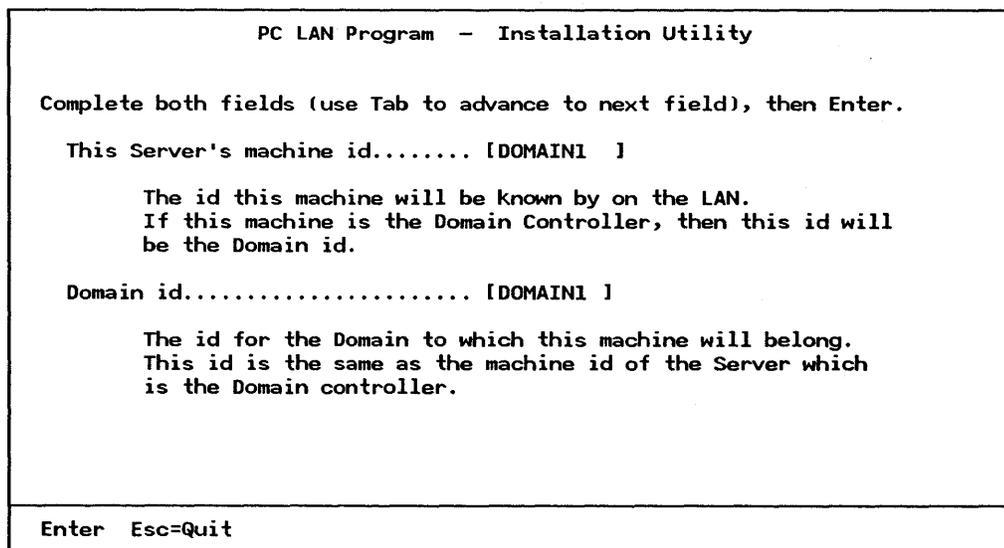


Figure 62. PC LAN 1.3 - Machine and Domain ID

7. Figure 62: The last stage in this section is to specify this machine ID and the ID of the domain in which it participates.

<sup>13</sup> 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.

- If you are installing a Domain Controller, then the domain ID **must** be the same as the server ID<sup>14</sup>. This example shows the responses required if you are installing a Domain Controller in 'DOMAIN1'.
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 drivers<sup>15</sup>.

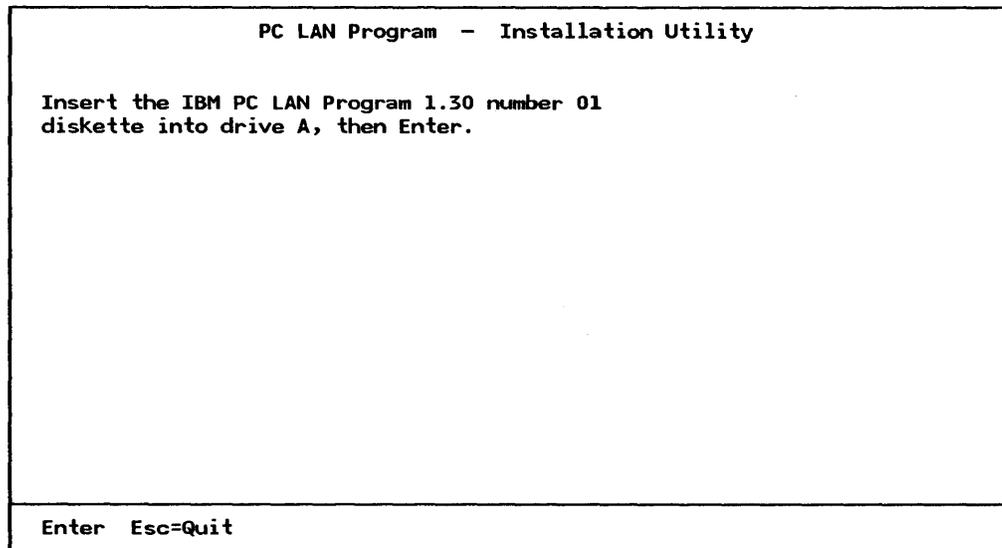


Figure 63. PC LAN 1.3 - Installing the Diskettes

---

9. Figure 63: 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.

---

<sup>14</sup> This is the only place where you specify that this is to be a domain controller configuration.

<sup>15</sup> For an explanation of these LAN Support Program parameters see "LAN Support Program" on page 83.

```
PC LAN Program - Installation Utility

Change System Configuration File

The current command shown below will be replaced by the new command
shown at the bottom. To change the new command, type the changes, then
Enter. Otherwise, Enter.

System file name: C:\AUTOEXEC.BAT           Line number: 1

Current command:
  PATH C:\;C:\DOS;C:\UTIL

New command:
  [PATH=C:\PCLP13BS;C:\PCLP13XS\DOS;C:\PCLP13XS\NET1_30;c:\util
]

Enter Esc=Quit

Enter Esc=Quit
```

Figure 64. PC LAN 1.3 - Changes To Configuration Files

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.

Figure 64: After the last diskette is copied, there will be a bit of extra processing and these questions may appear. You are 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. Figure 64 shows an example of the sort of question you may be asked. As you can see, 'C:\UTIL' was left off and so you may include it at this point.

```
PC LAN Program - Installation Utility

Installation is complete. A system reset must be performed before you can
use the PC LAN Program functions just installed.

Select an option:

> Return to DOS and inspect your system files
Automatic system reset and start PC LAN Program

Esc=Quit
```

Figure 65. PC LAN 1.3 - Installation Complete

11. Figure 65: Installation is now complete, this figure shows how 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 panels. In the following sections, reference will be made back to these panels to emphasize the options required in particular instances.

### 17.3.2 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" section).

During the installation phases outlined in the "General" 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.

2. Re-IPL the system.

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

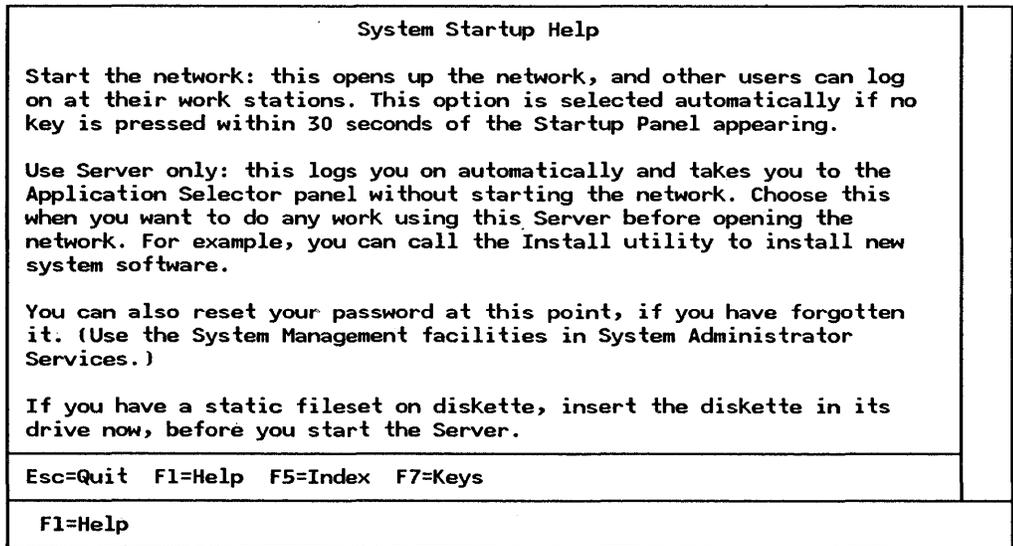
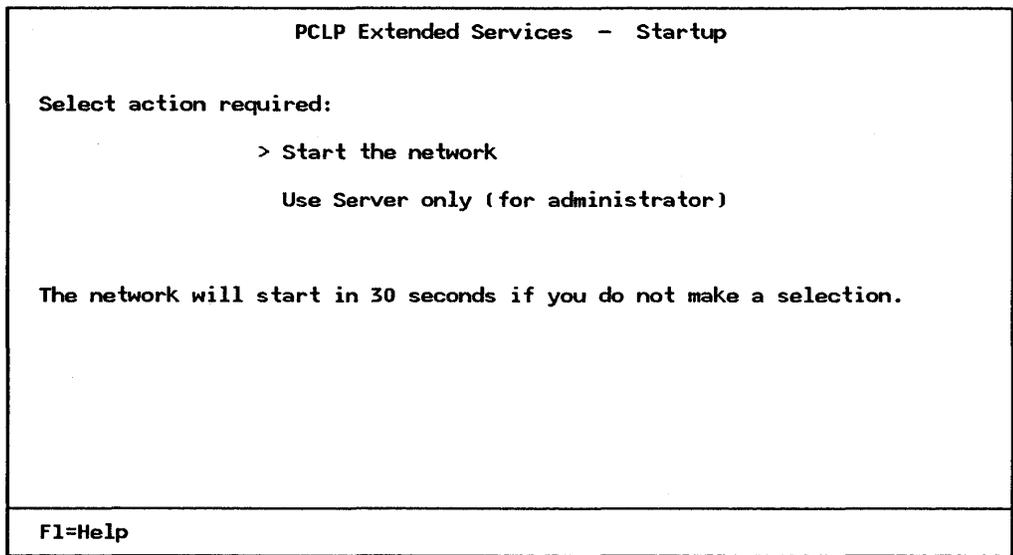


Figure 66. PC LAN 1.3 - Domain Controller Startup Options

- Figure 66: As a Domain Controller, you will then be presented with the option screen. Note that this screen and subsequent screens 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.

As an example of the online help available and to describe this option better, the help panel for this choice is shown in Figure 66, too.

If you choose not to start the network, then you are taken to do administrative functions. See the section below on "Administration".

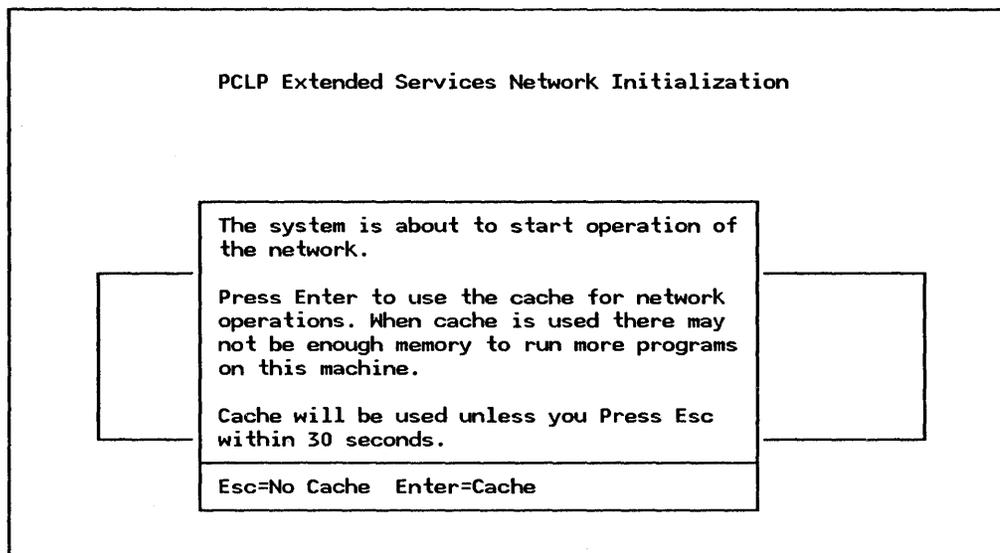


Figure 67. PC LAN 1.3 - Use of Cache?

4. Figure 67: 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.

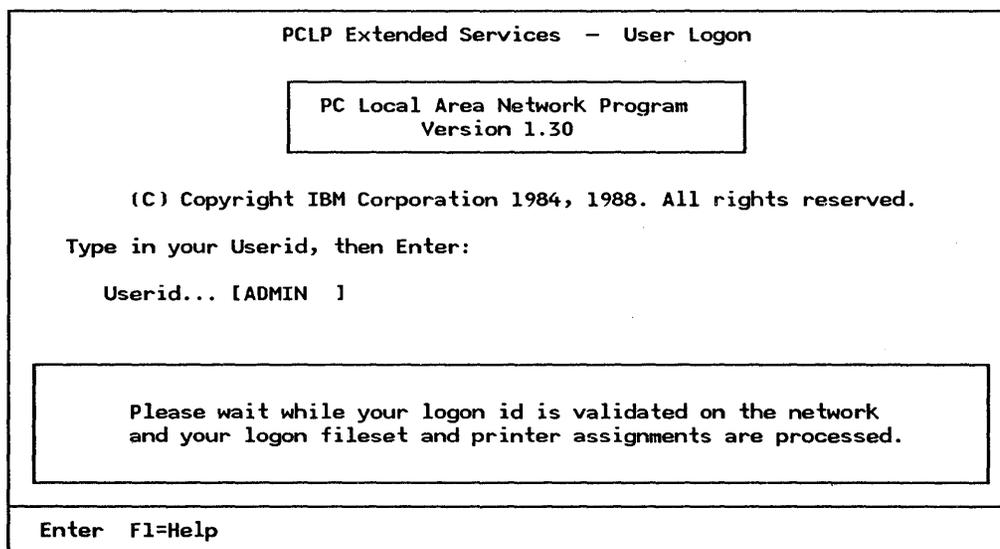


Figure 68. PC LAN 1.3 - Administrator Logon Panel

5. Figure 68: Once the network is started, you are then presented with a logon panel. If this is the **initial** creation of the network / Domain Controller, then a standard id is already allocated to allow you to gain access to the system. Logon 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. Alternatively, you can reduce the 'FILES=' 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 K and in extended services 0 K is the default value.

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

### 17.3.3 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 the "Planning Installation" section 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 Controller<sup>16</sup>
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.

---

<sup>16</sup> Note that you only need to define a workstation to the Domain Controller when it is a remote-IPL workstation. Otherwise, the Domain Controller does not care about workstations, only users and resources.

```

                                PCLP Extended Services - Application Selector

Select an application to be invoked:

Application  Description
LOGOFF      Terminate your usage of this computer
>PCLP      Perform a PCLP function
DOS        Perform a DOS command
LANMSG     PCLP Base Services Message Functions

F1=Help
```

Figure 69. PC LAN 1.3 - Application Selector

17.3.3.1 General Steps

- 1. Figure 69: Log on using the ID 'ADMIN'. When you log on, 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.

```

                                PCLP Extended Services - PCLP Functions

Select a function:

Function    Description
PRINTF     Print a File
USERSERV   Manage printer jobs and printers or list users
FILEMAN    Allocate or Change Filesets
USERADMN   Change passwords, LOGON allocations, applications used
OLR        Online Reference Information
OVERVIEW   Overview of PCLP Extended Services
>ADMINSRV  Administrator Functions
PRINTDDF   Print Domain Definition Files

Esc=Quit  F1=Help
```

Figure 70. PC LAN 1.3 - Extended Services

- 2. Figure 70: To perform administrative tasks you should choose the "ADMINSRV" option.

End Date Shutdown >Manage	F1=Help
<b>PCLP Extended Services - Administrator Services</b>	
Date (MM-DD-YYYY)...: 05-06-1988	Time (HH:MM)...: 16:29
Logons are...: Enabled	
Userid	Machine Application
ADMIN	DOMAIN1 PCLP

Figure 71. PC LAN 1.3 - Administrative Services

- Figure 71: This screen gives you several options in the action bar at the top of the screen. You should choose "Manage" if you want to add system definitions, etc. This screen 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.

End Users Printers Machines Applications Filesets Images	F1=Help
<b>PCLP Extended Services - System Management Services</b>	
Date (MM-DD-YYYY)...: 05-06-1988	Time (HH:MM)...: 16:30
Logons are...: Enabled	
Userid	Machine Application
ADMIN	DOMAIN1 PCLP

Figure 72. PC LAN 1.3 - Management Options

- Figure 72: This screen 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.

### 17.3.3.2 Defining Additional Servers

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

1. Figure 72: Choose Option "Machines" from the action bar. You will then have to decide if you will maintain machine details or work with new machines (this is a pop-up panel - not shown here). You should select "NEW".

```
End Users Printers Machines Applications Filesets Images F1=Help
PCLP Extended Services - System Management Services

New Machine Details

Complete the panel by typing and selecting, then Enter.

Machine id... [SERVER1 ]
Machine use... Work station
                > Server

Note: Each time you finish adding a new machine, you will
      be returned to this panel. When you have finished
      adding new machines, press Esc to leave this panel.

Enter Esc=Quit F1=Help
```

Figure 73. PC LAN 1.3 - Defining a New Machine

2. Figure 73: Give the name of the device, and specify it as a server.

```
End Users Printers Machines Applications Filesets Images F1=Help
PCLP Extended Services - System Management Services

Machine Details

Complete the panel by typing and selecting, then Enter:

Machine id.....: SERVER1
Machine use.....: Server

Description..... [PC AT Server-01 in Domain1 ]

Support remote IPL... Yes
                    > No

Enter Esc=Quit F1=Help
```

Figure 74. PC LAN 1.3 - New Machine Details

3. Figure 74: 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 remote IPL from 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.

### 17.3.3.3 Installing a User

Again, we are working from the menu illustrated in Figure 72 on page 120.

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 SERVER1 (the installation of code to SERVER1 is covered in the next section) and you have logged onto SERVER1 as ADMIN.

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

1. From the "Management Options" menu, choose 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".

---

End Users	Printers	Machines	Applications	Filesets	Images	F1=Help
PCLP Extended Services - System Management Services						
New User Details						
Type userid, then Enter:						
Userid... [PAUL01 ]						
Each userid is used as a network name and should be a unique name within this local area network.						
Note: Each time you finish adding a new user, you will be returned to this panel. When you have finished adding new users, press Esc to leave this panel.						
Enter Esc=Quit F1=Help						

Figure 75. PC LAN 1.3 - Adding a New User

---

2. Figure 75: The next option asks for a user ID. Type in the user ID that you are adding.

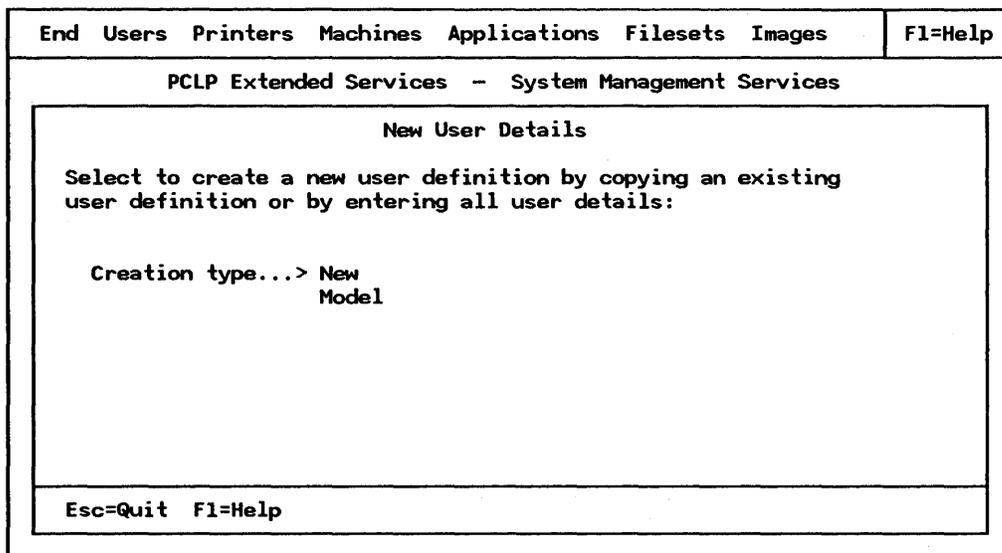


Figure 76. PC LAN 1.3 - User Type

3. Figure 76: PCLP will then allow you to model this user ID on existing user IDs, or, create you own profile for this user. We will select NEW in this case.

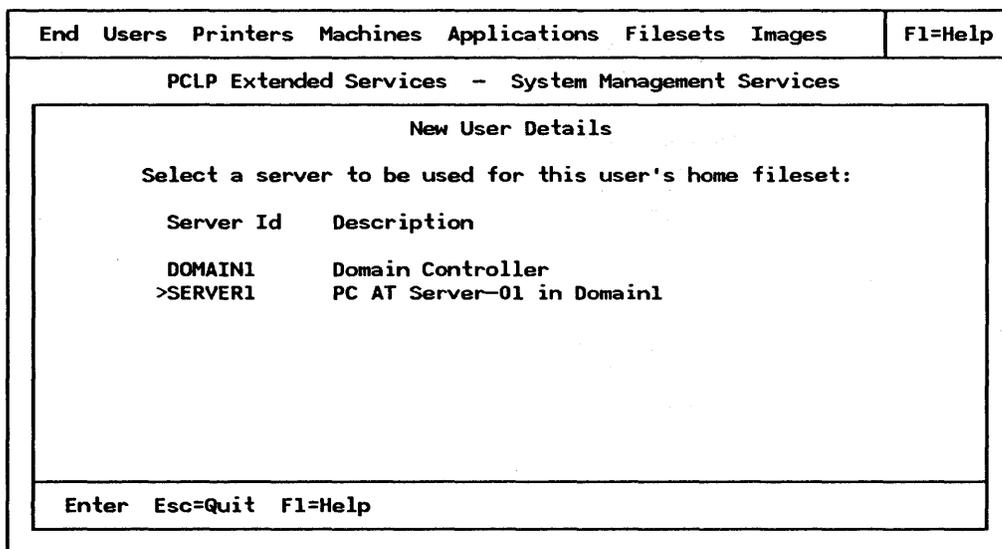


Figure 77. PC LAN 1.3 - User Home Fileset

4. Figure 77: 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 details and home filesets will be created and stored.

Notice that we are selecting SERVER1 to be the home server for this user. This means that all the profiles for this user and other administrative data and files will be held on SERVER1.

End Users Printers Machines Applications Filesets Images	F1=Help
PCLP Extended Services - System Management Services	
<p style="text-align: center;"><b>New User Details</b></p> <p>Complete panel by typing and selecting, then Enter:</p> <p>Userid.....: PAUL01  User name..... [PAUL EASTWOOD extension 3390 ]</p> <p>Privilege.....&gt; Normal  Administrator</p> <p>Password required...&gt; Yes  No</p>	
Enter Esc=Quit F1=Help	

Figure 78. PC LAN 1.3 - New User Details

- Figure 78: 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.
- If PASSWORD is specified, you will then have to set the password.

End Users Printers Machines Applications Filesets Images	F1=Help
PCLP Extended Services - System Management Services	
<p style="text-align: center;"><b>New User Details</b></p> <p>The new user has been created with default details.</p> <p>Modify details.... Yes  &gt; No</p>	<p style="text-align: center;"><b>Details</b></p> <p>ing, then Enter:</p> <p>extension 3390</p>
F1=Help	
No	
Enter Esc=Quit F1=Help	

Figure 79. PC LAN 1.3 - Confirmation Of Details

- Figure 79: Finally, if you wish to change any of the details for this user then you are given this option next.
  - You will now have finished installing the new USER.
- If you wish, you can now continue and install more users.

### 17.3.3.4 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.

As an example, we will install the Editor 'PE2' to be shared across the network.

The sequence of actions for installing an application are:

1. Decide on which server in the Domain the application is to reside
2. Create an APPS 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.

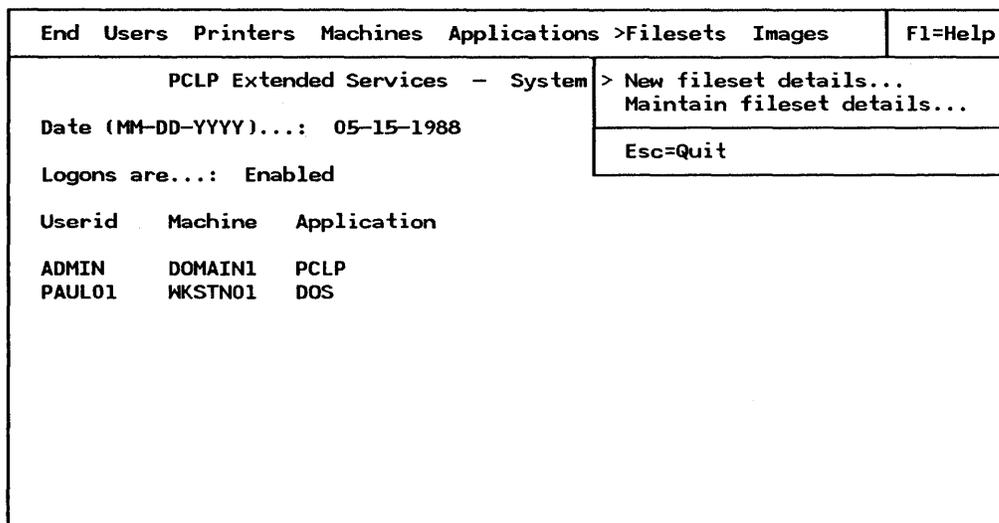


Figure 80. PC LAN 1.3 - Creating a New Fileset

1. Figure 80: First, you must create a Fileset for the application. This menu is from ADMIN\_SRV - the "MANAGE" option. Choose "New Fileset Details".

End Users Printers Machines Applications Filesets Images	F1=Help
PCLP Extended Services - System Management Services	
<p style="text-align: center;">New Fileset Details</p> <p>Type fileset id and then Enter:</p> <p>Fileset id...[APPS ]</p> <p style="text-align: center;">Note: Each time you finish adding a new fileset, you will be returned to this panel. When you have finished adding new filesets, press Esc to leave this panel.</p>	
Enter Esc=Quit F1=Help	

Figure 81. PC LAN 1.3 - The Name of the Fileset

- Figure 81: You must specify the name of the fileset. This should be unique within the domain.

End Users Printers Machines Applications Filesets Images	F1=Help
PCLP Extended Services - System Management Services	
<p style="text-align: center;">New Fileset Details</p> <p>Complete the panel by typing and selecting, then Enter.</p> <p>Fileset id....: APPS Description.... [Applications Sub-directory on DOMAIN1 ]</p> <p>Fileset Type...&gt; Internal External</p>	
Enter Esc=Quit F1=Help	

Figure 82. PC LAN 1.3 - Fileset Details

- Figure 82: You can now include a description of the fileset, and specify if it is to be internal or external<sup>17</sup>. If the APPS directory is on one of the servers in the domain, then this fileset is internal.

<sup>17</sup> An External fileset is one that does not reside on one of the servers in this domain.

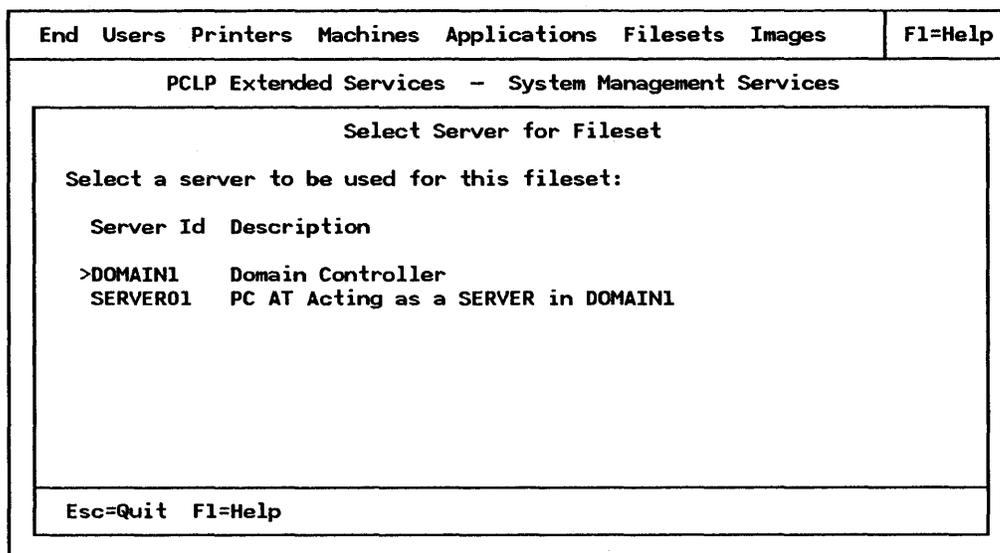


Figure 83. PC LAN 1.3 - Which Server holds the Fileset

- Figure 83: All the servers that you have defined to the system will be shown in this panel. You can assign this fileset to any listed; however, you should choose the server on which you installed (or intend to install) the application.

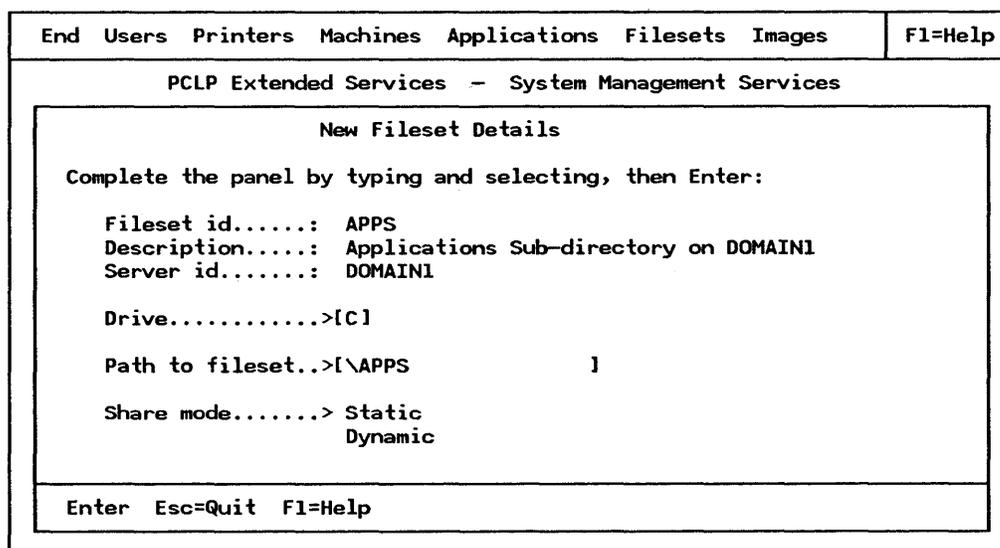


Figure 84. PC LAN 1.3 - New Fileset Details

- Figure 84: You now assign a drive on which this fileset will reside and the path to the fileset on that drive. The 'SHARE MODE' indicates 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.

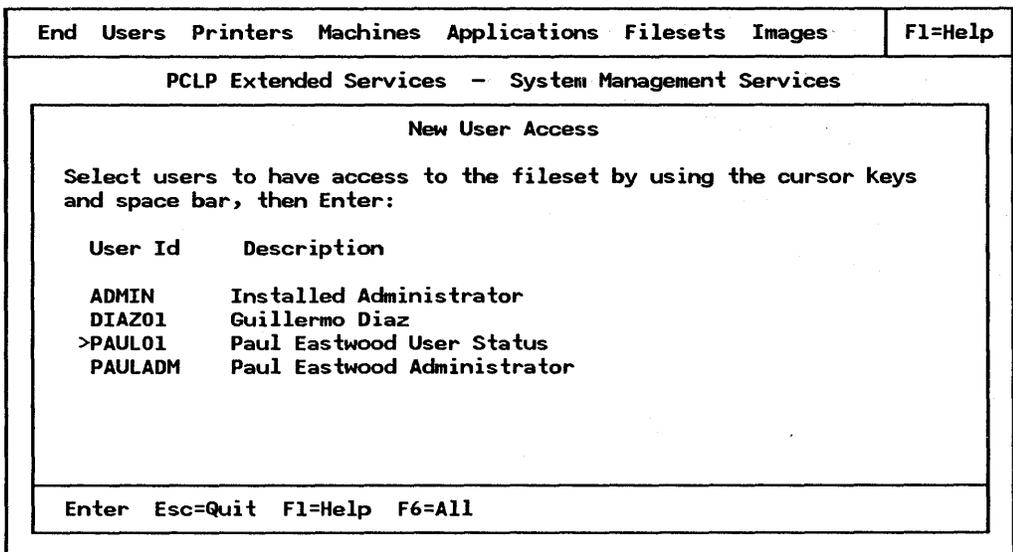


Figure 85. PC LAN 1.3 - Name Users Who Will Have Access to Fileset

6. Figure 85: You are then presented with a list of users that are defined to the system. Select users who will have access to this fileset.

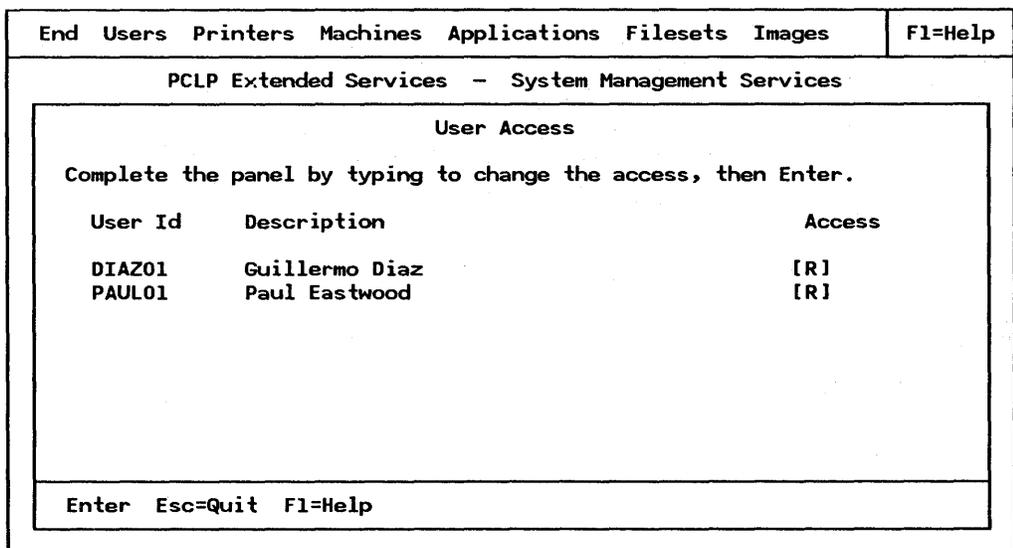


Figure 86. PC LAN 1.3 - User Access to Fileset

7. Figure 86: 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".

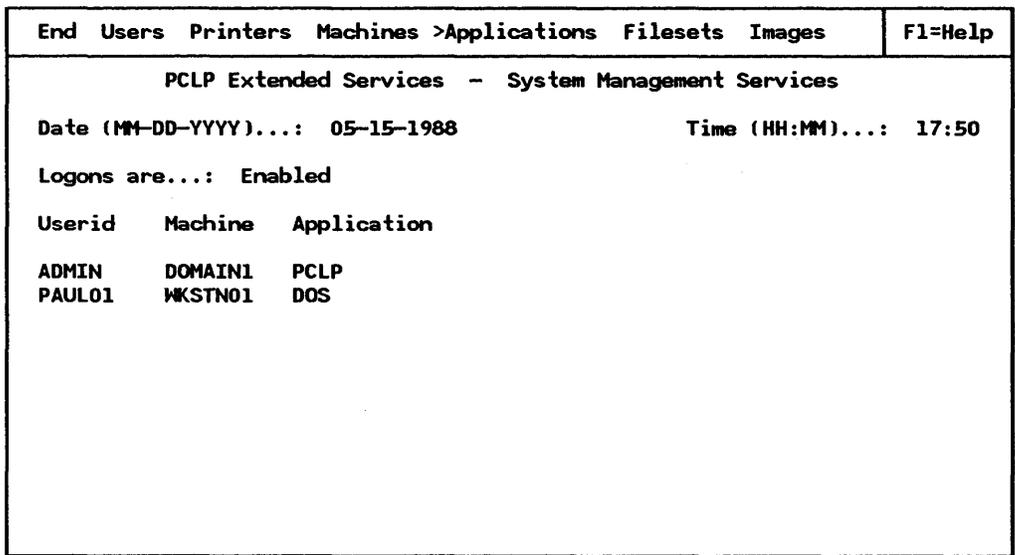


Figure 87. PC LAN 1.3 - Defining Applications

8. Figure 87: You have now completed the definition of a fileset. You are returned to this "Systems Management Selection" screen.

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

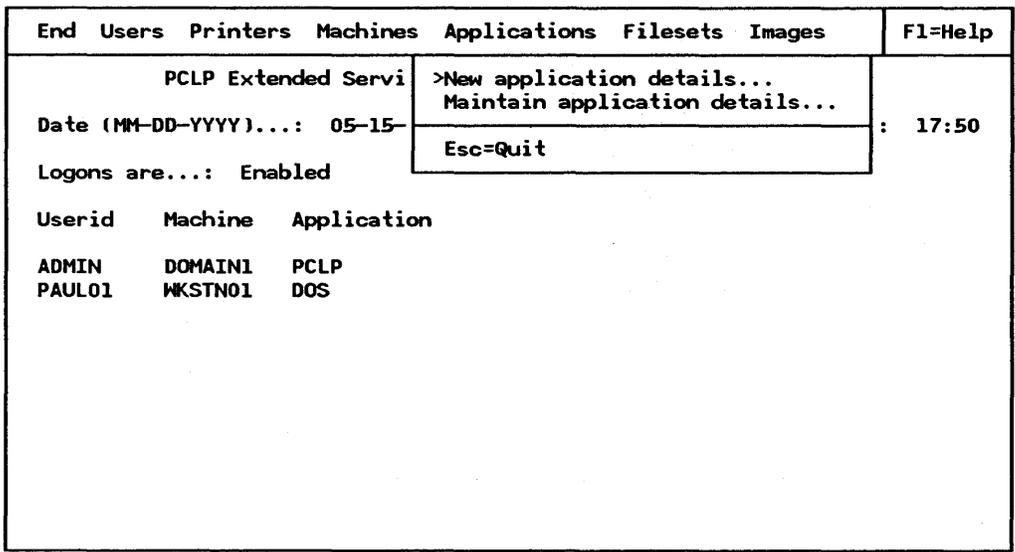


Figure 88. PC LAN 1.3 - Select Application Pop-up

9. Figure 88: A pop-up panel appears; you should choose NEW application details.



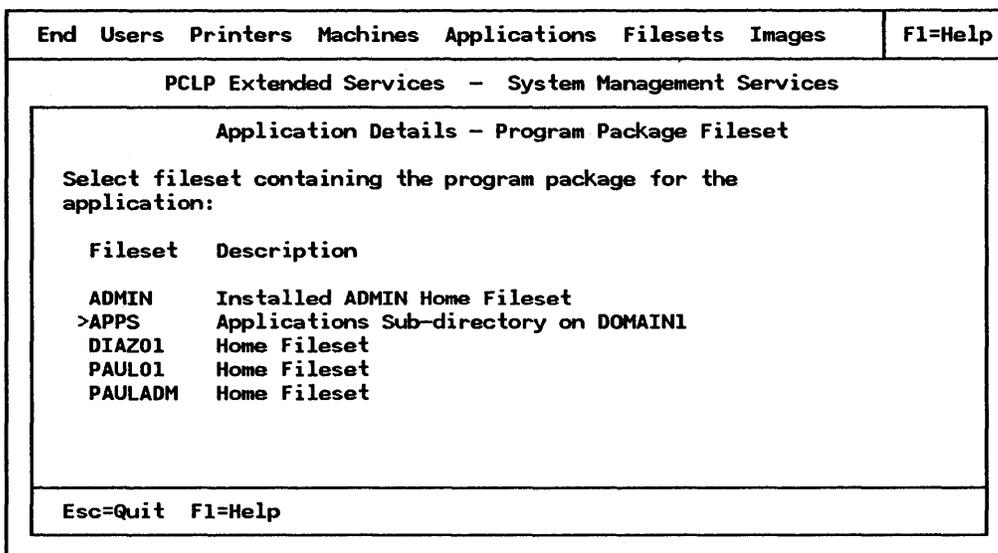


Figure 91. PC LAN 1.3 - Fileset Location of Application

12. Figure 91: Next, select the Fileset which contains the application. In this case, we choose the APPS fileset that we have already defined.

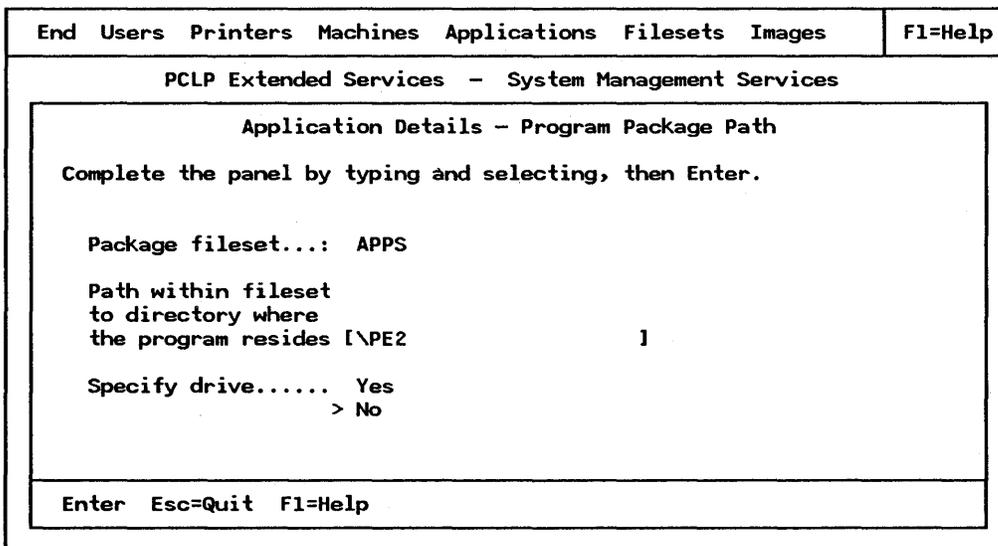


Figure 92. PC LAN 1.3 - Program Package Path

13. Figure 92: All you need to do now is specify the path to the application within the chosen fileset. Also specify the drive. "NO" takes the defaults.

```
CALL %DRV%\PE2\%e %1 %2 %3 %4 %5 %6 %7 %8 %9
```

Figure 93. PC LAN 1.3 - Batch File for Application

14. Figure 93: 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. The batch file created for this application is shown above.

PCLP Extended Services - PCLP Functions	
Select a function:	
Function	Description
PRINTF	Print a File
USERSERV	Manage printer jobs and printers or list users
FILEMAN	Allocate or Change Filesets
>USERADMN	Change passwords, LOGON allocations, applications used
OLR	Online Reference Information
OVERVIEW	Overview of PCLP Extended Services

Esc=Quit F1=Help

Figure 94. PC LAN 1.3 - PCLP Functions Menu

15. Figure 94: As an administrator, you can then add this application to the user's "Application Selector" menus. This is done 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 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.

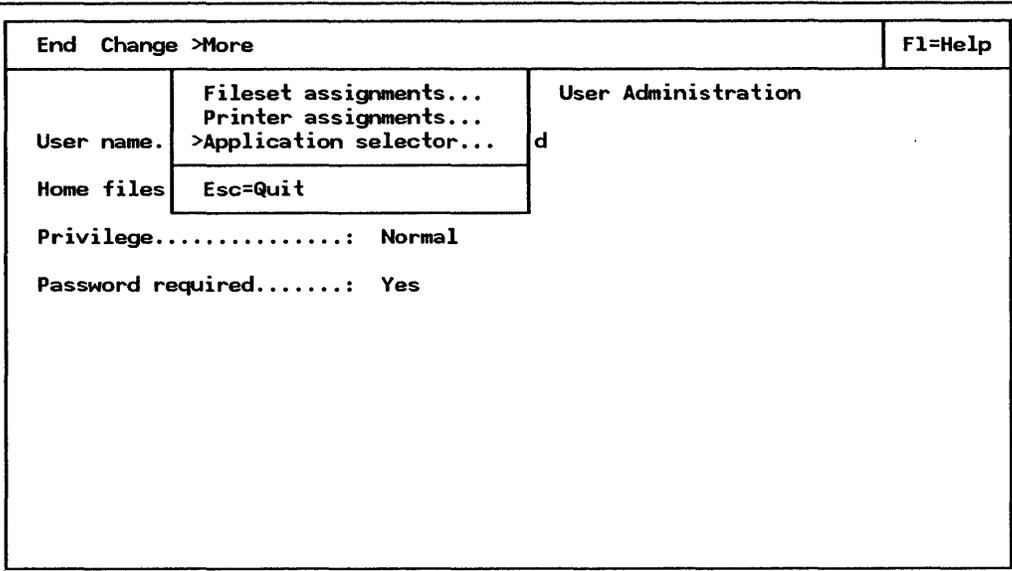


Figure 95. PC LAN 1.3 - User Administration Menu - Option MORE

16. Figure 95: You can change several different assignments including your default drives and filesets; however, you need to work with the Application Selector.

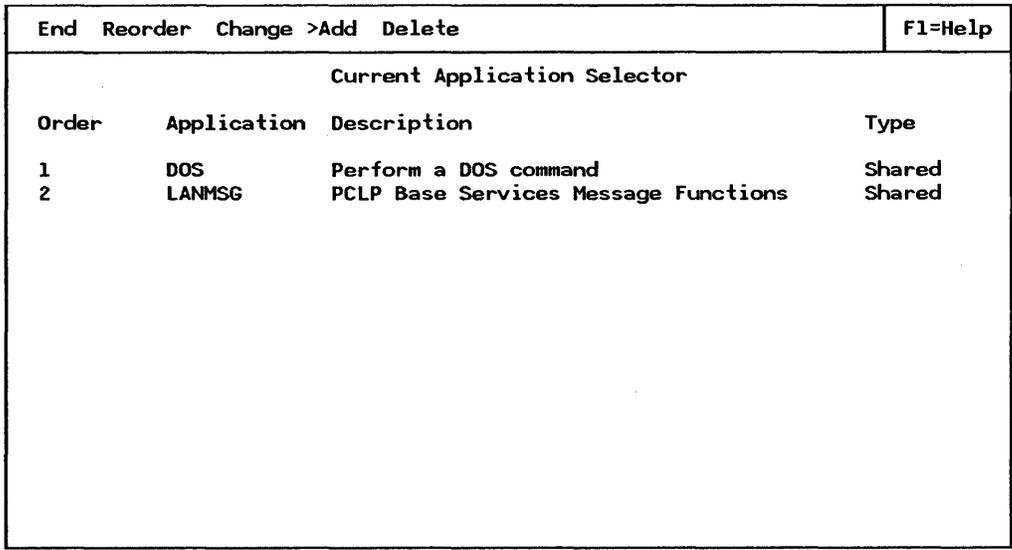


Figure 96. PC LAN 1.3 - Current Application Selector Menu

17. Figure 96: Your current application selector menu (the items you can change) is presented with several options listed in the action bar. Choose to ADD.

End Reorder Change Add Delete				F1=Help
		> Shared application...	ctor	
		Private application...		
		Esc=Quit		
Order	Applicati			Type
1	DOS			Shared
2	LANMSG	PCLP Base Services Message Functions		Shared

Figure 97. PC LAN 1.3 - Adding a NEW Application

18. Figure 97: 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.

End Reorder Change Add Delete				F1=Help
Current Application Selector				
Add Shared Application				
Select shared applications to add to application selector by using the cursor keys and space bar, then Enter:				
	Application	Description		
	>EDITOR	PE2 Editor		
Enter Esc=Quit F1=Help F6=All				

Figure 98. PC LAN 1.3 - Select New Application

19. Figure 98: 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.

> End Reorder Change Add Delete			F1=Help
<b>Current Application Selector</b>			
Order	Application	Description	Type
1	DOS	Perform a DOS command	Shared
2	LANMSG	PCLP Base Services Message Functions	Shared
3	EDITOR	PE2 Editor	Shared

**Figure 99. PC LAN 1.3 - Updated Application Selector Menu**

20. Figure 99: You are then returned to this screen, which shows you what you 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. You should reference the ITSC Guide on PCLP 1.3 for more examples.

This is the end of "Administrative functions".

### 17.3.4 Additional Server - Installation

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

The additional server is a server 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" section) as outlined in "General" on page 109. 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.

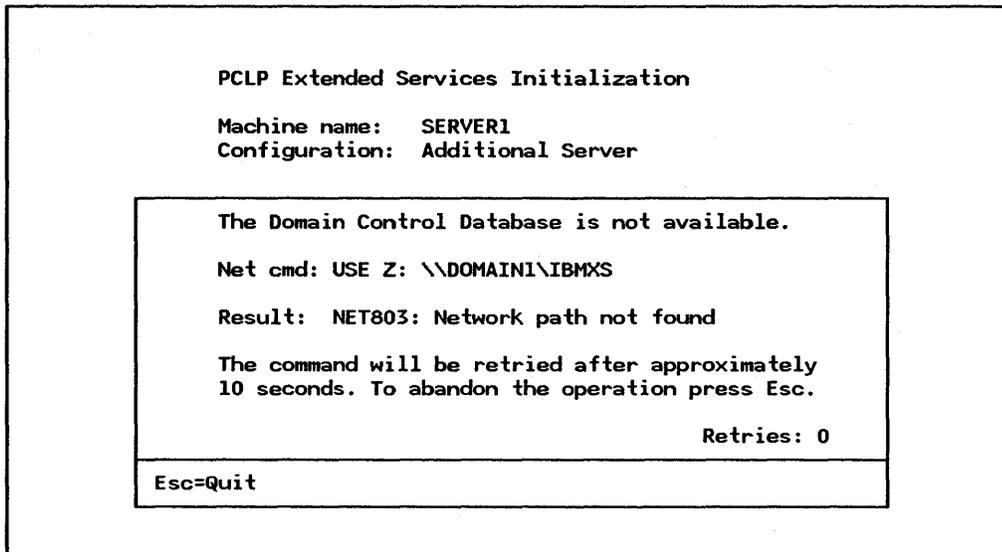


Figure 100. PC LAN 1.3 - Domain Controller Not Available

- Figure 100: 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.

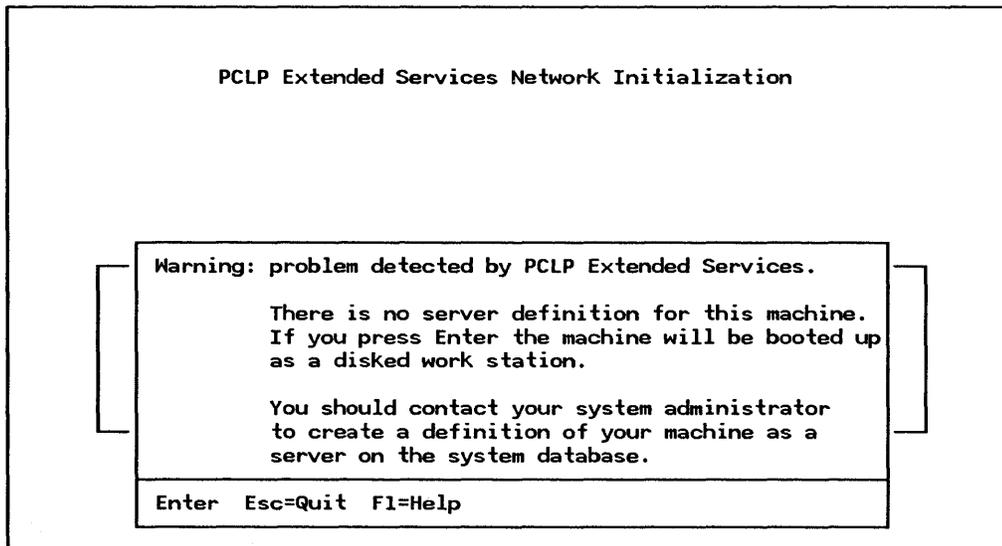


Figure 101. PC LAN 1.3 - No Server Definition

- Figure 101: 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 memory-resident applications loaded in the AUTOEXEC. Alternatively, you can reduce the "FILES=" 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 K and in extended services 0 K 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".

### 17.3.5 Workstation Installation

This section describes how to install the PC LAN Program 1.3 onto a disked workstation<sup>18</sup>.

```
PC LAN Program - Installation Utility

You should not install the PCLP software on a machine which is to
be remote initial program loaded (RIPL'd).

Select the Extended Services configuration type for this machine:

> Work station
  Server

Esc=Quit
```

Figure 102. PC LAN 1.3 - Workstation Option

Installing a workstation follows the same general steps as outlined in "General" on page 109, the difference being in the selection of a workstation configuration rather than a server. See Figure 102.

1. Install the PCLP V1.3 code onto a suitable system (see the "Planning" section). As outlined in "General" on page 109, you should have taken the following options.
  - Extended services
  - Workstation option.

<sup>18</sup> A DISKED workstation is one that has a fixed disk.

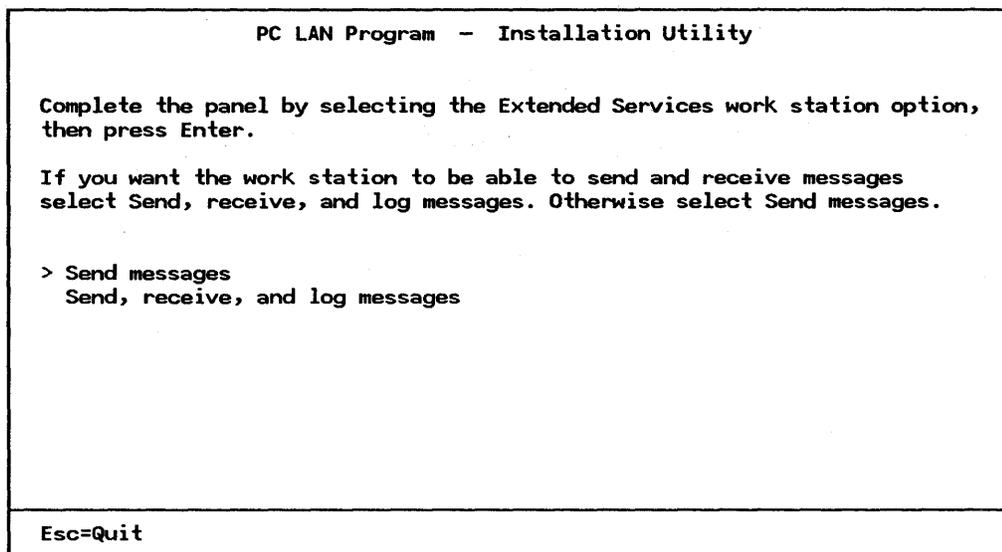


Figure 103. PC LAN 1.3 - RCV or RDR Configuration?

2. Figure 103: 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 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.

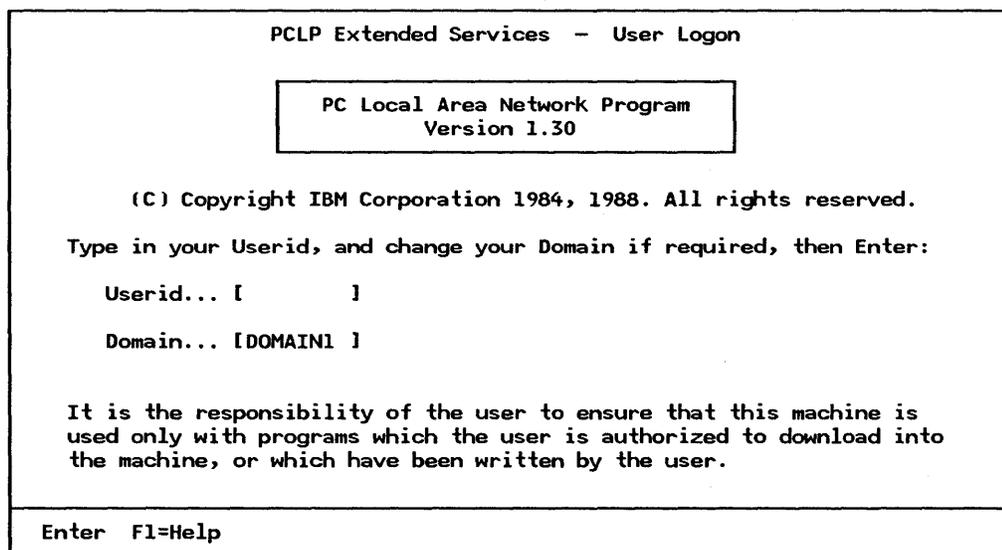


Figure 104. PCLP 1.3 - User Logon Panel

5. Figure 104: You will then see a LOGON screen. Notice that the default domain is set for you; this can be changed by over typing.

## ***17.4 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.*



# 18.0 PC 3270 Emulation Program Version 3

## 18.1 Overview

For the purposes of simplicity, "PC 3270 Emulation Program Version 3" will be shortened to "3270 EP". The current version and the one that has been used here is 3.03.

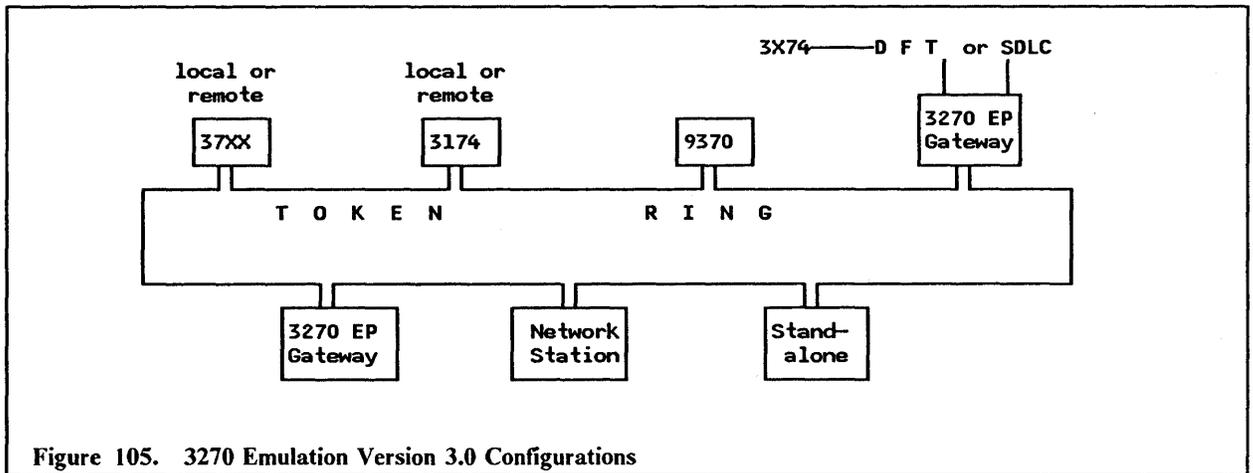
3270 EP provides emulation and host communications capabilities using several different configurations. These are:

**Standalone** A Standalone 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 standalone 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 or a 37XX.

**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.



## 18.2 Planning Checklist

### 18.2.1 Prerequisites - Hardware

- One of the following PCs  
PC, PC-XT, PC-AT, PS/2 mdl's 30, 50, 60, 70, 80  
Depending on the configuration you require, the hardware prerequisites will be different.
- Standalone  
This can only be standalone in a Token-Ring LAN, not a PC Network.
  - Required memory - 169 KB
  - Connection to Token-Ring Network
  - Token-Ring Adapter Handler Interface Program 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 - 209 KB
    - ▲ PC LAN - 156 KB
  - Appropriate connection to a LAN<sup>19</sup>
- 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
    - ▲ TR-attached to a 37XX or 3174 Gateway - 248 KB
  - Appropriate LAN Attachment<sup>19</sup>
  - Appropriate Host Attachment
    - ▲ SDLC adapter version 2 or Multi-protocol adapter (PS/2 Microchannel)
    - ▲ 3278/79 Emulation adapter or 3270 Emulation adapter.
- Gateway with Network Station
  - Memory requirements

---

<sup>19</sup> Connection to a LAN may also require some interface software such as the Adapter Handler Interface Program for the Token-Ring Adapter, or PC Network Protocol Driver Program or the LAN Support Program which contains all these modules.

## PC Network

- ▲ SDLC-attached - 225 KB
- ▲ DFT-attached - 230 KB
- ▲ Attached through a Gateway to a TR, then to a 37XX or 3174 gateway - 278 KB

## Token-Ring Attached

- ▲ SDLC-attached - 278 KB
  - ▲ DFT-attached - 283 KB
  - ▲ TR-attached to a 37XX or 3174 Gateway - 278 KB
- Appropriate LAN attachment<sup>19</sup>
  - Appropriate host attachment

## 18.2.2 Prerequisites - Software

- DOS 3.2<sup>20</sup>
- For "Network Station" or "Gateway Configurations", one of the following is required:
  - LAN Support Program
  - NETBIOS program product

For more information see "LAN Support Program" on page 83.

## 18.2.3 Coexistence and Compatibility

### 18.2.3.1 3270 connection card (or 3278/79 Emulation Card)

The 3270 connection card and Token-Ring adapter require different interrupt levels. For more information on interrupt levels see "PC Token-Ring Network Adapter Installation" on page 15. 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 21.

### 18.2.3.2 SDLC Card

If you have an SDLC Gateway and are using the SDLC card, make sure that the Token-Ring adapter card does not use Interrupt Level 3. For more information see "PC Token-Ring Network Adapter Installation" on page 15.

### 18.2.3.3 PCLP 1.2

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" on page 83.

---

<sup>20</sup> DOS 3.3 or higher is required in case of LAN Support Program.

### 18.2.3.4 PCLP 1.3

The 3270 EP will work in all configurations with a PCLP 1.3 extended services workstation configuration.

## 18.2.4 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 standalone 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 so complex.

For attachment of the 3270 EP in Gateway or Standalone 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).

### 18.2.4.1 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 259.

If you are using a 37XX Gateway or a 9370, then the 3270 EP Gateway or Standalone 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
IDNUM=	xxxxx	
PUTYPE=	2	

LU Parameters	Recommended Value	Notes
LOCADDR=	2 to 33	Corresponds to the number of sessions through the Gateway.

Figure 106. VTAM/NCP Parameters for 3270 EP - Gateway or Standalone Configuration

---

If you are using a remote 3174 Gateway, then these definitions are in the NCP under a half-duplex leased multipoint line definition.

### 18.2.4.2 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 Standalone stations (the Downstream PUs - DSPUs).
- The DLC SAP address of the 3270 EP which is 04.

#### ***18.2.4.3 3270 EP Gateway or Standalone 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 or 9370).
- 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 '04' for a 3174, 37XX. If you are connecting to a 9370 check with the host programmers for the value of the SAPADDR = parameter.

#### ***18.2.4.4 3270 EP Network Station Parameters***

When customising a "Network Station", you need to know the Name that you should use for your station. This Name is specified in the "Gateway Station" that is supporting this "Network Station".

## ***18.3 Installation Steps***

This installation section will be organized as follows:

1. General installation options required for 3270 EP
2. General Gateway configuration considerations
3. DFT Gateway installation
4. SDLC Gateway installation
5. Token-Ring Gateway installation
6. Standalone configuration
7. Network Station configuration.

### **18.3.1 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 Parameters see "LAN Support Program" on page 83. This section also contains worksheets to help you determine these parameters correctly.

The specific scenarios covered later in this chapter will show these parameters.

- Standalone 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 the extra parameters shown in Figure 107 on page 146.
- 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" on page 83 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" on page 83 in order to establish the correct value for "ST=" parameter<sup>21</sup>.

- 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 3270 EP Gateway, then you should review "LAN Support Program" on page 83.

The number of NETBIOS sessions and commands used by 3270 EP needs to be coded as a dxmT0mod.sys parameter. Figure 108 on page 147 shows the resources required.

Configuration	Additional 'dxmT0mod.sys' Parameters
Standalone only	(not required)
Standalone + 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	ST=2 (at least) 'C=' and 'S=' requirements? (a)
Gateway - DFT and SDLC only	'C=' and 'S=' requirements? (a)
Gateway via Token-Ring only	ES=1, EST=1 'C=' and 'S=' requirements? (a)

Figure 107. 3270 EP - NETBIOS Parameters:

NOTES:

(a) See LAN Support Program and Figure 108 on page 147 below.

<sup>21</sup> If you are using one server and one Gateway, code ST=3.

	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	32 (b)
Standalone		0	0
Network Station		2	4

Figure 108. 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 copied the program from diskettes to your fixed disk. You can specify a subdirectory during the procedure.

3. Once the program is installed, type:

C: PSCPG

Ext 101      303

**3270 TASK SELECTION**

ID	ITEM
a	Communicate
b	Communication Profile Tasks
z	Exit

Type ID letter to choose ITEM; press ENTER:

Figure 109. 3270 EP - Task Selection

4. Figure 109:

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.

### 18.3.2 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 ("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 Question 'i'. This is shown in Figure 111 on page 149.

If you choose Gateway with network station you will also need to customize the Network Station; choose Option "f" shown in Figure 112 on page 150.

The requirements for each type of Gateway (DFT, SDLC or Token-Ring) are discussed in the following sections. The following are the steps required for "Gateway Setup" which is Option "h" from the "Communications Profile Tasks" menu. Each Gateway requires a "Gateway Setup", common for all Gateways, which defines the Network Stations.

Chg Profile		Ext 101	303
GATEWAY SETUP			
ID ITEM	YOUR CHOICE	POSSIBLE CHOICES	
a	Gateway Name	Up to 15 Characters	
b	Maximum Number of Sessions	8, 16, 24, or 32	

When finished with this menu, press ENTER.

Type ID letter to choose ITEM; press ENTER:

Figure 110. 3270 EP - Gateway Setup

1. Figure 110: Select a name for this Gateway. In this example we have chosen "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<sup>22</sup>.

When you press Enter, the next screen will be presented.

<sup>22</sup> Even though a DFT port will only support a maximum of five sessions, you must specify eight here.

Chg Profile		GATEWAY		Ext 101	303
LIST OF NETWORK STATIONS					
ID ITEM		YOUR CHOICE		POSSIBLE CHOICES	
a	Network Station Name 02	Gateway		Up to 15 Characters	
b	Network Station Name 03	stat1		Up to 15 Characters	
c	Network Station Name 04	stat2		Up to 15 Characters	
d	Network Station Name 05	stat1		Up to 15 Characters	
e	Network Station Name 06			Up to 15 Characters	
f	Network Station Name 07			Up to 15 Characters	
g	Network Station Name 08			Up to 15 Characters	
h	Network Station Name 09			Up to 15 Characters	
i	Display Sessions	2 3 4		02-09 Separated	
j	Printer Sessions	5		by Spaces	

Press  key or  key to see more. When finished, press ENTER.

Type ID letter to choose ITEM; press ENTER:

Figure 111. 3270 EP - List of Network Stations

- Figure 111: You now need to create a list of names which 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 the Gateway.

Three of the network names shown in this example are assigned to display sessions. The printer attached to 'STAT1' is defined to be a host addressable printer so a printer session must be assigned to STAT1 here.

### 18.3.3 DFT Gateway Installation

The DFT Gateway supports a maximum of five sessions. This can be any combination of display and / or printer sessions. The Gateway can run as a background task on a PCLP Server for example (PCLP 1.2 or Base Services) or can have a network session as well. The customization steps are as follows.

- Select "Communications Profile Tasks" from initial menu.

```

Chg Profile                               Ext 101                               303
COMMUNICATION PROFILE TASKS

ID  ITEM                                YOUR CHOICE  POSSIBLE CHOICES
a  Configuration                         3           1 = Standalone Station
                                     2 = Network Station
                                     3 = Gateway
                                     4 = Gateway with
                                     Network Station
b  Communication Attachment              2           1 = SDLC           2 = DFT
                                     3 = IBM Token-Ring Network
c  Alternate Tasks                      1           1 = Yes           2 = No
d  3270 Keyboard                        101         1 - 999
e  3270 Keyboard Remap                  2           1 = Yes           2 = No
f  Create or Revise Communication Setup
g  Create or Revise Modem and Line Description
h  Create or Revise Gateway Setup

z  Return to Task Selection

Type ID letter to choose ITEM; press ENTER: h

```

Figure 112. 3270 EP - DFT Gateway

2. Figure 112: Select from this panel Option 3 for Gateway (or 4 if you wish to use the Gateway as a Network Station also), and select DFT attachment.
3. As this is a Gateway, you should now proceed with option "h", "Create Gateway Setup", which has been previously covered in "General Gateway Considerations".

### 18.3.4 SDLC Gateway Installation

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 this chapter will show the correspondence between host and 3270 EP parameters.

```

Chg Profile                                     Ext 101                                     302
                                     COMMUNICATION PROFILE TASKS

ID  ITEM                                     YOUR CHOICE  POSSIBLE CHOICES
a  Configuration                             3            1 = Standalone Station
                                     2 = Network Station
                                     3 = Gateway
                                     4 = Gateway with
                                     Network Station
b  Communication Attachment                   1            1 = SDLC           2 = DFT
                                     3 = IBM Token-Ring Network
c  Alternate Tasks                           1            1 = Yes           2 = No
d  3270 Keyboard                             101          1 - 999
e  3270 Keyboard Remap                       2            1 = Yes           2 = No
f  Create or Revise Communication Setup
g  Create or Revise Modem and Line Description
h  Create or Revise Gateway Setup

z  Return to Task Selection

Type ID letter to choose ITEM; press ENTER:  g

```

Figure 113. 3270 EP - SDLC Gateway, Communications Tasks

1. Figure 113: Specify a Gateway configuration, and in this case also specify SDLC attachment. Having made this choice, you now need to "Create or Revise Modem and Line Setup". Select Option g.

```

Chg Profile                                     Ext 101                                     302
                                     MODEM AND LINE DESCRIPTION

ID  ITEM                                     YOUR CHOICE  POSSIBLE CHOICES
a  Physical Unit ID                           0
b  Network Facility                           2            1 = Switched       2 = Dedicated
                                     3 = Switched Backup
c  SDLC Station Address                       C2
d  Continuous Carrier                         2            1 = Yes           2 = No
e  Half Speed                                 2            1 = Yes           2 = No
f  NRZI Encoding                             1            1 = Yes           2 = No
g  Answer-Tone Generation                     2            1 = Yes (Switched only)  2 = No
h  End With REQDISCONT                       1            1 = Yes           2 = No
i  Destination Address                       00000000    0 - 79999999

When finished with this menu, press ENTER.
Type ID letter to choose ITEM; press ENTER:

```

Figure 114. 3270 EP - SDLC Gateway, Modem and Line

2. Figure 114: To complete this section 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".

### 18.3.5 Token-Ring 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 to a host Gateway such as a 3174, 9370 or 37XX. To the host (or the Host Gateway) it looks like a 3174 control unit (in fact on a Token-Ring it is similar to a 3174-3R)<sup>23</sup>. 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 this chapter will show the correspondence between host and 3270 EP parameters.

Chg Profile		Ext 101	303
COMMUNICATION PROFILE TASKS			
ID	ITEM	YOUR CHOICE	POSSIBLE CHOICES
a	Configuration	4	1 = Standalone Station 2 = Network Station 3 = Gateway 4 = Gateway with Network Station
b	Communication Attachment	3	1 = SDLC      2 = DFT 3 = IBM Token-Ring Network
c	Alternate Tasks	1	1 = Yes      2 = No
d	3270 Keyboard	101	1 - 999
e	3270 Keyboard Remap	2	1 = Yes      2 = No
f	Create or Revise Communication Setup		
g	Create or Revise Modem and Line Description		
h	Create or Revise Gateway Setup		
z	Return to Task Selection		
Type ID letter to choose ITEM; press ENTER: g			

Figure 115. 3270 EP - Token-Ring Gateway

<sup>23</sup> 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.

- Figure 115: Select Gateway or Gateway with Network Station configuration and also Token-Ring attachment.

Select option g, for further specifications about the Token-Ring attachment.

```

Chg Profile
                                Ext 101          303
                                MODEM AND LINE DESCRIPTION

ID  ITEM                        YOUR CHOICE  POSSIBLE CHOICES

a  Physical Unit ID            E0006
b  Network Facility            1           1 = Switched    2 = Dedicated
c  SDLC Station Address        04          3 = Switched Backup
d  Continuous Carrier          2           1 = Yes         2 = No
e  Half Speed                  1           1 = Yes         2 = No
f  NRZI Encoding               1           1 = Yes         2 = No
g  Answer-Tone Generation      2           1 = Yes (Switched only)  2 = No
h  End With REQDISCONT         2           1 = Yes         2 = No
i  Destination Address         00114014    0 - 79999999
  
```

When finished with this menu, press ENTER.

Type ID letter to choose ITEM; press ENTER:

Figure 116. 3270 EP - Token-Ring Gateway, Line Setup

- Figure 116: To complete this section you will need to know the following values from your host programmers:

<b>PU ID</b>	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 host Gateway.
<b>Network Facility</b>	Irrelevant for this customization.
<b>SDLC Station Address</b>	This is the DLC SAP address of the host Gateway. For example, A SAP address of 4 can be used for a 3174 and 37XX. If a 9370 is the host Gateway, see your host programmers for the value of the SAPADDR = parameter coded in VTAM.
<b>Continuous Carrier</b>	irrelevant for Token-Ring communications.
<b>Half Speed</b>	Irrelevant for Token-Ring communications.
<b>NRZI Encoding</b>	Irrelevant for Token-Ring communications.
<b>Answer Tone</b>	Irrelevant for Token-Ring communications.
<b>REQDISCONT</b>	Irrelevant for Token-Ring communications.
<b>Destination Address</b>	This is the host Gateway Token-Ring Network Adapter address which must be a locally administered address and comprises of decimal digits only. Specify here only the last eight digits of the address (the full address will be 4000xxxxxxx, ranging from 70000000 to 79999999).

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".

### 18.3.6 Standalone Configuration

A Standalone configuration on a Token-Ring is one that communicates directly with the host Gateway, not through a 3270 EP Gateway. The standalone configuration is therefore seen as a '3174' type of device on the Token-Ring<sup>23</sup>.

An important thing to note about the Standalone 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 this chapter will show the correspondence between host and 3270 EP parameters.

Chg Profile			Ext 101	303
COMMUNICATION PROFILE TASKS				
ID	ITEM	YOUR CHOICE	POSSIBLE CHOICES	
a	Configuration	1	1 = Standalone Station 2 = Network Station 3 = Gateway 4 = Gateway with Network Station	
b	Communication Attachment	3	1 = SDLC      2 = DFT 3 = IBM Token-Ring Network	
c	Alternate Tasks	1	1 = Yes      2 = No	
d	3270 Keyboard	101	1 - 999	
e	3270 Keyboard Remap	2	1 = Yes      2 = No	
f	Create or Revise Communication Setup			
g	Create or Revise Modem and Line Description			
h	Create or Revise Gateway Setup			
z	Return to Task Selection			
Type ID letter to choose ITEM; press ENTER:				

Figure 117. 3270 EP - Standalone Configuration

1. Figure 117: Select standalone configuration and Token-Ring attachment.

```

Chg Profile
                                     Ext 101          303
                                MODEM AND LINE DESCRIPTION

ID  ITEM                                YOUR  POSSIBLE
   CHOICE                               CHOICES

a  Physical Unit ID                    E0007
b  Network Facility                     1      1 = Switched    2 = Dedicated
c  SDLC Station Address                 04     3 = Switched Backup
d  Continuous Carrier                   2      1 = Yes          2 = No
e  Half Speed                           1      1 = Yes          2 = No
f  NRZI Encoding                        1      1 = Yes          2 = No
g  Answer-Tone Generation               2      1 = Yes (Switched only)  2 = No
h  End With REQDISCONT                  2      1 = Yes          2 = No
i  Destination Address                  00114014  0 - 79999999

```

When finished with this menu, press ENTER.

Type ID letter to choose ITEM; press ENTER:

Figure 118. 3270 EP - Standalone Configuration, Line Setup

2. Figure 118: To complete this section you will need to know the following values from your host programmers:

- PU ID
- Network facility
- SDLC station address
- Continuous carrier
- Half speed
- NRZI encoding
- Answer tone
- End with REQDISCONT
- Destination address

For a discussion of these parameters, see "Token-Ring Gateway Installation" on page 152.

### 18.3.7 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 "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.

```

Chg Profile
                                Ext 101          303
                                COMMUNICATION PROFILE TASKS

ID  ITEM                        YOUR CHOICE  POSSIBLE CHOICES
a  Configuration                2           1 = Standalone Station
                                2 = Network Station
                                3 = Gateway
                                4 = Gateway with
                                Network Station
b  Communication Attachment     3           1 = SDLC          2 = DFT
                                3 = IBM Token-Ring Network
c  Alternate Tasks              1           1 = Yes          2 = No
d  3270 Keyboard                101        1 - 999
e  3270 Keyboard Remap         2           1 = Yes          2 = No
f  Create or Revise Communication Setup
g  Create or Revise Modem and Line Description
h  Create or Revise Gateway Setup

z  Return to Task Selection

Type ID letter to choose ITEM; press ENTER:  f

```

Figure 119. 3270 EP - Network Station

1. Figure 119: Specify that the station is a Network Station and that it is Token-Ring attached. You then need to create a communications setup. Select option f.

```

Chg Profile
                                Ext 101          303
                                COMMUNICATION SETUP

ID  ITEM                        YOUR CHOICE  POSSIBLE CHOICES
a  3270 Numeric Lock           2           1 = Yes          2 = No
b  3270 Printer Use            4           1 = Screen Print
                                2 = Host
                                3 = Screen Print and Host
                                4 = None
c  File Transfer                1           1 = Yes          2 = No
d  Application Programming      4           1 = Presentation Space
    Interface (API)              2 = Server-Requester
                                Programming Interface (SRPI)
                                3 = Both
                                4 = None
e  Station Name                 stat1       Up to 15 Characters

When finished with this menu, press ENTER.
Type ID letter to choose ITEM; press ENTER:

```

Figure 120. 3270 EP - Network Station, Communication Setup

2. Figure 120: This panel is common for all network sessions. If you have a Gateway with Network Station then you will also need to customize this panel. Specify the name of this Network Station. You do not 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.

## ***18.4 Scenarios***

The following pages present the parameters and relationships required to set up 3270 EP communications across a Token-Ring. 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

## 18.4.1 Connection to Remote 3174 Gateway

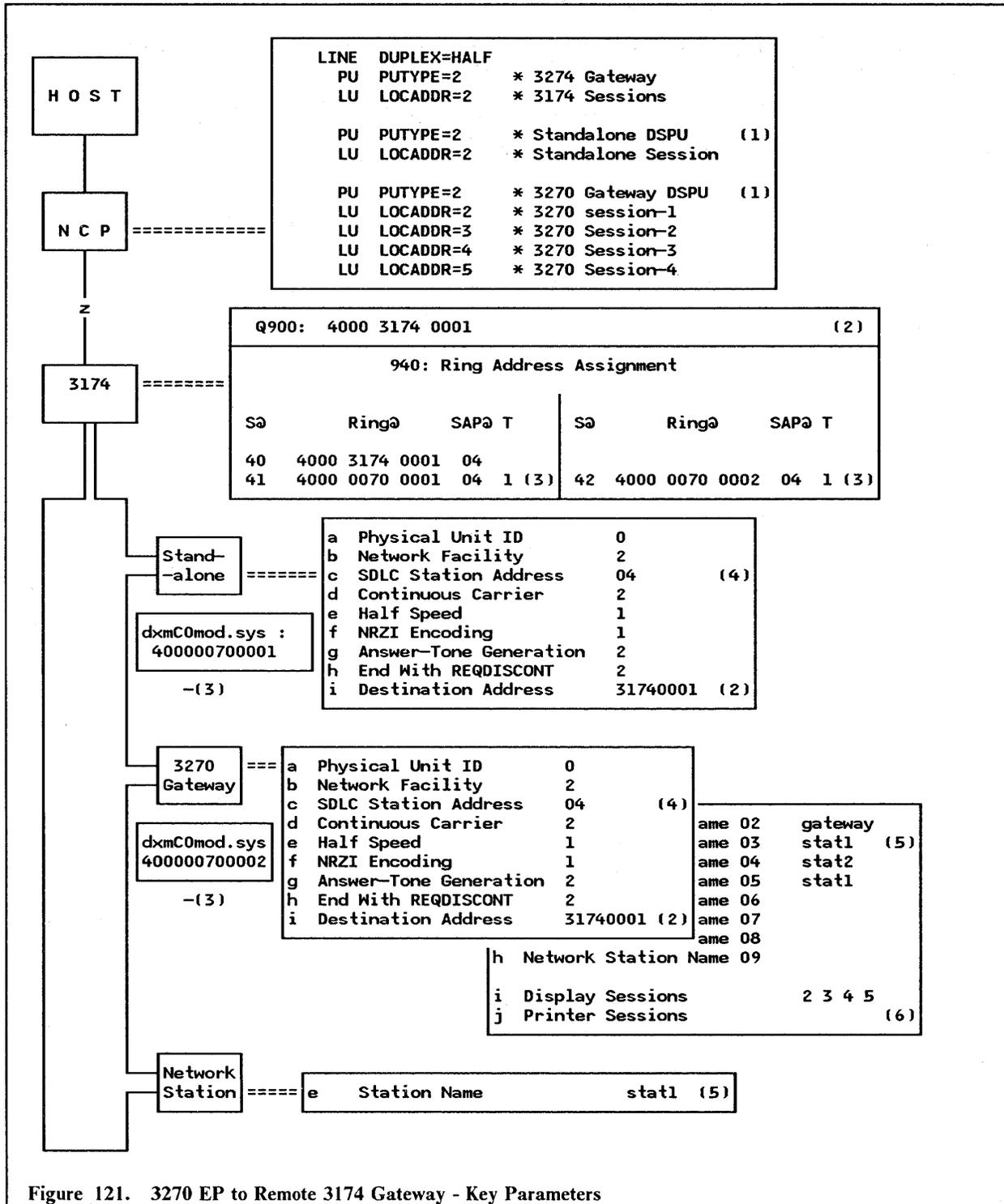


Figure 121. 3270 EP to Remote 3174 Gateway - Key Parameters

### Notes - Connection to Remote 3174 Gateway

1. The number of sessions required must be defined at the host. 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. Only the last eight digits are specified in the 3270 EP customization - these must be decimal.
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.
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.

## 18.4.2 Attachment through a Local 3174 Gateway

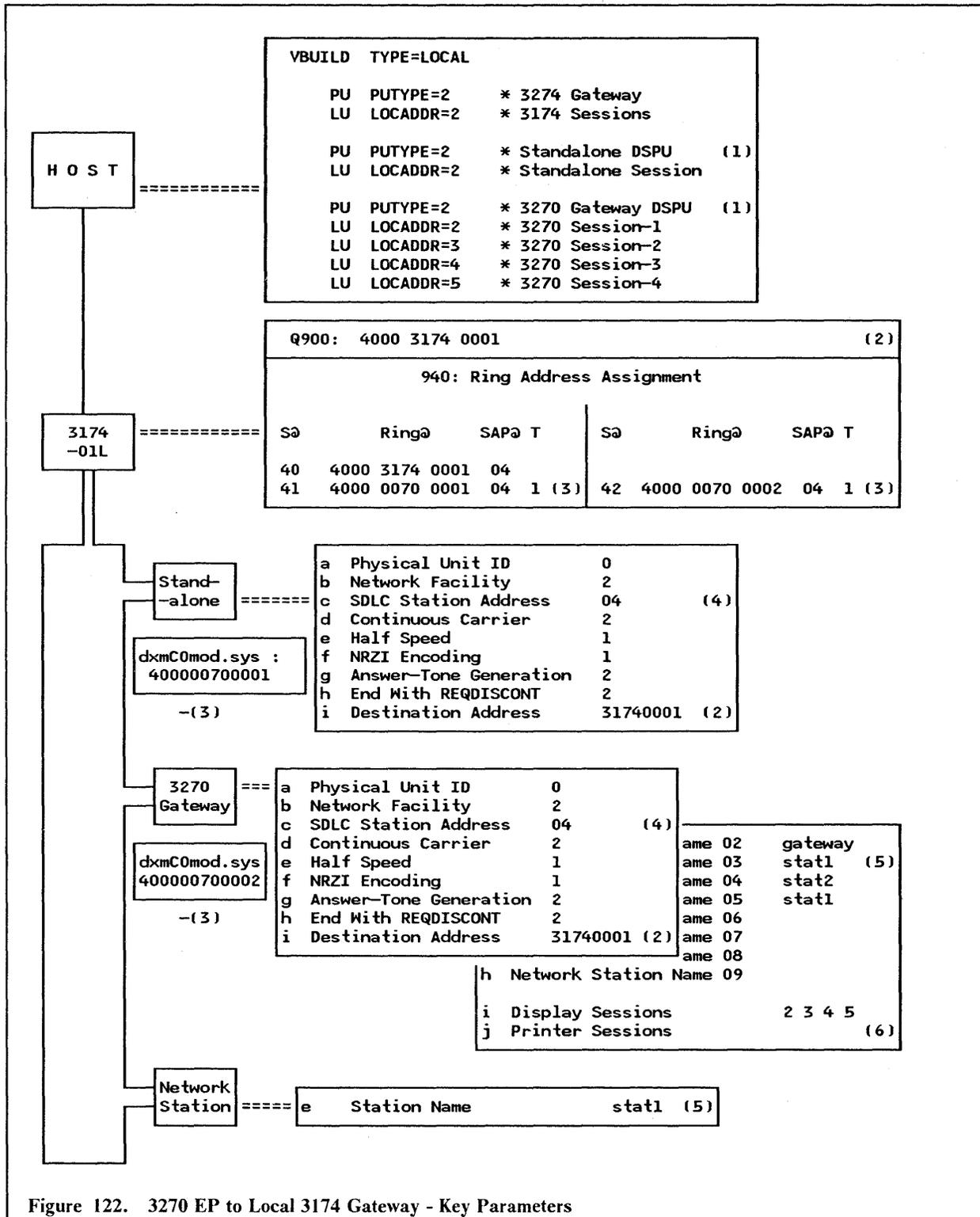


Figure 122. 3270 EP to Local 3174 Gateway - Key Parameters

### **Notes - Attachment through a Local 3174 Gateway**

1. The number of sessions required must be defined at the host. 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. Only the last eight digits are specified in the 3270 EP customization - these must be decimal.
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 Local Addresses in which case it is defined as a dxmC0mod.sys parameter in the CONFIG.SYS file of the PC.
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.

### 18.4.3 Attachment to a Token-Ring Connected 9370

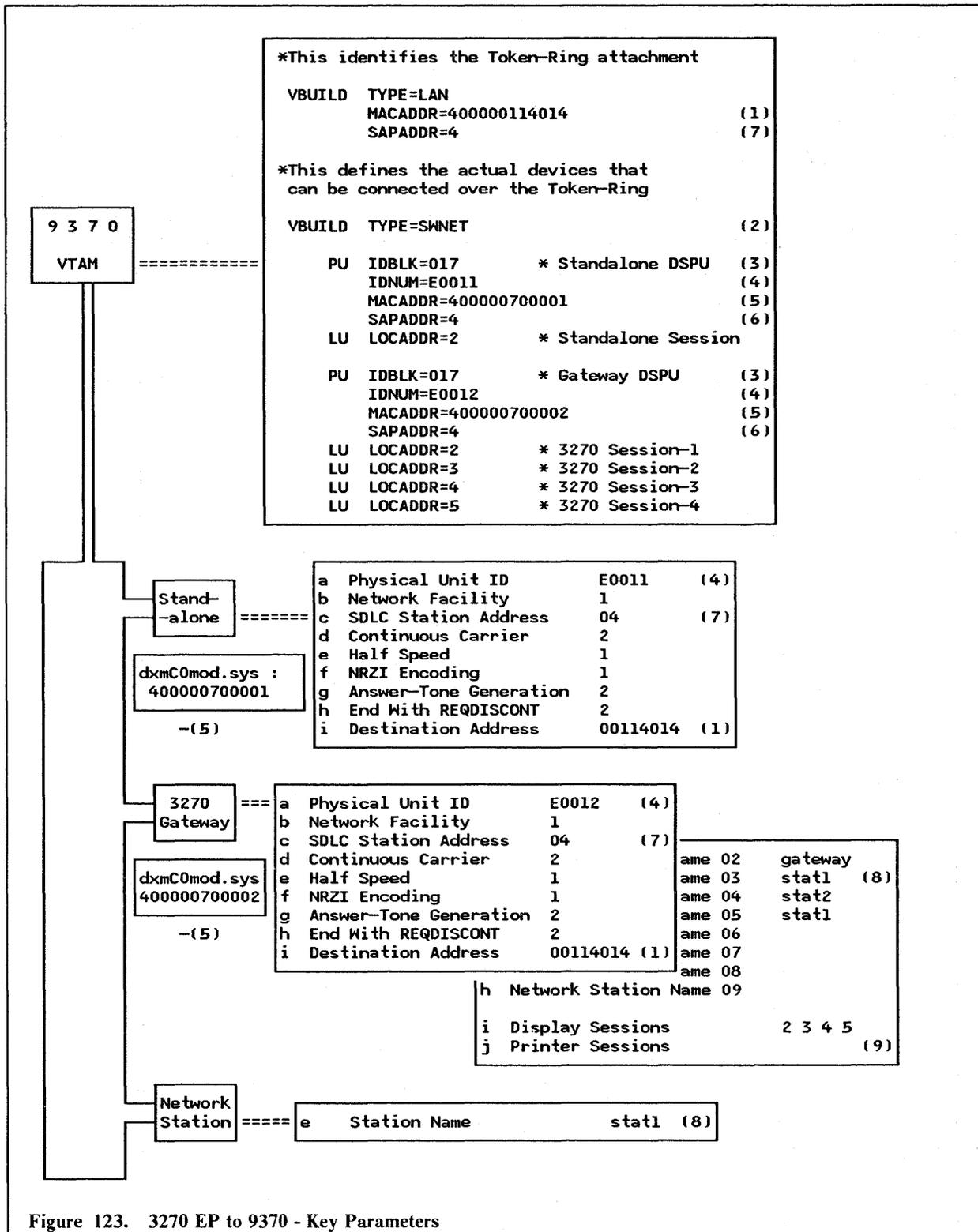


Figure 123. 3270 EP to 9370 - Key Parameters

### 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. Only the last eight digits are specified in the 3270 EP customization - these must be decimal.
2. The number of sessions required must be defined at the host. If a printer session is required, your host programmers should use a different 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.

# 18.4.4 Attachment to a Token-Ring Connected 37XX

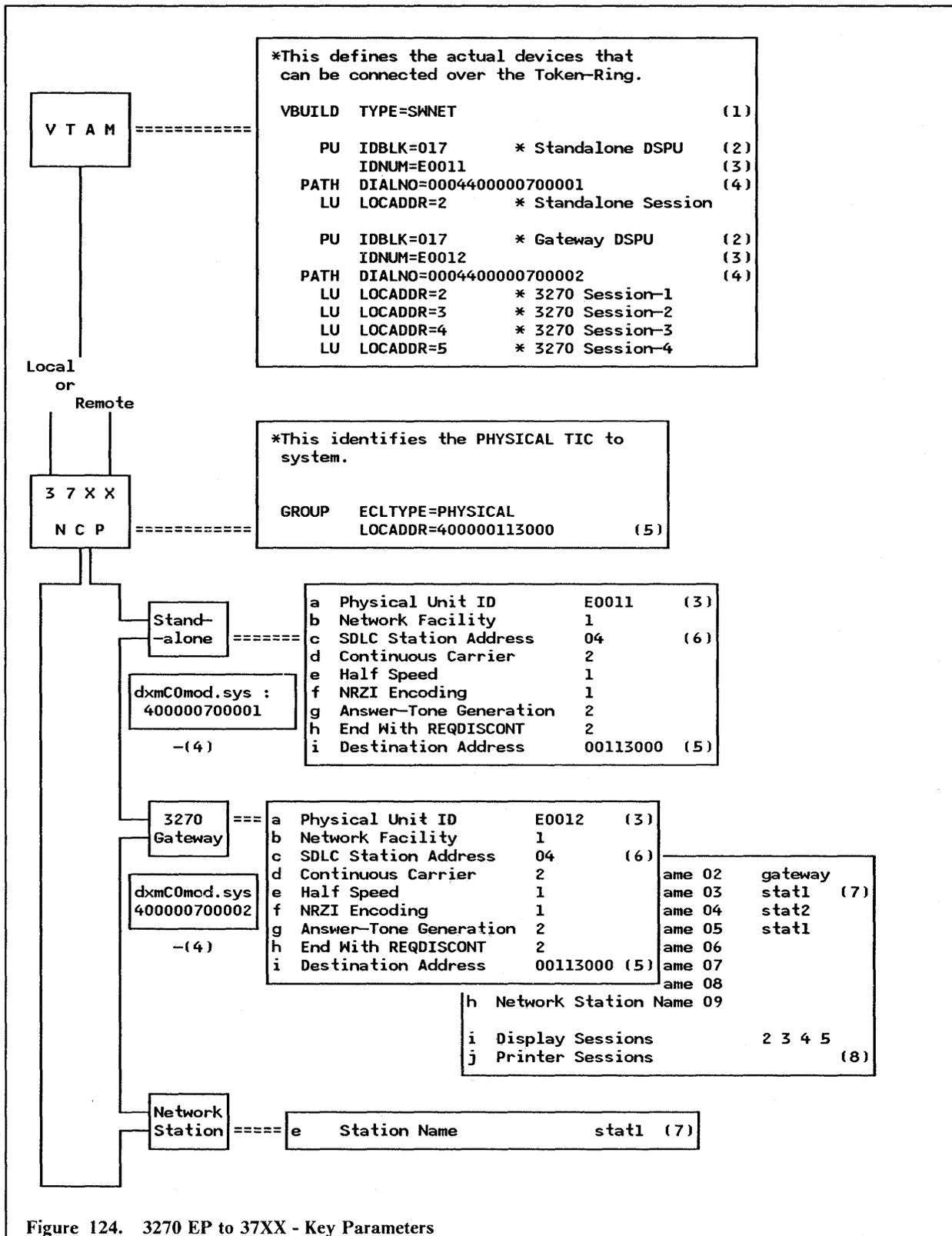


Figure 124. 3270 EP to 37XX - Key Parameters

### Notes - Attachment to a Token-Ring Connected 37XX

1. The number of sessions required must be defined at the host. If a printer session is required, your host programmers should use a different 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; only the last eight digits are specified in the 3270 EP customization - these must be decimal.
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.

## 18.4.5 Connection through a 3270 SDLC Gateway

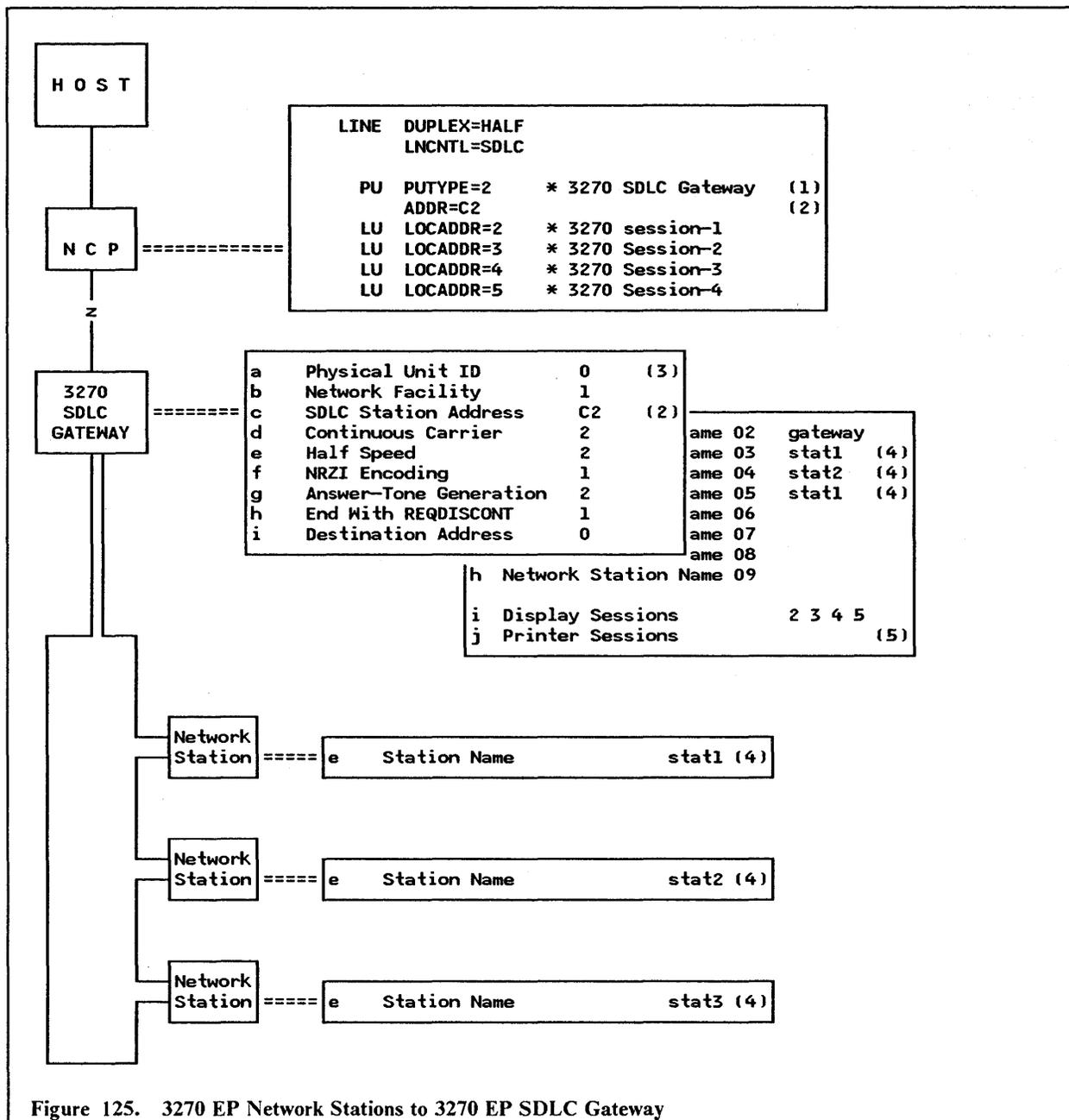


Figure 125. 3270 EP Network Stations to 3270 EP SDLC Gateway

### **Notes - Connection through and 3270 SDLC Gateway**

1. The SDLC Gateway and all its associated displays and printers must be defined in the host. If a printer session is required, your host programmers should use a different 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.

## ***18.5 Basic Troubleshooting***

A common problem usually encountered is the following:

"Not enough Network Control Blocks (NCBs)"

This is due to the COMMANDS parameters in NETBIOS not being set at a high-enough value. You should edit the CONFIG.SYS file and increase the "C =" parameter of the line "device = dxmT0mod.sys". To help with this there are worksheets supplied in the section "LAN Support Program" on page 83.

## ***18.6 Where To Go For More Information***

- *3270 EP System Planner's and Reference Guide*
- *GG22-9430 Guidelines for Setting IBM LAN Support Program Parameters for Use with Selected IBM Products.*



# 19.0 3270 Workstation Program Version 1.1

## 19.1 Overview

The Workstation Program (WSP) replaces and enhances the function of the 3270-PC Control Program. The new Version 1.1 now allows workstations to be host-connected across a Token-Ring LAN using IEEE 802.2 Protocols<sup>24</sup>. Briefly, the Workstation Program provides the following:

- Multiple host (from 0 to 4) sessions
- Multiple DOS (from 0 to 6) sessions
- Two notepad sessions
- Attachment to 3X74 controllers 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 attachment of Workstation Program to hosts through the different gateways.

## 19.2 Planning Checklist

### 19.2.1 Prerequisites - Hardware

- One of the following: PC-XT, PC-AT, PS/2 models 30, 50, 60, 70, 80
- Appropriate Token-Ring Adapter and cables; see "PC Token-Ring Network Adapter Installation" on page 15 and "PS/2 Token-Ring Adapter/A Installation" on page 21.

### 19.2.2 Prerequisites - Software

- DOS 3.3 or higher
- LAN Support Program; see "LAN Support Program" on page 83.

### 19.2.3 Coexistence and Compatibility

#### 19.2.3.1 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

---

<sup>24</sup> This LAN connection supports only the Token-Ring Network. The PC Network is NOT supported because no host communication gateways are available.

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.

### **19.2.3.2 3278/79 Emulation Adapter**

If this adapter is used (unlikely in this environment) with the Token-Ring Adapter, you must ensure that the interrupt levels are set differently. See "PC Token-Ring Network Adapter Installation" on page 15 and "PS/2 Token-Ring Adapter/A Installation" on page 21 for a discussion of what interrupt levels are compatible and how to set them<sup>25</sup>.

### **19.2.3.3 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 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'.

### **19.2.3.4 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 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 127 on page 172.

## **19.2.4 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 to a host or host Gateway, you will need to know the following parameters (also, ensure that your host Programmers have coded these parameters).

### **19.2.4.1 Host Parameters**

The VTAM/NCP parameters that need coding are covered in complete detail in "VTAM and NCP Definitions" on page 259.

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.

---

<sup>25</sup> Note that this adapter is not required if you are communicating to a host through a Token-Ring Attached Gateway.

PU Parameters	Recommended Value	Notes
IDBLK=	05E	For 37XX and 9370 Connection Hardcoded in 3270 WSP 1.1
IDNUM=	xxxxx	Must match the PU-ID used in the WSP.
MAXDATA=	2042	
PUTYPE=	2	Required by WSP

LU Parameters	Recommended Value	Notes
LOCADDR=	2 to 5	Corresponds to the number of sessions

Figure 126. 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.

#### 19.2.4.2 3174 Parameters

When you customize the 3174 you will need the following parameters:

- The locally administered address of this 3174.
- The Token-Ring Adapter Address of the attaching workstations (the Downstream PUs - DSPUs).

#### 19.2.4.3 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 or 9370).
- 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 of the Workstation Program's station.
- The Remote SAP ID for the Gateway or host. This is typically '04' for a 3174, 37XX or 9370.

#### 19.2.4.4 LAN Support Program

Make sure that you use module 'dxmC1mod.sys' and not 'dxmC0mod.sys'; otherwise the Workstation Program will not communicate across the LAN.

### 19.2.5 Migration From 3270 Emulation Version 3

If you are migrating, then be aware that:

1. The IDBLK of the Workstation Program is 05E, whereas, the IDBLK for 3270 Em V3 is 017.
2. The SAP address of Workstation Program is 08; the SAP address of the 3270 Em V3 is 04.

## 19.3 Installation Steps

This Installation Section will be organized as follows:

1. General installation options for Token-Ring Network Attachment
2. Attachment through a remote 3174 Gateway
3. Attachment through a local 3174 Gateway
4. Attachment to a Token-Ring Network connected 9370
5. Attachment through a local or remote 37XX Gateway.

### 19.3.1 General Installation Options for Token-Ring Network Attachment

---

```
CONFIG.SYS:

    device=dxmA0mod.sys

    device=dxmC1mod.sys xxxxxxxxxxxxxx

( device=dxmT0mod.sys DS=   ES=1 EST=1 O=N )
```

Figure 127. WSP - CONFIG.SYS File Statements:

NOTES:

DS is greater than or equal to the send buffer size entered during Workstation Program customization

xxxxxxxxxxxx = 12 digit local address of the PC.

---

1. Figure 127:

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" on page 83.

If you are using PCLP 1.2 or PCLP 1.3 Base Services as well, then you should code the check that the **dxmT0mod.sys** statement 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 CUSTOMISATION 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	Target C		
HARDWARE OPTIONS	System Unit PS/2 Model 80	Keyboard	XMA Emulation 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 128. WSP - Customization Panel-1

3. Figure 128: This is 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	Long name	Screen	EAB	PS
	E	HOST1___	24x80	Yes	
	F	HOST2___	24x80	Yes	
	G	HOST3___	24x80	Yes	
	H	HOST4___	24x80	Yes	
PF1=Help	PgDn=Next	PgUp=Prev	Home=Home	End=Last	Esc=Quit

Figure 129. WSP - Customization Panel-2, Host Options

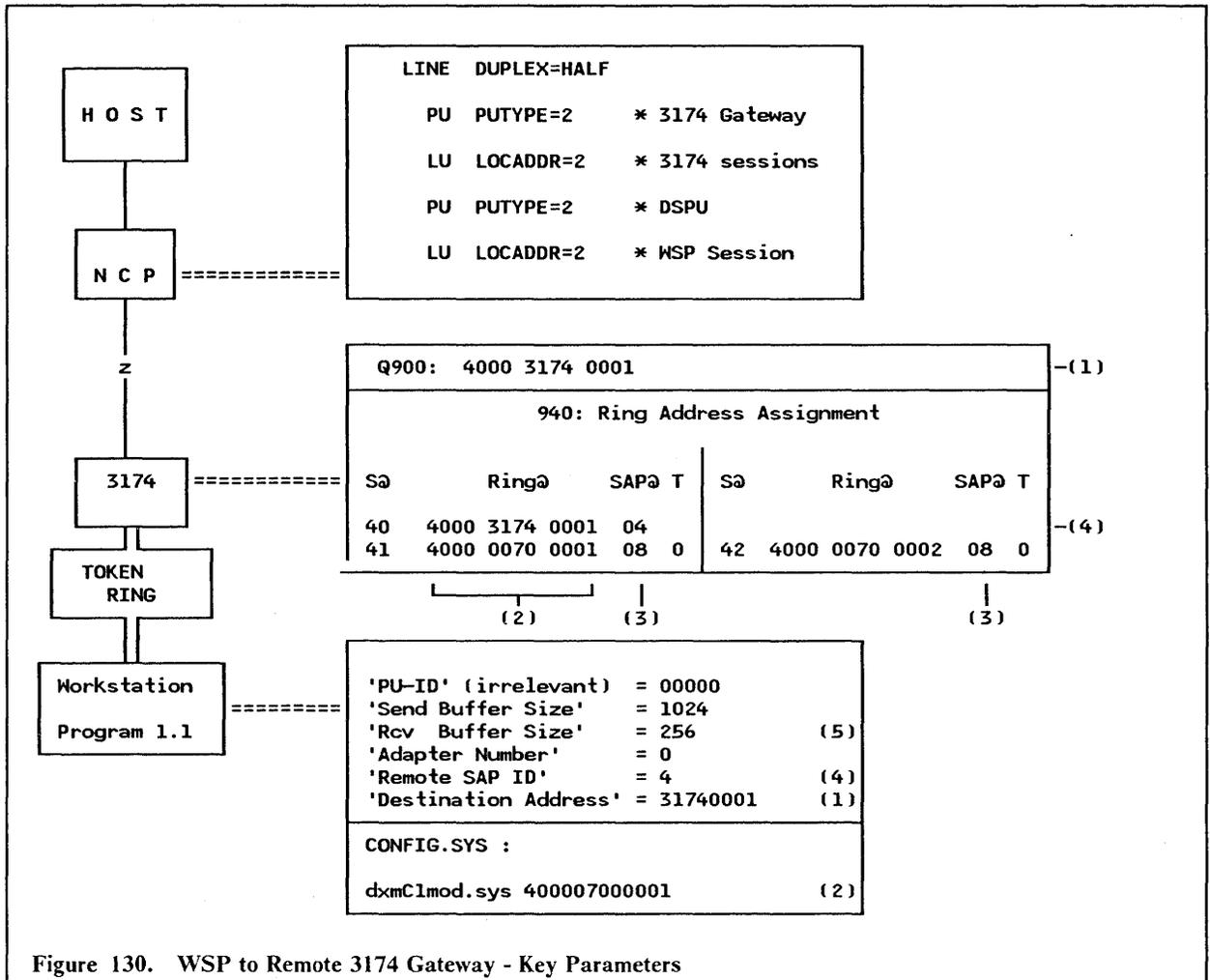
4. Figure 129: The "Host Options" panel is very important. It is the options set here that we shall concentrate on the most.

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)
- 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 and is therefore required when you are attaching through a 37XX Gateway or a 9370 directly. It is not required if you are using a 3174 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 T0 module of the CONFIG.SYS. See Figure 127 on page 172.
- Receive Buffer Size**    Unless you have XMA (Extended Memory Addressing) then 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 which must be decimal.
- Host Sessions**        Define the number and characteristics of host sessions.

## 19.3.2 Attachment through a Remote 3174 Gateway



### 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.

### 19.3.3 Attachment through a Local 3174 Gateway

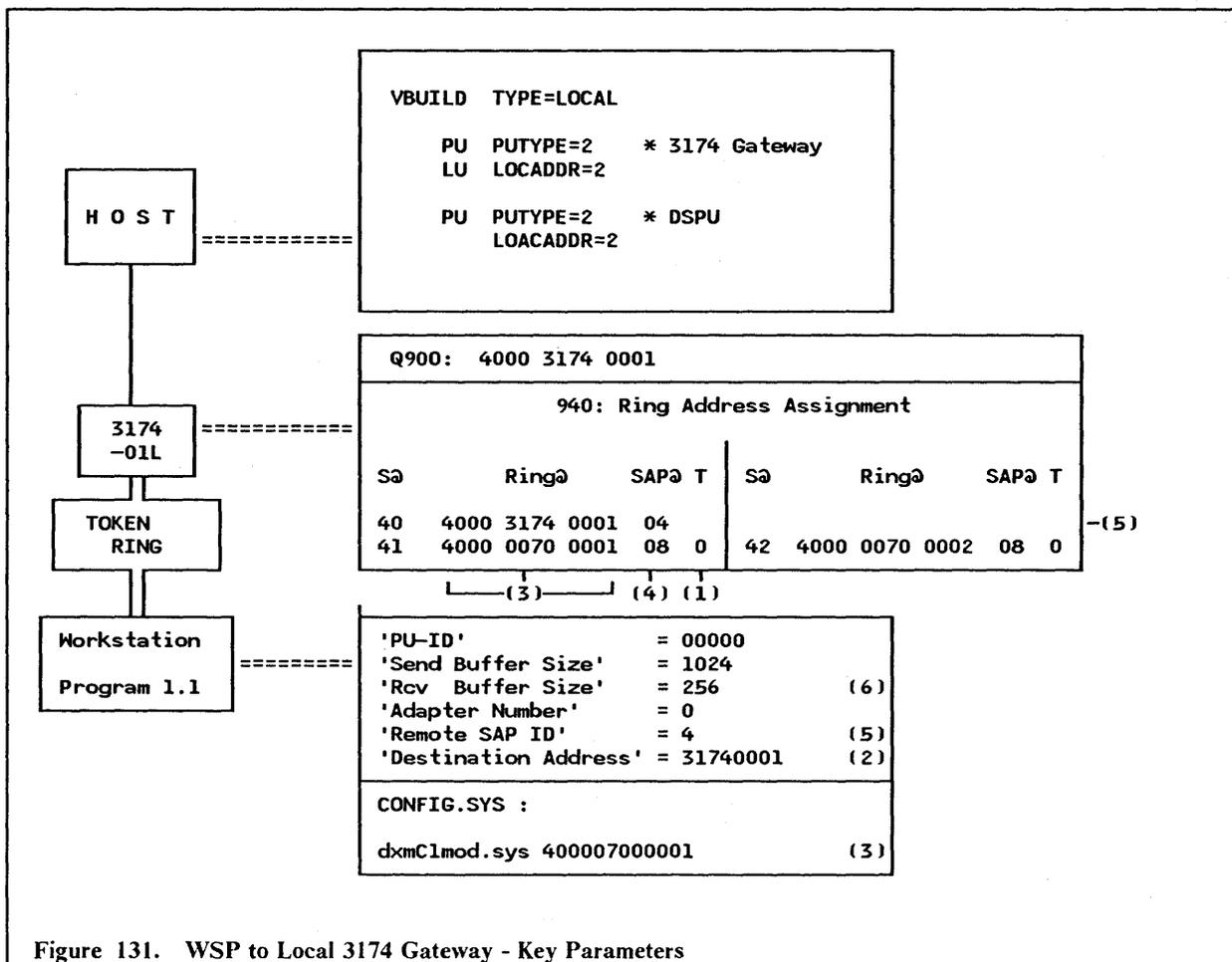
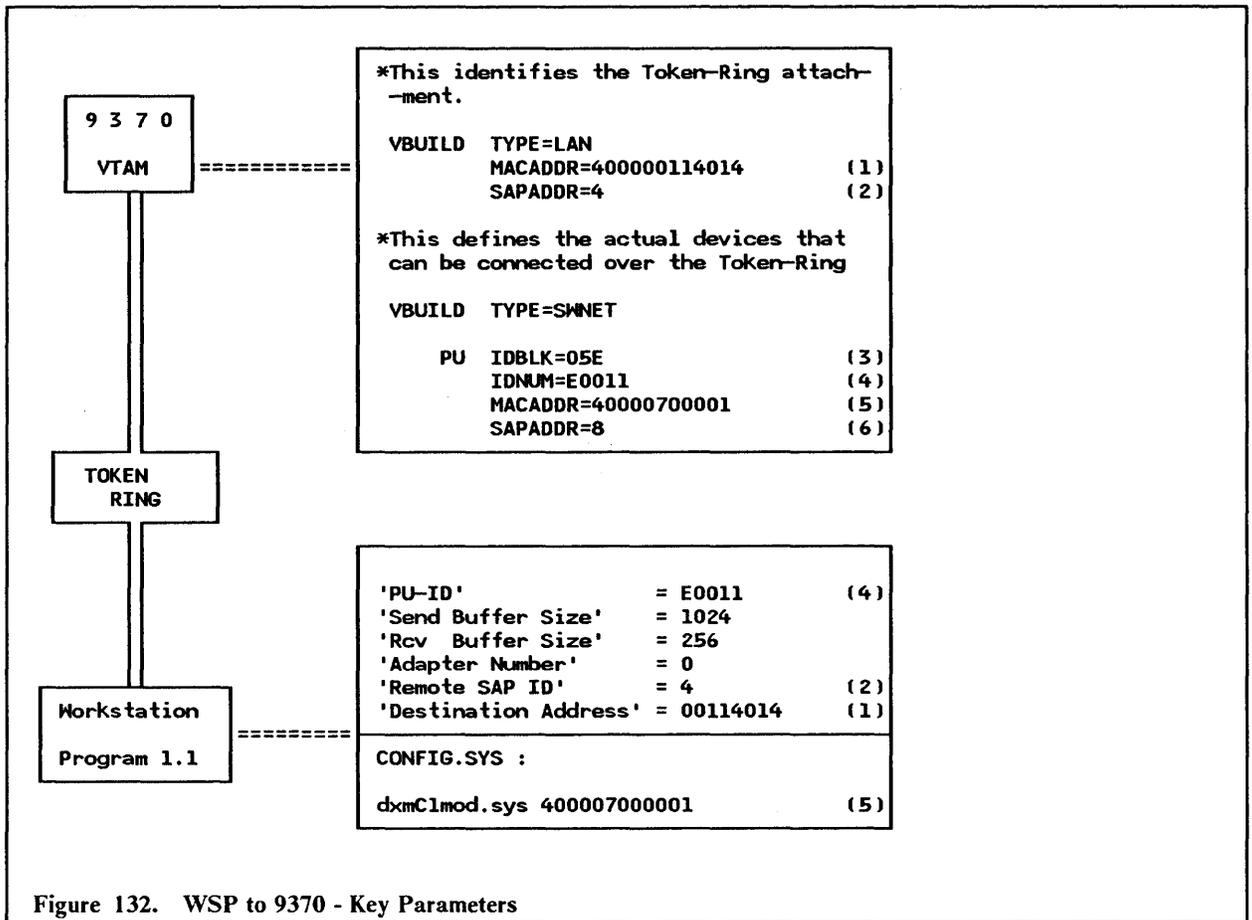


Figure 131. WSP to Local 3174 Gateway - Key Parameters

#### 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.

### 19.3.4 Attachment to a Token-Ring Network Connected 9370



#### 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 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 of VTAM 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.

### 19.3.5 Attachment through a Local or Remote 37XX Gateway

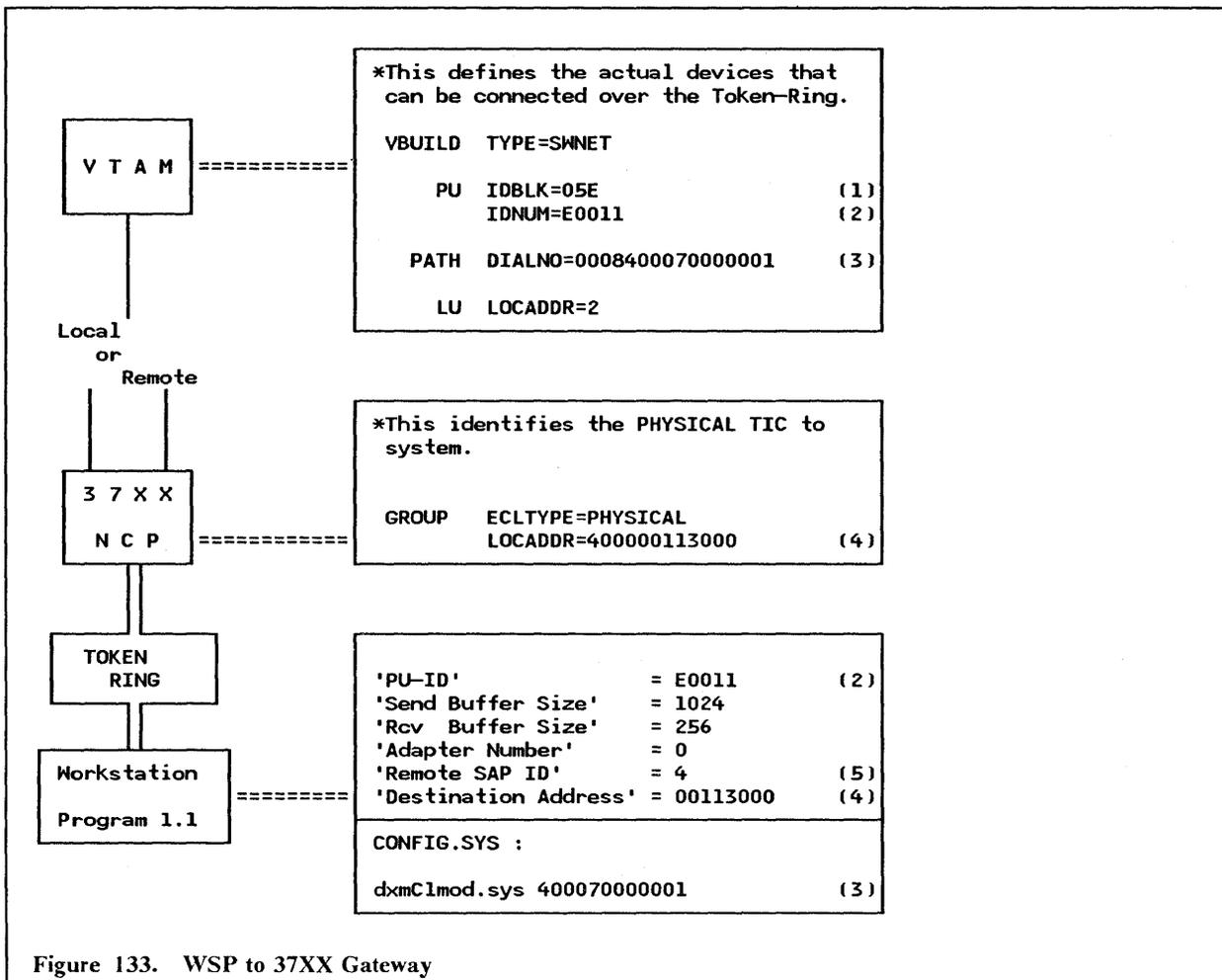


Figure 133. WSP to 37XX Gateway

#### 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.

## 19.4 Where To Go For More Information

- 3270 Workstation Program Version 1.10 Setup and Customization.

# 20.0 Token-Ring Network Bridge Program V1.1

## 20.1 Overview

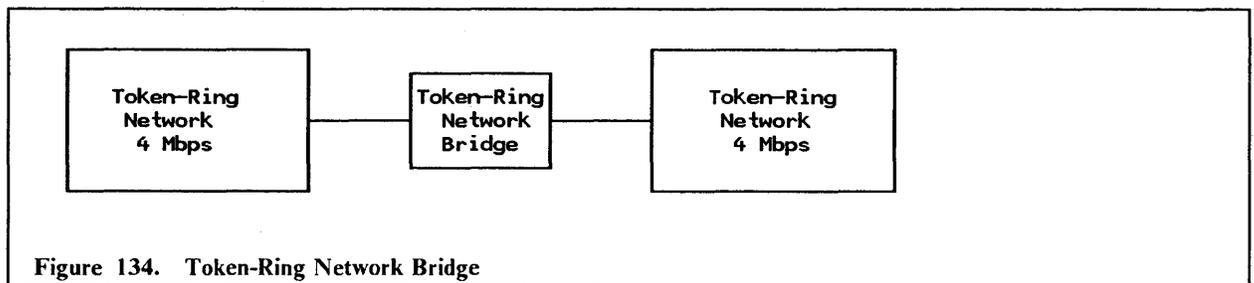


Figure 134. Token-Ring Network Bridge

The Token-Ring Network Bridge Program allows you to connect two 4 Mbps rings of a Token-Ring Network allowing communication between devices on different rings. The bridge is a dedicated computer.

Multiple rings that are bridged appear as one logical ring and applications that are written to the IEEE 802.2 Open Interface, to the NETBIOS interface or to the APPC/PC interface can operate across bridges without modification.

The bridge program can also communicate with up to four network management programs such as the IBM LAN Manager.

A configuration program that comes on the bridge program diskette allows you to tailor the bridge program functions for your network.

You can use the IBM Token-Ring Network Bridge program to connect up to eight rings.

### 20.1.1.1 Performance of the Bridge

Preliminary measurements of bridge delay between two unloaded networks (using an AT, as required, for the bridge) indicate the bridge hop delay to be dependent on the message frame size, and to range from two milliseconds for a 256 byte frame to nine milliseconds for the maximum, 2048 byte, allowable frame size.

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 with their IBM support to evaluate the impact of high traffic levels of bridge placements in the network.

## 20.2 Planning Checklist

### 20.2.1 Prerequisites - Hardware

- One of the following with at least 256 Kb of memory
  - Family I computers

- ▲ PC-AT
- ▲ Industrial Computer 7531 or 7537
- ▲ Personal System/2 model 30.

These computers must use the Token-Ring Network Adapter II.

- Family II computers
  - ▲ Personal System/2 model 50, 60 or 80.

These computers must use the Token-Ring Network Adapter II/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.

### 20.2.2 Prerequisites - Software

- DOS 3.3 or later
- Diagnostic diskettes for the Token-Ring Adapters

These are packaged with the adapters.

### 20.2.3 Coexistence And Compatibility

If you are migrating from the bridge program V1.00, you cannot use the V1.00 configuration file with V1.1. You should make a printed copy of this old file so that you can refer to it when configuring your V1.1 bridge.

Also, be aware that you cannot run V.100 of the bridge program on a Personal System/2 (50, 60, 80).

The bridge program cannot be run on a PC-XT-286.

## 20.3 *Installation Steps*

To install a bridge between two rings of a Token-Ring Network, you will need to have determined certain attributes about the two environments such as the names of the rings and the names or numbers of the bridges. Consequently, you need to plan this installation.

The steps for installation are as follows:

- Review product documentation
- Complete bridge planning chart
- Install the bridge hardware
- Prepare a working copy
- Install and customize
- Load the bridge program

### 20.3.1 Complete Bridge Planning Chart

Before you start, you should complete the bridge planning chart which will help you set the correct configuration.

The Bridge Planning Chart, is part of the product documentation and it is described in the *IBM Token-Ring Network Bridge Program User's Guide* and included in this document for illustration. This chart is shown in Figure 135 on page 182 and Figure 136 on page 183.

**Bridge Planning Chart**

Date \_\_\_\_\_ Bridge Identification \_\_\_\_\_

Check one: Load Manually \_\_\_\_\_ Load Automatically \_\_\_\_\_

Section 1 \_\_\_\_\_ Bridge Configuration Parameters

Check one: Alter Configuration \_\_\_\_\_ Use Defaults \_\_\_\_\_

Bridge number (default = 1)	
Ring Number connected to Primary Adapter (default = 001)	
Ring Number connected to Alternate Adapter (default = 002)	
Frame Forwarding Active (default = Y)	
Bridge Performance Threshold (default = 10)	
Restart on Error (default = Y)	
Drive for memory Dump on Error (default = 0)	
Drive for Error Log (default = 0)	

	Primary	Alternate
Hop Count Limit (default = 7)		
Single-Route Broadcast (default = Y)		
Locally administered address (defaults = 000000000000)		
Ring Parameter Server (default = Y)		
Ring Error Monitor (Default = Y)		
Configuration Report Server (Default = Y)		
Shared RAM Address (Primary adapter default = 0000)		
Shared RAM Address (Alternate adapter default = 0000)		

	OLD	NEW
Link Password 0 (Default = 00000000)		
Link Password 1 (Default = 00000000)		
Link Password 2 (Default = 00000000)		
Link Password 3 (Default = 00000000)		

Figure 135. Bridge Planning Chart (Section 1)

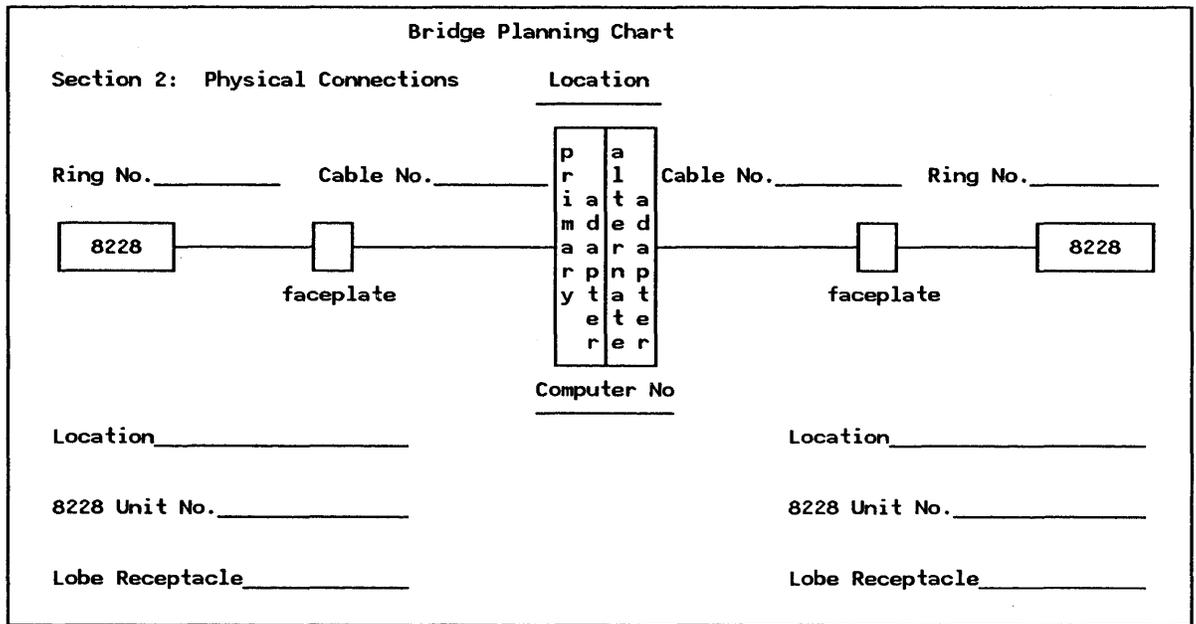


Figure 136. Bridge Planning Chart (Section 2)

### 20.3.2 Installing Bridge Hardware

This section will cover the installation of the Token-Ring Network Adapters.

1. Set Adapters - one to be primary and one to be alternate
  - For a PC Token-Ring Adapter II,
 

Set the switches on one adapter for primary and on the other for alternate. This operation is documented in "PC Token-Ring Network Adapter Installation" on page 15.
  - For a Token-Ring Adapter/A,
 

Use the system reference diskette to set the adapter parameters.
2. Set the interrupt levels at level 2 and level 3 respectively, otherwise the bridge program will generate a wrong error message.
3. Make sure the shared RAM addresses point to a different location in the hidden memory (default values for primary/alternate adapter should be ok).
4. Install the adapters
5. Connect cables.

You do not require the LAN Support Program or similar code such as TOKREUI or NETBEUI, the bridge program provides its own interface to the adapter microcode.

### 20.3.3 Prepare a Working Copy

Before you use the Bridge Program you need to prepare a working copy of the bridge program modules and files. There is not a special process involved in the generation of a working diskette; the idea is just to obtain a back-up copy of the product and work on it.

## 20.3.4 Install and Customize

1. Decide whether to install the program to a diskette or fixed disk.
2. Use the DOS copy command to copy the files from the program diskette.

If you are loading from a diskette and you require the bridge program to restart automatically in the event of a failure, you must make sure that the diskette is formatted to be a system diskette (that is, formatted using the /s option).

If you want to automatically restart the bridge, you must also edit the AUTOEXEC.BAT file on the disk or diskette to include the line:

```
C: ECCMAIN
```

Make sure that the AUTOEXEC does not include DOS commands that require operator intervention such as DATE and TIME since the bridge program will not start until a response to this prompts is made.

3. It may be possible that you are going to use the default values for the bridge. If this is so, proceed to "Load The Bridge Program" on page 188; otherwise, continue with customization.
4. Customize the configuration file. This can be done on any PC. You do not require the adapters to be installed.
5. Type:

```
ECCCNFG
```

After the copyright panel is displayed, the first of the configuration panels for the Bridge Program is displayed.

ECCPCG10	IBM TOKEN-RING NETWORK BRIDGE CONFIGURATION PROGRAM	Page 1 of 4 12:09:16
Type the desired values in each of the fields below. Press F2 (Quit) to exit to DOS without saving the configuration parameters. Press F6 (Save) to save the configuration parameters to the file ECCPARMS.BIN.		
Bridge number.....	[1]	(0-9, A-F)
Ring number connected to primary adapter....	[001]	(001-FFF Hexadecimal)
Ring number connected to alternate adapter..	[002]	(001-FFF Hexadecimal)
Frame forwarding active.....	[Y]	(Y=Yes, N=No)
Bridge performance threshold.....	[10 ]	(0-9999 Decimal)
Restart on error.....	[Y]	(Y=Yes, N=No)
Drive for memory dump on error.....	[0]	(0=Default, A,B,C,D)
Drive for error log.....	[0]	(0=Default, A,B,C,D)
F1=Help	F2=Quit	PgDn=
F6=Save		

Figure 137. Token-Ring Network Bridge Program - Customization Panel 1

6. Figure 137: This is the first of four panels. Using the information from the bridge planning chart, tailor these values to your network's requirements.

**Bridge Number** This number is used to uniquely identify a bridge to the bridge program when frames are forwarded through the bridge. Permissible values allow 16 bridge

numbers. The bridge numbers specified must be unique for **parallel** bridges<sup>26</sup> ; otherwise, any bridge number can be used. Bridge numbers should be assigned by the Token-Ring Network administrator or planner.

- Ring Number** Every ring in the network must have a unique ring number. Again, assignment of ring numbers is a task for the Token-Ring network administrator or planner.
- Frame Forwarding** 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 (the IBM LAN Manager Program does **not** provide this function).
- Performance Threshold** This parameter defines the tolerance for lost frames as the number of frames per 10,000 that may be lost before notification. Notification is an entry on the "Performance Statistics" panel and if the bridge is in session with the LAN Manager Program, an alert will be sent to the manager and possibly to NetView if NetView/PC is being used.
- 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 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.
- 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 in fact anything that causes the bridge program to terminate, for example, the reason for a restart, etc. 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.

---

<sup>26</sup> Parallel bridges are bridges interconnecting the same rings of a Token-Ring Network.

ECCPCG20	IBM TOKEN-RING NETWORK BRIDGE CONFIGURATION PROGRAM		Page 2 of 4 12:09:24
Type the desired values in each of the fields below. Press F2 (Quit) to exit to DOS without saving the configuration parameters. Press F6 (Save) to save the configuration parameters to the file ECCPARMS.BIN.			
	RING 001	RING 002	
Hop count limit.....	[7]	[7] (1-7)	
Single-route broadcast.....	[Y]	[Y] (Y=Yes, N=No)	
Locally administered address.....	[000000000000]	[000000000000]	
(400000000000 - 40007FFFFFFF, all 0's means use permanent address)			
ENABLED FUNCTIONAL ADDRESSES			
Ring parameter server.....	[Y]	[Y] (Y=Yes, N=No)	
Ring error monitor.....	[Y]	[Y] (Y=Yes, N=No)	
Configuration report server...	[Y]	[Y] (Y=Yes, N=No)	
F1=Help	F2=Quit	PgUp=	
F6=Save		PgDn=	

Figure 138. TR Bridge - Customization Panel 2

7. Figure 138:

**Hop Count** The hop count is a means of limiting the number of bridges that a frame crosses.

**Single Route Broadcast** The purpose of the single route broadcast is to prevent multiple copies of a frame being broadcasted around a Token-Ring Network from passing around the same physical ring twice; for example where there are two parallel bridges, only one frame will be forwarded on to the next ring.

This is a very important performance parameter especially in the case of a backbone ring configuration.

**Locally Administered Address** If you wish to use locally administered address for the Token-Ring Network Adapters, you can specify this here. The network administrator or planner should assign all locally administered addresses for the adapters.

**Parameter Server** If this function is enabled then the bridge will provide certain parameters (such as ring number, etc.) to adapters inserting on that ring.

**Ring Error Monitor** If this is enabled then the bridge will collect error frames from the ring and display statistics on these errors.

**Configuration Report Server** If this is enabled then the bridge program will receive messages indicating changes in the ring configuration.

ECCPCG30	IBM TOKEN-RING NETWORK BRIDGE CONFIGURATION PROGRAM	Page 3 of 4 12:09:31
<p>Type the desired values in each of the fields below.          Press F2 (Quit) to exit to DOS without saving the configuration parameters.          Press F6 (Save) to save the configuration parameters to the file ECCPARMS.BIN.</p>		
	RING 001	RING 002
Shared RAM address.....	[0000]	[0000]
(4 hexadecimal digits, divisible by '0400'X, 0000 means use default)		
F1=Help F6=Save	F2=Quit	PgUp= PgDn=

Figure 139. TR Bridge - Customization Panel 3

8. Figure 139:

**Shared RAM Address** This defines the shared RAM that each adapter will use. If you are using Adapter II then this should be initially set using the switch blocks when you install the adapters (see Figure 7 on page 16 and Figure 8 on page 17). If you have a PS/2 Model 50 or higher, the shared RAM addresses are initially set using the system reference diskette (see Figure 17 on page 25). See "PC Token-Ring Network Adapter Installation" on page 15 and "PS/2 Token-Ring Adapter/A Installation" on page 21 for more information.

ECCPCG40	IBM TOKEN-RING NETWORK BRIDGE CONFIGURATION PROGRAM	Page 4 of 4 12:09:39
<p>Type the desired values in each of the fields below.          Press F2 (Quit) to exit to DOS without saving the configuration parameters.          Press F6 (Save) to save the configuration parameters to the file ECCPARMS.BIN.          Press F5 (Redisplay) to clear all the fields if any errors have been made.</p>		
Passwords must be 6-8 alphanumeric characters.		
	OLD	NEW
Link password 0.....	[ ]	[ ]
Link password 1.....	[ ]	[ ]
Link password 2.....	[ ]	[ ]
Link password 3.....	[ ]	[ ]
F1=Help F6=Save	F2=Quit	F5=Redisplay PgUp=

Figure 140. TR Bridge - Customization Panel 4

9. Figure 139 on page 187:

**Link Password**

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.

### 20.3.5 Load The Bridge Program

Now that you have a customized configuration you can proceed with loading the bridge program. Before you load you must ensure that all bridges that are connected to a specific ring, refer to that ring<sup>27</sup> by the **same** number and that all bridges connecting the same two rings have **different** numbers.

To load manually, turn off the PC, wait at least 15 seconds and then turn power back on. type C> ECCMAIN at the DOS prompt and press the Enter key.

To load automatically, turn the computer power on. (If the bridge computer power is already on, turn the power off, wait at least 15 seconds and then turn the power back on).

The bridge will initialize itself; you will see various messages displaying the current status. If any problems occur, check with Chapter 4 "Status and Messages" in the *Bridge Program User's Guide* that comes with the product.

## 20.4 Where To Go For More Information

- *IBM Token-Ring Network Bridge Program User's Guide*
- *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.*

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<sup>27</sup> WARNING: Be careful not to swap the physical attachments for primary and alternate adapters. This would inevitably lead to a mismatch in ring numbering.

# 21.0 Asynchronous Communications Server

## 21.1 Overview

The primary objective of the Asynchronous Communications Server program is to give access to data and to send and receive messages from remote resources. To do this, a user can use the ACS function and an application that communicates with the server using the Asynchronous Communications Server Interface Protocol (ACSI). Such applications are Crosstalk<sup>28</sup> and PFS Access<sup>28</sup>.

- Crosstalk**                      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**                    Emulates a VT100 or a VT52.

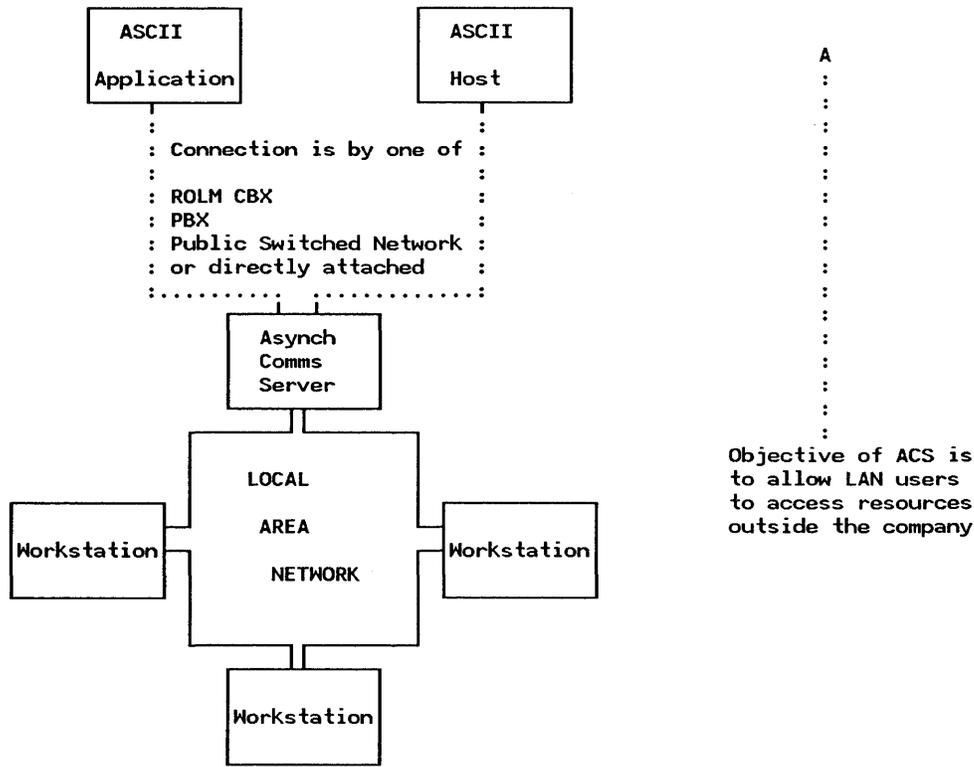


Figure 141. The Asynchronous Communications Server

<sup>28</sup> *Crosstalk* is a trademark of MICROSTUF Inc. and *PFS* is a trademark of Software Publishing Corporation.

The components of the connection are as follows:

- LAN Device** A workstation attached to the LAN running an application that supports the ACSI protocol to access off-LAN devices. In addition, the LAN device uses a NETBIOS interface to communicate with the server.
- Off-LAN Device** This device is one that is connected to the server by an asynchronous line and can be one of a host system, a host service (for example, the Dow Jones News Service), an ASCII terminal or an intelligent workstation like a PC or PS/2 with appropriate software.
- Asynchronous Server** The server provides connectivity between a LAN device and an off-LAN device. It contains the communications hardware and uses the NETBIOS interface to communicate across the LAN. Any LAN device wishing to use the server must address the server using the ACSI protocol.

The server uses a customized configuration file to connect LAN and off-LAN devices using the appropriate communications setup and establishes a connection as follows:

- **Outbound Calls**

A LAN device requests connection to an off-LAN device. The server retrieves the configuration parameter values from the configuration file and routes the call to a communications adapter that matches those values. The server then establishes the connection.

The server retrieves blocked data from the application and sends it to the remote device.

- **Inbound Calls**

The server accepts a call from outside the LAN. It then prompts the external caller for a destination name and matches this to a name in the configuration file. The server then establishes a connection in the waiting LAN device. Finally, the server will buffer received data before sending it to the LAN device.

The two communications ports on the server must have similar characteristics such as speed of operation, type of connection (switched, direct, etc) and so on.

Each communications adapter on the server must have a unique NETBIOS name. You can also assign up to three 'group' NETBIOS names to a server. These group names are used to provide a pool of resources for LAN-devices and enable the servers to support queuing.

The ACS protocol defines a resource queueing mechanism that gives the requesting LAN device the ability to queue for server resources. This request for resource queueing is acknowledged by every server that is capable of providing the desired resource. The first available server that can provide the resource calls the requesting LAN device when the resource is available. The requestor either accepts or rejects the call. The server informs the other servers on the LAN that the request has been serviced. The other servers remove the connection request from their queues.

## ***21.2 Planning Checklist***

### **21.2.1 Prerequisites - Hardware**

There are different versions of this program, one for the USA and the other for EMEA. Note how each option is qualified with EMEA or USA to indicate where it is supported.

- One of PC, PC-XT, PC-AT, XT-286, PS/2
- Memory requirements:
  - Initialization requires 160K bytes
  - Execution requires 120K bytes

plus DOS and LAN Support Program requirements.

- The server requires a LAN adapter:  
Token-Ring Network or PC Network adapter.<sup>29</sup>
- One (or two for the server) communications adapters:
  - PC and PC-XT Asynchronous Communications Adapter
  - PC-AT Serial/Parallel adapter
  - Dual-port Asynchronous Communications Adapter (PS/2)
  - Built-in Asynchronous Port (PS/2)
  - Multiprotocol Communications Adapter (PS/2).
- Communications can be via:
  - Internal modem in the server PC
  - External modem attached to server serial port.
  - Direct connection to server's serial port (EMEA)
    - ▲ PCAT maximum line speeds: 19.2Kbps - single line or 9.6Kbps - two lines
    - ▲ PCXT maximum line speeds: 9.6Kbps - single line or 4.8Kbps - two lines.
- Analogue access of a switched line
  - Attachment to any 'AT' or V.25 bis device (EMEA)
  - Internal modems on COM1 or COM2
    - ▲ IBM 1200 bps internal modem (US, EMEA)
    - ▲ IBM 2400 bps internal modem (US, EMEA)
    - ▲ SILE or other V.25 compatible internal modems (EMEA)
    - ▲ Other attention command set compatible internal modems (USA).
  - External Modems on COM1 or COM2
    - ▲ IBM 5841 1200 bps modem
    - ▲ IBM 5842 2400 bps modem
    - ▲ HAYES Smartmodem 300, 1200, 2400 or compatible (EMEA)
    - ▲ Racal-vadic VL24225 V.25 bis autodial modem (EMEA)
    - ▲ Other external PTT mandatory modem (EMEA)
    - ▲ Other attention set compatible 300, 1200 or 2400 bps modems (USA).
- Connection established through one of:
  - Public Switched Network (PSN)
  - ROLM CBX
  - Other CBX.
- Digital Access of a Switched Line
  - ROLM Date Terminal Interface (DTI) (US)
  - IBM/ROLM PC Interface Card (IPCI) (US)
  - ROLMPHONE Program Interface (RPI) (US)
  - ROLM JUNIPER II Data Communications Module (DCM) (US).

## 21.2.2 Prerequisites - Software

- DOS 3.2 or higher
- The LAN Support Program or a similar NETBIOS interface see "LAN Support Program" on page 83.

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<sup>29</sup> In EMEA, the PC Network (Baseband) Adapter is also supported.

### **21.2.3 Coexistence and Compatibility**

### **21.2.4 Configuration Parameters**

Figure 142 on page 193 shows the structure of the configuration file. It will be referenced throughout this section.

In the following section, some parameters may apply to either the USA or EMEA. Where there are differences this is pointed out. Otherwise, all parameters are valid in both cases.

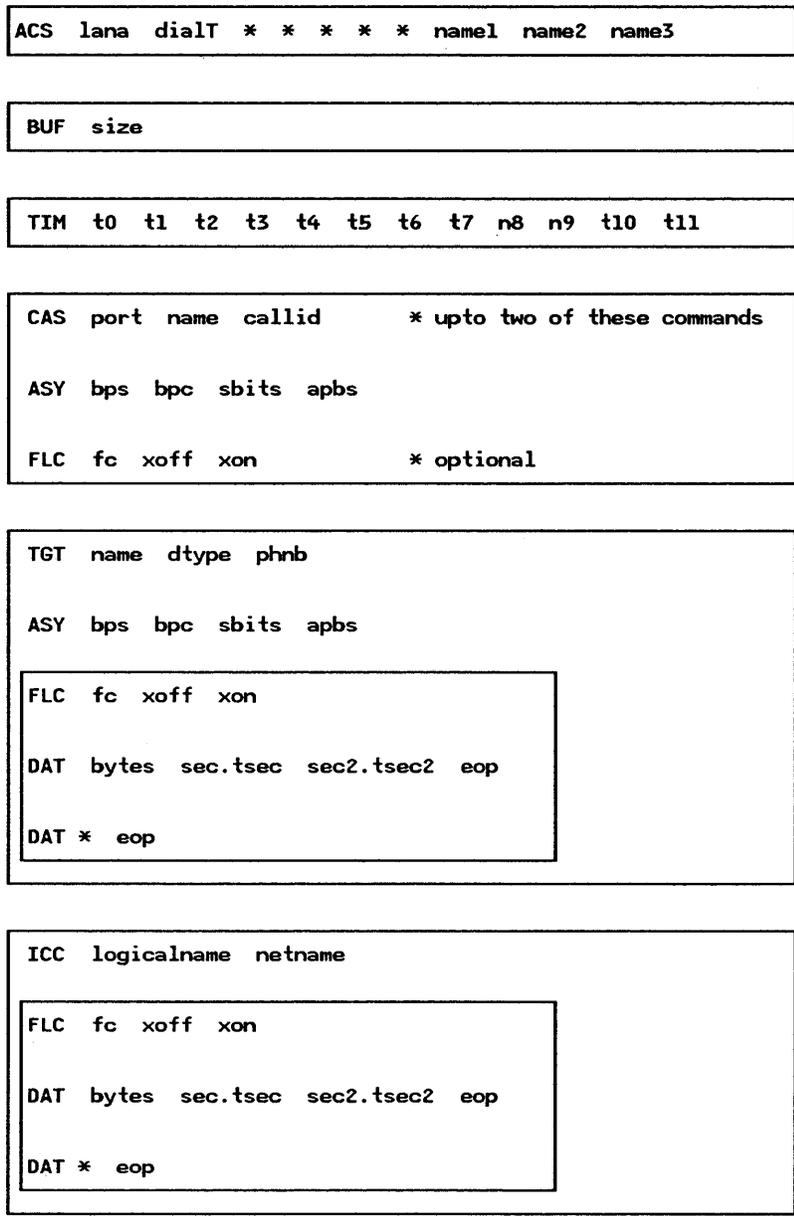


Figure 142. ACS - Configuration File Structure: Each group of commands is in a separate box. For the inner boxes, if the first command is used, then the following commands are required. The commands shown here relate to the EMEA requirements; the differences for the USA are outlined in the following section.

#### 21.2.4.1 ACS lana dialT \* \* \* \* \* name1 name2 name3 (EMEA)

This specifies the server using the EMEA format. The '\* \* \* \* \*' must be coded, but do not have values.

##### Parameter Values

**lana** Local Area Network adapter type.  
'0' for Token-Ring Network Adapter

'1' for PC Network Adapter

- dialT** Type of dialing protocol
- 'ATDPCmd' for attention command set used with pulse dialing
  - 'ATDTCmd' for attention command set used with tone dialing
  - 'V25bisCRN' for CCITT V.25 with the CRN command set used for call requests
  - 'V25bisCRI' for CCITT V.25 with the CRI command set used for call requests
  - 'DIRECT' for support of non-switched lines
- nameX** Optional one to three NETBIOS group names.

#### **21.2.4.2 ACS lana comt dial cbx acct accd cbxq n1 n2 n3 (US)**

This specifies the server using the USA format.

##### *Parameter Values*

- lana** Local Area Network type
- 'T' for Token-Ring
  - 'N' for PC Network
- comt** Type of communications adapter installed
- '300M', '1200M', '2400M' for internal modems
  - 'ROLM' for ROLM connection
- dial** Type of dialing for modem
- 'T' for tone dial
  - 'P' for pulse dial
- cbx** Program level of ROLM CBX II
- '0' for NULL
  - '8' for ROLM CBX 8004
  - '9' for ROLM CBX 9004
- acct** ROLM CBX account code required
- 'N' if not required
  - 'R' for required
- accd** Account code, if required
- A four-digit account code, else 0000
- cbxq** CBX queuing supported
- 'Y' for queuing support required
  - 'N' for queuing support not wanted
- n1 n2 n3** NETBIOS "group" names

### 21.2.4.3 *BUF size*

#### *Parameter Values*

**size** Buffer size in increments of 1K bytes  
1 to 16 for two communications adapters  
1 to 33 for one communications adapter  
Default is 2K per adapter; the minimum required for terminal emulation is 2K, for file transfer 5K.

### 21.2.4.4 *TIM t0 t1 t2 t3 t4 t5 t6 t7 t8 t9 t10 t11*

This command applies to EMEA only.

#### *Parameter Values*

**t0** Disconnect time for circuit 106 (CTS). Default = 240.0  
**t1** Silent period between DTR and DCE. Default = 0.2  
**t2** Delay time to answer on circuit 125. Default = 5.0  
**t3** Delay time to call the same number. Default = 180.0  
**t4** Idle time following a successful call. Default = 6.0  
**t5** Call unsuccessful abort delay. Default = 60.0  
**t6** Maximum complete time for incoming call. Default = 40.0  
**t7** Data inactivity timeout. Default = 40.0  
**n8** Maximum number of unsuccessful calls. Default = 2  
**n9** Hour delay to repeat unsuccessful calls. Default = 4  
**t10** Amount of time the 'connection established' signal must be present to consider the connection complete. Default = 0.1  
**t11** Time delay after lost connection. Default = 0.0

### 21.2.4.5 *CAS port name callid*

This is the communications attachment specification. Only two CAS commands can be specified after the ACS command.

#### *Parameter Values*

**port** Communications port number  
'1' for COM1.  
'2' for COM2.  
**name** The unique NETBIOS name for this adapter.  
**callid** Call identification field for EMEA only. Use '\*' if it is not being used; otherwise this consists of 1 to 16 digits which is usually the telephone number of the line attached to this port.

#### **21.2.4.6 ASY bps bpc par sbits abps**

The ASYnchronous communications adapter parameters.

##### **Parameter Values**

<b>bps</b>	Line speed in bits per second 100, 150, 300, 600, 1200, 1800, 2400, 3600, 4800, 7200, 9600 or 19200 bps.
<b>bpc</b>	Bits per character This is either 7 or 8
<b>par</b>	Parity 'P0' for NONE (8 bits per character) 'P1' for ODD (7 bits per character) 'P2' for EVEN (7 bits per character) 'P3' for MARK (7 bits per character) 'P4' for SPACE (7 bits per character) For USA, use the words 'NONE', 'ODD', etc instead of 'P0', etc.
<b>sbits</b>	Stop bits, '1' or '2'
<b>abps</b>	Allowable line speeds in bits per second from 100, 150, 300, 600, 1200, 1800, 2400, 3600, 4800, 7200, 9600 or 19200 bps.

#### **21.2.4.7 FLC fc xoff xon**

Flow control specification

##### **Parameter Values**

<b>fc</b>	Flow control supported '1' (EMEA), 'Y' (USA) for supported '0' (EMEA), 'N' (USA) for disabled
<b>xoff</b>	Hexadecimal XOFF character, normally '13'
<b>xon</b>	Hexadecimal XON character, normally '11'

#### **21.2.4.8 DAT bytes sec.tsec sec2.tsec2 eop**

Data transfer specification

##### **Parameter Values**

<b>bytes</b>	Receive packet size, in bytes '0' if not being used '1 to 1024' for packet size If you specify a packet size greater than 1, you must also specify one of the following timer values:
--------------	--

- sec.tsec** The time to send a received character from the buffer to the application. Value in seconds from 0 to 999.9. Value of 0 indicates no use of this feature.
- sec2.tsec2** Time required to send a received part of a packet from the buffer to the application if the transfer of the packet is not yet complete. Value in seconds from 0 to 999.9.
- eop** End of packet characters, check with the application program.
- DAT \* eop** A special continuation command line to specify more end-of-packet characters.

### ***21.2.4.9 TGT name dtype phnb (EMEA) or TGT name dest dgph (US)***

Target name specification

#### ***Parameter Values***

- name** Target name of remote application, 1 to 16 characters. The TARGET name is the NETBIOS name.
- dtype** Type of destination required (EMEA).  
 If '0', then 'phnb' will be a telephone number  
 If '2', then 'phnb' will be an ASCII identification address
- phnb** A 40-character string representing a phone number or an ASCII-identification type (EMEA)
- dest** An indicator for the next field 'dgph'  
 if 'DATA' then 'dgph' is a datagroup name  
 if 'TELE' then 'dgph' is a telephone number
- dgph** A telephone number or a datagroup name for a ROLM CBX.

### ***21.2.4.10 ICC logicalname netname***

Incoming Call Parameters

#### ***Parameter Values***

- logicalname** LAN destination name, the logical name of the LAN PC. Can be up to 16 characters.
- netname** A unique NETBIOS name for the physical PC on the LAN.

## ***21.3 Installation Steps***

This will assume installation onto a fixed disk system.

1. Install your server on the LAN of your choice if not already done.
2. Complete the checklists given in Chapter 2 of the *Asynchronous Communications Server Program Installation and Configuration Guide* that comes with the program.
3. Make a backup of the program diskette by using the DOS COPY command with the '/s/v' option. Use this diskette throughout the installation.
4. The next stage is to modify the configuration file. Using a text editor such as EDLIN, view the ACSERVER.CFG file and change the values and add lines where necessary. Use the following table to relate the information gathered on the configuration checklists to the commands in the configuration file.

Checklist Parameters	Configuration File Command
<b>Server Parameters</b> Server Buffer Size Timing Parameters	ACS BUF TIM
<b>Adapter Parameters</b> Port Identifiers Asynchronous Communication Line Parameters Flow Control Characteristics	CAS ASY FLC
<b>Remote Application Parameters</b> Remote Application Identifiers Asynchronous Communication Line Parameters Flow Control Characteristics Data Transfer Parameters	TGT ASY FLC DAT
<b>Incoming Call Parameters</b> LAN Communication Application Identifiers Asynchronous Communication Line Parameters Flow Control Characteristics Data Transfer Parameters	ICC specified in ASY following CAS FLC DAT

Figure 143. Parameter and Configuration Checklist

- With the server diskette now in drive A, type in the following command to install the program to fixed disk:

ACSINSTL C:

A message will appear to inform that installation is complete.

- Now remove the diskette from the drive, and make C: your current drive.
- You now need to modify the AUTOEXEC.BAT file if you want the server to start automatically.

Include the commands:

ACSERVER

ACSBAS

after any commands used to load the LAN support software.

If you are using the PCLAN program, then this command must come after the network is started.

- For a manual start, enter the commands in the order given above.

9. Once you have completed the installation, you can then use the sample programs which are included on the program diskette to verify the installation of the server. Full instructions for this are included in Chapter 5 of the *Asynchronous Communications Server Program Installation and Configuration Guide* that comes with the program.

## ***21.4 Where To Go For More Information***

- *The IBM Asynchronous Communications Server Program Installation and Configuration Guide* that comes with the program.
- *G320-9323 IBM PC Seminar Proceedings Vol 3 No.4, Asynchronous Communications Server Protocol.*



## 22.0 Remote NETBIOS Access Facility Version 2

### 22.1 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.

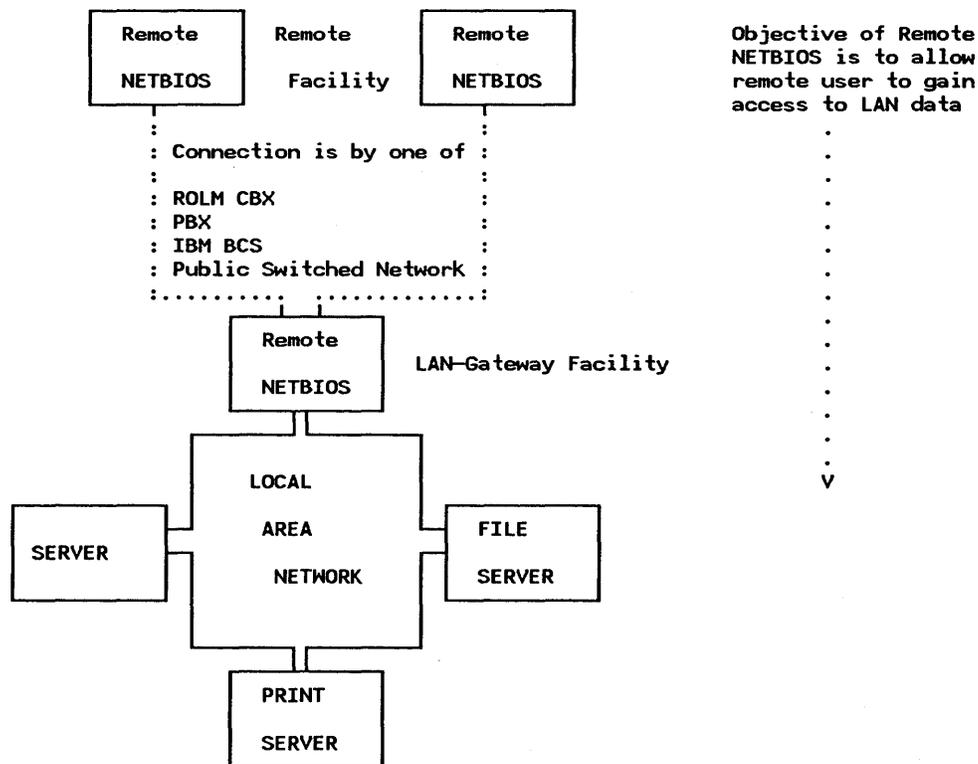


Figure 144. The Remote NETBIOS Access Facility

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 (see "Asynchronous Communications Server" on page 189.)

## 22.2 *Planning Checklist*

### 22.2.1 Prerequisites - Hardware

- Asynchronous communications hardware<sup>30</sup> :
  - 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
- Analogue 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
    - ▲ 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

---

<sup>30</sup> The RTIC card is not supported.

- 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).

### **22.2.1.1 Remote Facility**

- Memory required for initialization is 155K (mono) 169K (color)
- 113K bytes to execute the Facility plus sufficient memory for application, for example, PC LAN Program V 1.2 Redirector configuration.
- Diskette drive and display.

### **22.2.1.2 LAN-Gateway Facility**

- Memory required for initialization is 158K (mono) 172K (color)
- 116K bytes to execute the Facility
- Diskette drive and display
- LAN Adapter: Token-Ring Adapter or PC Network Adapter.

## **22.2.2 Prerequisites - Software**

- DOS 3.1 or later
- NETBIOS on the LAN-Gateway Facility.

## **22.2.3 Coexistence and Compatibility**

The Remote Facility will work with the Redirector function of the PC LAN Program Version 1.2.

It is also compatible with the Asynchronous Communications Server program, see "Asynchronous Communications Server" on page 189.

## **22.2.4 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 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.

## 22.3 Installation Steps

Before you start to install or customize the Facility, you should print the SOFTPUB guides which are on the program disk. To do this, insert the program disk into drive A: and type

SOFTPUB

This will present you with a selection menu to enable you to print the guides on an attached printer.

This installation section 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 Installation and Configuration Guide*.

### 22.3.1 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 E of the *IBM Remote NETBIOS Access Facility Ver 2 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.

```
A100

      IBM Remote NETBIOS Access Facility
      SYSTEM CONFIGURATION UTILITY

      Display/Change Options

Select the option to Display/Change:

  1. The Remote System Configuration File
  2. The Local Area Network (LAN) System Configuration File
  3. The LAN System Security File
  9. End the Program.

Selection ==> 1

Please read the README.MSG file contained on your Remote NETBIOS
Access Facility Program source diskette. It contains updates to
the Installation and Configuration Guide and information
concerning configuration parameters and how they affect operation
with certain equipment and application programs.
```

Figure 145. Remote Facility - Display/Change Options

5. Figure 145: Select option 1 to configure the Remote Facility.

```
A200

      IBM Remote NETBIOS Access Facility
      SYSTEM CONFIGURATION UTILITY

      Filename Default Selection

Do you want to use the default filename (REMOTE.CFG)
as the name of the Remote System Configuration File?
Y (Y or N)

ESC=Quit
```

Figure 146. Remote Facility - Filename Default Selection

6. Figure 146: If you wish to change the default filename used for the configuration file select 'Y', otherwise select 'N'.

```

R000
      IBM Remote NETBIOS Access Facility
      SYSTEM CONFIGURATION UTILITY

      Remote System Configuration File

Select the data to review:

  1. System Definition Data
  2. System Communication Data
  3. System Timing Data
  4. LAN-Gateway Access Table

Selection ==> 1

ESC=Quit

```

Figure 147. Remote Facility - Remote System Configuration File

7. Figure 147: The next three options reflect the worksheet questions. Select each option in turn to verify or change any options as required.

```

D000
      IBM Remote NETBIOS Access Facility
      SYSTEM CONFIGURATION UTILITY

      System Definition Data

Select the item to review:

  1. Dialing Type                ATDT Command
  2. Computer Type              IBM PS/2 Model 25 or 30
  3. LAN Logical Address        0
  4. Make/Break Connection     A-L
      Key Sequence Definition
  5. Asynchronous Port        COM1

Selection ==>

ESC=Quit

```

Figure 148. Remote Facility - System Definition Data

8. Figure 148: By selecting an option, the allowable values for that parameter are displayed from which you choose the required values.

**Dialing Type**            The type of dialing that will be used. Options are; tone, pulse, V.35 CRN or CRI, Rolmphone244, direct or PC Convertible options.

- Computer Type** Select the correct model from the list presented.
- LAN Logical Address** This can be from "0" to "15".
- Key Sequence** The key sequence to be used to start the Remote Facility. The default is ALT-L, this only needs to be changed if it conflicts with a user application. For example, "A-L" or "A-F3", etc.
- Async Port** Whether asynchronous port from COM1 to COM8 is to be used for the Remote Facility communications port. If you are using an IBM PC Convertible that contains an internal modem, you must select COM1 as the communications port. If ID uses an external modem, this must be COM2.

Now return to the previous menu and select option 2, "System Communication Data".

```

E000
                                IBM Remote NETBIOS Access Facility
                                SYSTEM CONFIGURATION UTILITY

                                System Communication Data

Select the item to review:

1. Port Speed                      1200 bps
2. Number of Data Bits per Character  8
3. Parity Used                      NONE
4. Number of Stop Bits              1

Selection ==>

ESC=Quit

```

Figure 149. Remote Facility - System Communication Data (Modem)

9. Figure 149:

The parameters here are:

- Port Speed** This can be one of 110, 150, 300, 600, 1200, 1800, 2400, 3600, 4800, 7200, 9600 or 19200 bps depending on the connection you have.
- Data Bits** Whether 7 or 8 bits are used to represent each character.
- Parity Used** Can be "odd", "even", "mark", "space" or "none". If you are using 8-bit characters then you must select "none".
- Stop Bits** Can be either "1" or "2". If you are using 8-bit characters then you must select "1".

Now return to the previous menu and select option 3, "System Timing Data".

```

B000

          IBM Remote NETBIOS Access Facility
          SYSTEM CONFIGURATION UTILITY

          System Timing Data

Select the item to review:

  1. t0  240.0          7. t6  40.0
  2. t1   0.2          8. t7  40.0
  3. t2   6.0          9. n8   2
  4. t3  180.0         10. n9  4.0
  5. t4   6.0          11. t10 0.1
  6. t5  60.0          12. t11 0.0

Type the item number to change:
[ ]( 1 - 12 )
Then press ENTER.

ENTER  ESC=Quit

```

Figure 150. Remote Facility - System Timing Data

10. Figure 150: 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.

- t0**            The maximum amount of time that circuit 106 (CTS) may be absent before connection is terminated. If this is zero, the call is never terminated due to loss of CTS. Default = 240.0.
- t1**            The time following the raising of DTR during which no data is transmitted. This applies to V.35bis, direct connection and attention set modems. Default = 0.2.
- t2**            The delay time following the detection of a ring signal on circuit 125 (ring-in) and before attempting to answer the call. Default = 6.0.
- t3**            The time following an unsuccessful call attempt during which no call attempts are made to the same number. Default = 180.
- t4**            The amount of time following a successful call during which no call attempts are permitted (an idle period). Default = 6.0.
- t5**            The time allowed to complete an "outgoing" call before the call is aborted. Default = 60.
- t6**            The maximum time allowed to complete an incoming call. Default = 40.
- t7**            The "data inactivity" timeout. If no data is received or transmitted within this time then the connection is terminated. Default = 40.
- n8**            The maximum number of unsuccessful call attempts to a given number (a whole number). Additional calls to that number are forbidden until the system is reset or "n9" hours have elapsed. Default = 2.
- n9**            The number of hours that must elapse before a number that has been put on the forbidden call list can be redialed. Default = 4.
- t10**           The amount of time the "connection established" signal must be present to consider the call complete. For direct connection or attention set devices, this

relates to circuit 109 (RLSD). For V.35 devices it is circuit 107 (DSR).  
Default = 0.1.

**t11** The maximum amount of time allowed between the loss of the "connection established" signal and the disconnection of the call. Default = 0.0.

Now return to the previous menu and select option 4, "LAN-Gateway Access Table".

---

H100

IBM Remote NETBIOS Access Facility  
SYSTEM CONFIGURATION UTILITY

Change LAN-Gateway Table Entry

Type the new LAN-Gateway Name:

[GATEWAY1        ]

Then press ENTER.

ENTER   ESC=Quit

Figure 151. Remote Facility - Change LAN-Gateway Table Entry

---

11. Figure 151: This is the name of the LAN-Gateway to which the Remote Facility will have access.

---

H200

IBM Remote NETBIOS Access Facility  
SYSTEM CONFIGURATION UTILITY

Change LAN-Gateway Table Entry

Type the new LAN-Gateway User ID/Password:

[PASSWORD1       ]

Then press ENTER.

Note: If you type an asterisk (\*), you will  
be asked for the User ID/Password when a  
connection is started.

ENTER   ESC=Quit

Figure 152. Remote Facility - Change LAN-Gateway Table Entry

---

12. Figure 152 on page 209: Type here your Remote Facility user identification or password.

```
H401

      IBM Remote NETBIOS Access Facility
      SYSTEM CONFIGURATION UTILITY

      Change LAN-Gateway Table Entry

Type the new LAN-Gateway Telephone Number:
      [                               ]

Then press ENTER.

Note: If you type an asterisk (*), you will
      be asked for the Telephone Number when a
      connection is started.

ENTER  ESC=Quit
```

Figure 153. Remote Facility - Change LAN-Gateway Table Entry

13. Figure 153: 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.
14. 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).
15. 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.
16. Finally, return from each menu, selecting to save any new files.
17. 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 Installation and Configuration Guide*.

### 22.3.2 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 E of the *IBM Remote NETBIOS Access Facility Ver 2 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. This is shown in Figure 145 on page 205. To customize the LAN-Gateway, select option 2.

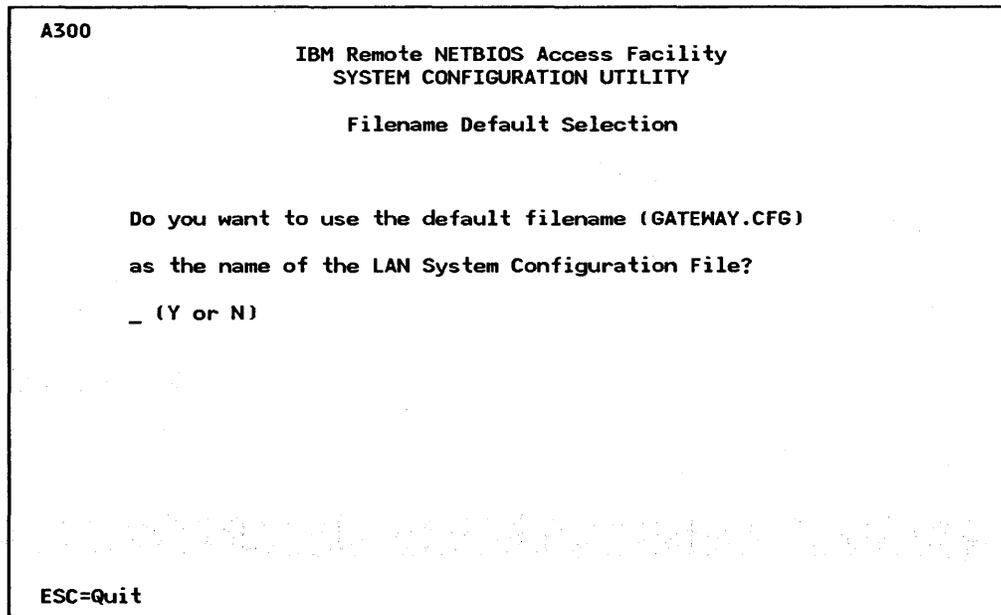


Figure 154. LAN-Gateway - Filename Default Selection

5. Figure 154: If you want to change the default filename used for the configuration file select "Y", otherwise select "N".

```
L000
      IBM Remote NETBIOS Access Facility
      SYSTEM CONFIGURATION UTILITY

      LAN-Gateway Configuration Data

Select the data to review:

  1. System Definition Data
  2. System Communication Data - COM1
  3. System Communication Data - COM2
  4. System Timing Data - COM1
  5. System Timing Data - COM2
  6. LAN Definition Data

Selection ==> 1

ESC=Quit
```

Figure 155. LAN-Gateway - LAN-Gateway Configuration Data

6. Figure 155: This is a menu of all the items you must work through to configure the LAN-Gateway. Select option 1 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.

```
J000
      IBM Remote NETBIOS Access Facility
      SYSTEM CONFIGURATION UTILITY

      System Definition Data

Select the item to review:

  1. LAN-Gateway Name           GATEWAY1
  2. Computer Type             IBM PS/2 Model 50 or 60
  3. COMM Port(s) to be used   COM1 COM2
  4. COMM Port(s) to be shared with
      IBM Async Communications Server  No Shared Ports
  5. Initialization Delay (seconds)  10

Selection ==>

ESC=Quit
```

Figure 156. LAN-Gateway - System Definition Data

7. Figure 156: The system definition data options are as follows:

**Gateway Name**      A 16 character name that identifies this gateway to Remote Facilities.

- Computer Type**      Select the correct model from the list presented.
- COMM ports**        Choose the COM values to be assigned to the first and second ports from COM1 to COM8.
- Initialization Delay**    A value in seconds, from 0 to 999.
- Now return to the previous menu and select option 2, "System Definition Data" for the first COM port.

```

N000
      IBM Remote NETBIOS Access Facility
      SYSTEM CONFIGURATION UTILITY

      System Communication Data

Select the item to review:

  1. Dialing Type                ATDT Command
  2. Port Speed                  1200 bps
  3. Number of Data Bits per Character  8
  4. Parity Used                 NONE
  5. Number of Stop Bits        1

Selection ==>

ESC=Quit

```

Figure 157. LAN-Gateway - System Communication Data

8. Figure 157: This is a menu that must be completed for each COM port being used. The parameters and values are as follows:

- Dialing Type**      The type of dialing that will be used. Options are; tone, pulse, V.35 CRN or CRI, Rolmphone244, direct or PC Convertible options.
- Port Speed**        This can be one of 110, 150, 300, 600, 1200, 1800, 2400, 3600, 4800, 7200, 9600 or 19200 bps depending on the connection you have.
- Data Bits**         Whether 7 or 8 bits are used to represent each character.
- Parity Used**        Can be "odd", "even", "mark", "space" or "none". If you are using 8-bit characters then you must select "none".
- Stop Bits**         Can be either "1" or "2". If you are using 8-bit characters then you must select "1".

Now return to the previous menu and select option 3, to complete this menu again for for the next COM Port if another is being used.

When the other port is configured, return again to the previous menu and select option 4.

```

B000

          IBM Remote NETBIOS Access Facility
          SYSTEM CONFIGURATION UTILITY

          System Timing Data

Select the item to review:

    1. t0  240.0          7.  t6  40.0
    2. t1   0.2          8.  t7  40.0
    3. t2   6.0          9.  n8   2
    4. t3  180.0         10. n9   4.0
    5. t4   6.0          11. t10  0.1
    6. t5  60.0          12. t11  0.0

Type the item number to change:
[ 1( 1 - 12 )
Then press ENTER.

ENTER  ESC=Quit

```

Figure 158. LAN-Gateway - System Timing Data

9. Figure 158: 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.

- t0** The maximum amount of time that circuit 106 (CTS) may be absent before connection is terminated. If this is zero, the call is never terminated due to loss of CTS. Default = 240.0.
- t1** The time following the raising of DTR during which no data is transmitted. This applies to V.35bis, direct connection and attention set modems. Default = 0.2.
- t2** The delay time following the detection of a ring signal on circuit 125 (ring-in) and before attempting to answer the call. Default = 6.0.
- t3** The time following an unsuccessful call attempt during which no call attempts are made to the same number. Default = 180.
- t4** The amount of time following a successful call during which no call attempts are permitted (an idle period). Default = 6.0.
- t5** The time allowed to complete an "outgoing" call before the call is aborted. Default = 60.
- t6** The maximum time allowed to complete an incoming call. Default = 40.
- t7** The "data inactivity" timeout. If no data is received or transmitted within this time then the connection is terminated. Default = 40.
- n8** The maximum number of unsuccessful call attempts to a given number (a whole number). Additional calls to that number are forbidden until the system is reset or "n9" hours have elapsed. Default = 2.
- n9** The number of hours that must elapse before a number that has been put on the forbidden call list can be redialed. Default = 4.
- t10** The amount of time the "connection established" signal must be present to consider the call complete. For direct connection or attention set devices, this

relates to circuit 109 (RLSD). For V.35 devices it is circuit 107 (DSR).  
Default = 0.1.

t11. The maximum amount of time allowed between the loss of the "connection established" signal and the disconnection of the call. Default = 0.0.

Now return to the previous menu and select option 5, to set the System Timing Data for the other COM port if you have another one.

When this is complete, return to the previous menu and select option 6, "LAN Definition Data".

```
K000
                                     IBM Remote NETBIOS Access Facility
                                     SYSTEM CONFIGURATION UTILITY

                                     LAN Definition Data

Select the item to review:

  1. LAN Adapter Type                IBM TOKEN-RING
  2. LAN Adapter Address              0
  3. Port COM1 Definition Data
  4. Port COM2 Definition Data
  5. Application Definition Data
    (optional)

Selection ==>

ESC=Quit
```

Figure 159. LAN-Gateway - LAN Definition Data

10. Figure 159: 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. These will be covered next.

**LAN Adapter** One of Token-Ring Network adapter, PC Network Baseband adapter or PC Network (Broadband) adapter.

**Adapter Address** This can be either "0" or "1" (primary and alternate respectively).

Now select options 3, COM1 definitions.

```
K300
      IBM Remote NETBIOS Access Facility
      SYSTEM CONFIGURATION UTILITY

      Com1 Definition Data

Select the item to review:

  1. Maximum Number of NCBs Outstanding      4
  2. Maximum Number of LAN Names Registered  4
  3. Maximum Number of Sessions Open        9
  4. Size of Internal Network Buffer (Kbytes) 40

Selection ===>

ESC=Quit
```

Figure 160. LAN-Gateway - Com1 Definition Data

11. Figure 160: These LAN parameters are NETBIOS parameters. For a complete discussion of what these parameters do and how they are related, see "LAN Support Program" on page 83.

If you want to change the parameters, the values are:

- NCBs Outstanding**    The maximum number of outstanding network control blocks (from 1 to 255) that the LAN-Gateway Facility should allow.
- LAN Names**            The maximum number of LAN names (from 1 to 254) that can be registered to the LAN-Gateway Facility PC.
- Open Sessions**        The maximum number of open sessions (from 1 to 254) allowed with the LAN-Gateway Facility PC.
- Internal Buffer**        The size of the internal network buffer (from 4K to 512K bytes) for the LAN-Gateway Facility PC.

This 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".

Once this is completed, return again to the previous menu and select option 5, "Application Definition Data".

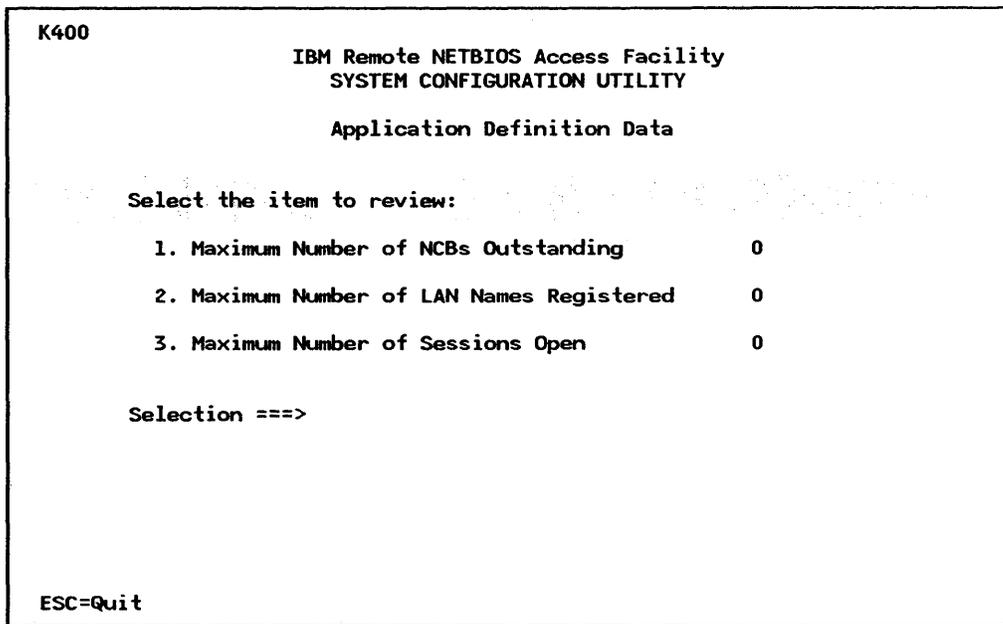


Figure 161. LAN-Gateway - Application Definition Data

12. Figure 161: 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.

<b>NCBs Outstanding</b>	The maximum number of outstanding network control blocks (from 0 to 255) that the LAN-Gateway Facility should allow.
<b>LAN names</b>	The maximum number of LAN names (from 0 to 254) that can be registered to the LAN-Gateway Facility PC.
<b>Open Sessions</b>	The maximum number of open sessions (from 1 to 254) allowed with the LAN-Gateway Facility PC.

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 8K bytes.

For example:

$$\begin{aligned}
 & 8 \text{ NCBs} \times 8\text{K bytes (application buffer size)} \\
 + & 8 \text{ NCBs} \times 250 \text{ bytes} \\
 = & 66\text{K bytes.}
 \end{aligned}$$

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.

### 22.3.3 LAN Security File

To configure the security file, you should have completed the checklist 9 in Appendix E of the *IBM Remote NETBIOS Access Facility Ver 2 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".

---

```
A400
      IBM Remote NETBIOS Access Facility
      SYSTEM CONFIGURATION UTILITY

      Filename Default Selection

Do you want to use the default filename (GATEWAY.SEC)
as the name of the LAN System Security File?
_ (Y or N)

ESC=Quit
```

Figure 162. Security File - Filename Default Selection

---

2. Figure 162: Choose whether or not to use the default file.

---

```
S000
      IBM Remote NETBIOS Access Facility
      SYSTEM CONFIGURATION UTILITY

      LAN-Gateway Security File Access

Type the Security File Access Password:
      PASSWORD

Then press ENTER.

ENTER  ESC=Quit
```

Figure 163. Security File - LAN-Gateway Security File Access

---

3. Figure 163: The default password for initial use is 'PASSWORD'.

```

S100
      IBM Remote NETBIOS Access Facility
      SYSTEM CONFIGURATION UTILITY

      LAN-Gateway Security File Access

Select the option:

  1. Change the Security File Access Password.
  2. Change or Display the Security File.

Selection ==>

ESC=Quit

```

Figure 164. Security File - LAN-Gateway Security File Access

4. Figure 164: You are now given the option to change the password if you wish, or to change the security file information. Here, we will choose option 2 and change the security file information.

```

S200
      IBM Remote NETBIOS Access Facility      Line
      SYSTEM CONFIGURATION UTILITY           1 of 1

      LAN-Gateway User Selection Table

      User ID/Password Dial-Back Telephone #/Dataline #/Datagroup Name

  1. PW1                0214546188

Select an option letter:
  A. Add a new entry.
  C. Change or Display an entry.
  D. Delete an existing entry.

Selection ==>
PGDN=Forward  PGUP=Backward  ESC=Quit

```

Figure 165. Security File - LAN-Gateway User Selection Table

5. Figure 165: 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.

## ***22.4 Where To Go For More Information***

- *IBM Remote NETBIOS Access Facility Ver 2 Installation and Configuration Guide.*

## 23.0 LAN Asynchronous Connection Server (LANACS)

### 23.1 Overview

The LAN Asynchronous Connection Server 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 LANACS 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.

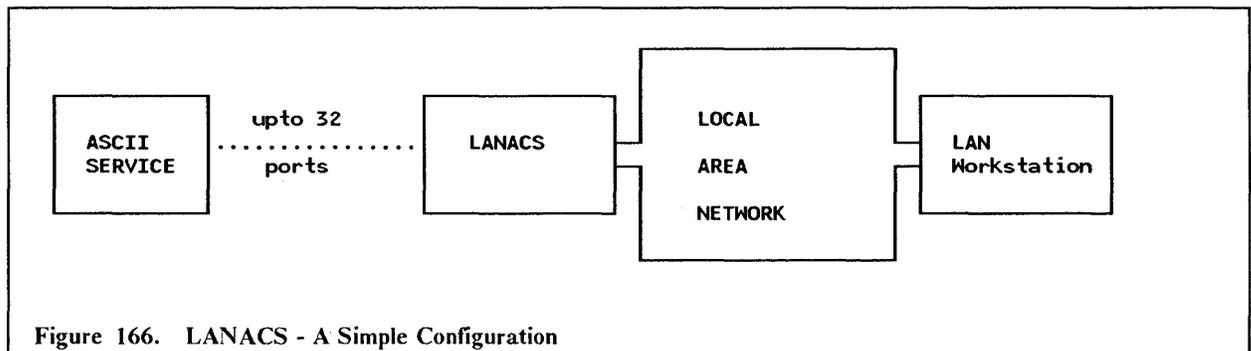


Figure 166. LANACS - A Simple Configuration

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.<sup>31</sup>

Applications like Crosstalk <sup>32</sup>, PFS Access <sup>32</sup> or YTERM conform these interfaces and can be used by LAN attached workstations. The function of the application is following presented, showing in brackets the software interface.

<sup>31</sup> The Asynchronous Communications Server Program also uses the ACSI protocol. The EBI protocol is unique to LANACS.

<sup>32</sup> *Crosstalk* is a Trademark of MICROSTUF Inc. and *PFS* is a trade mark 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.

Off-LAN devices must operate with a communications application program compatible with the program on the LAN workstation.

Off-LAN devices can be:

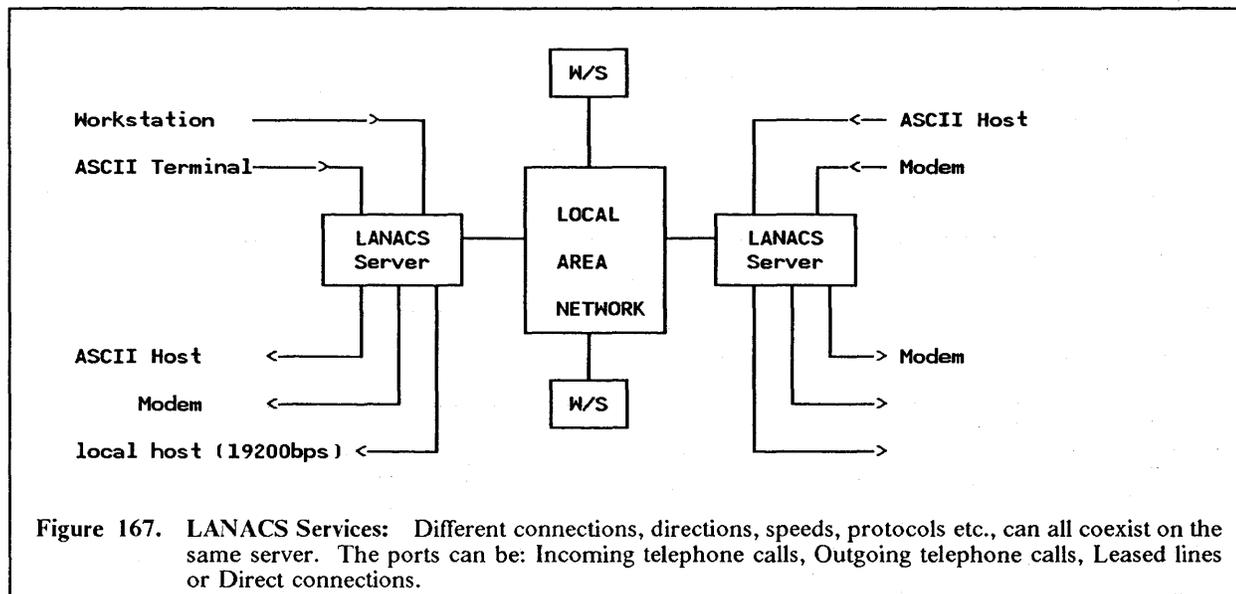
- ASCII workstations
- IBM workstations
- V.24 and V.28 compatible devices
- Protocol Conversion devices that attach to IBM hosts
- Devices attached to the ROLM CBX
- Modems.

These devices can be attached via switched and non-switched communication's line and external modem or can attach directly to an ASCII host.<sup>33</sup>

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 167 shows the variety of configurations and connections that can be established with the LANACS program.



<sup>33</sup> 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.

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.

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 168.

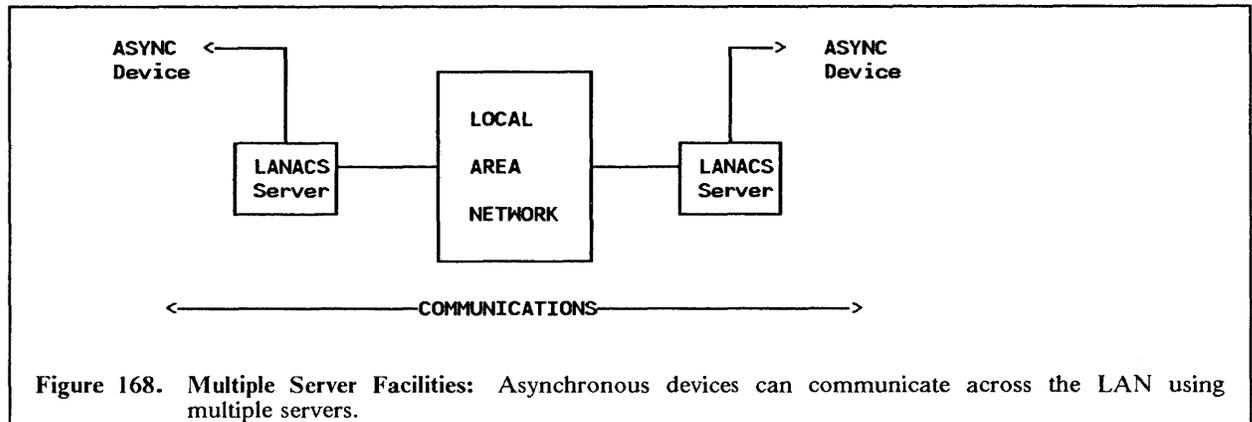


Figure 168. Multiple Server Facilities: Asynchronous devices can communicate across the LAN using multiple servers.

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.

## 23.2 Planning Checklist

### 23.2.1 Prerequisites - Hardware

1. 640KB of memory
2. Two Diskette drives or one drive and a fixed disk

The following table in Figure 169 lists the hardware combinations that are possible. Figure 170 on page 224 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 Md150	17*	C***, D***, E	2	M, N
PS/2 Md1s 60, 70, 80	32*	C***, D***, E	4	M, N

Figure 169. 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 170. 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.

### **23.2.2 Prerequisites - Software**

- DOS 3.3 or higher
- LAN adapter support such as LAN Support Program which must include NETBIOS (see "LAN Support Program" on page 83).

- 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.

### 23.2.3 Coexistence and Compatibility

For an overview of the adapter coexistence permutations, see Figure 169 on page 223.

### 23.2.4 Other Considerations

#### 23.2.4.1 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 171. 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 'ST : 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" on page 83 for a complete discussion and explanation of NETBIOS and the LAN Support Program parameters.

### 23.2.4.2 RTICM Installation

The following gives suggested switch and jumper settings for the RTIC Multiport (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 172. 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 Mdl30, 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

AT and XT286 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.

### 23.2.4.3 ICAPARM.PRM

Take note of this section only if you are using Multiport adapters.

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 173 on page 227 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 OF E010;  
#06A0 0 41 10 10 10 10 OF E010;  
#0AA0 0 42 10 10 10 10 OF E010;  
#0EA0 0 43 10 10 10 10 OF E010$
```

Figure 173. ICAPARM.PRM Suggested Values: All values are in HEX. Note that the last entry is terminated with the character '\$'.

### 23.2.5 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 following diagram in Figure 174 will serve to illustrate how LANACS works and the components that need customizing.

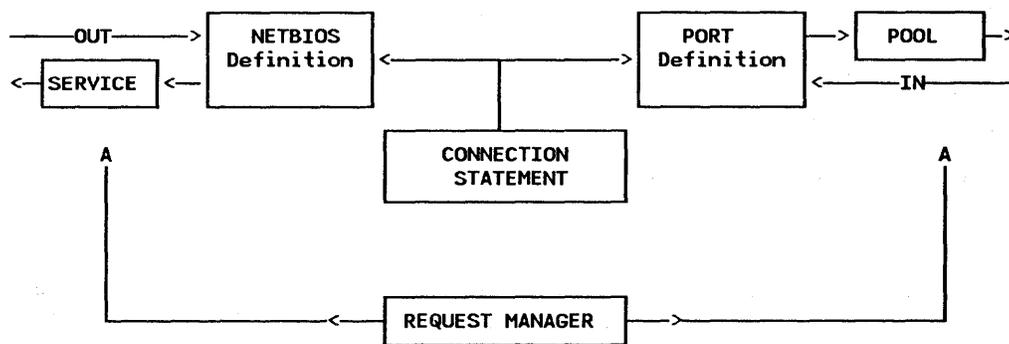


Figure 174. LANACS Operation

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 175 on page 229.

```

** 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
          Parameters and
          Variables
CONNECT  name1 TO name2
          *** This is a PORT
          *** definition

** Incoming Definitions **
name3    TYPE=NETBIOS  ORIENTATION=ORIGINATE
          Parameters and
          Variables
name4    TYPE=COM1    ORIENTATION=ANSWER
          Parameters and
          Variables
CONNECT  name3 TO name4
          *** This is a PORT
          *** definition

** 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 175. LANACS Configuration File Structure

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.

### 23.2.5.1 LAN Session Statements

The LAN session statements define which adapter ports are associated with which LAN sessions.

<i>Parameter</i>	<i>Definition</i>
<b>Session Name</b>	This begins each statement in the first column.
<b>TYPE</b>	For a LAN Session statement this is always NETBIOS and must be on the same line as the session name.
<b>ORIENTATION</b>	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.
<b>NETNAME</b>	This is optional. It is required if you have an outgoing EBI connection.
<b>PROTOCOL</b>	Required only for LAN sessions connected to outgoing ports.
<b>NAMETYPE</b>	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.
<b>SERVICE</b>	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.

### 23.2.5.2 PORT Definitions

It is important to make sure that these entries are correct and match the details required by attached devices.

<i>Parameter</i>	<i>Definition</i>
<b>Port Name</b>	This begins each PORT definition in the first column.
<b>TYPE</b>	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.
<b>ORIENTATION</b>	Either ANSWER or ORIGINATE. "ORIGINATE" is for outbound calls. "ANSWER" is for incoming calls. This should be the opposite of the NETBIOS orientation.
<b>ADAPTER</b>	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.
<b>PORT</b>	From 0 to 7. Only required with RTICM cards.

<b>SPEED</b>	Range 300 - 19200 or AUTOBAUD <sup>34</sup> .
<b>PARITY</b>	EVEN/MARK/ODD/SPACE/NONE. 'NONE' is the default. This is required for incoming calls and must match the parity with the connected device.
<b>DATA_BITS</b>	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.

### 23.2.5.3 *CONNECT Statements*

This is in the form:

CONNECT x TO y

and is 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.

### 23.2.5.4 *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.

<i>Parameter</i>	<i>Definition</i>
<b>Name</b>	The Request Manager name starts the statement in the first column.
<b>TYPE</b>	This must be REQMGR.
<b>POOL</b>	Specify a POOL Name.
<b>DEVICES</b>	This comes after POOL (if specified) and consists of a list of PORT names.

---

<sup>34</sup> AUTOBAUD is recommended for inbound terminal connection.

<b>NETNAME</b>	A NETBIOS name which identifies this POOL to LAN devices.
<b>NAMETYPE</b>	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.
<b>TARGET</b>	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"> <li>• PHONE = phone number</li> <li>• SPEED = 300 - 19200 bps</li> <li>• PARITY = Even/Mark/Odd/Space/None</li> <li>• Data_Bits = 7 or 8</li> <li>• Stop_Bits = 1 or 2</li> </ul>
<b>SERVICE</b>	Specify a SERVICE Name.
<b>SERVICE_NETNAME</b>	A NETBIOS name assigned to this service
<b>PROTOCOL</b>	ACSI or EBI
<b>PASSWORD</b>	This is optional

## 23.3 *Installation Steps*

### 23.3.1 Preparation

1. Install Token-Ring or PC Network Adapters. See "PC Token-Ring Network Adapter Installation" on page 15 or "PS/2 Token-Ring Adapter/A Installation" on page 21.
2. Install the communications adapter, one of those shown in Figure 170 on page 224.
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.
6. If you have installed any Multiport Adapters you will need to modify the ICAPARM.PRM depending on the number of adapters that you have installed. See the previous section under "Other Considerations".
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 lana1
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 176. 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 on 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.
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.

## 23.4 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 Number 4.*



## 24.0 APPC/PC

### 24.1 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 on other systems such as:

- IBM PC and PS/2 family
- Series/1
- System/36
- System/38
- 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.

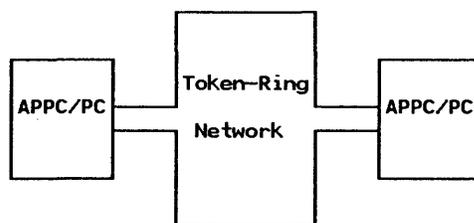
APPC/PC provides distributed transaction processing capability by enabling a program on an IBM PC to communicate with another program on another system without operator intervention.

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 177. APPC/PC Connection over Token-Ring Network

This figure shows an IBM PC running APPC/PC connected to a S/370 running CICS:

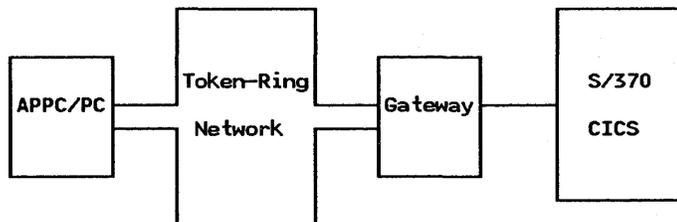


Figure 178. APPC Connection Between a PC and a S/370 Host

## 24.2 Planning Checklist

APPC/PC always uses SAP x'04', both for remote and local SAP.

## 24.3 Prerequisites - Hardware

- One of the following PCs  
PC, PC-XT, PC-AT, PS/2 mdl 30, 50, 60, 70, 80
- Required memory - at least 320 Kb
- Connection to Token-Ring
- Token-Ring Adapter Handler Interface Program (TOKREUI) OR the LAN Support Program (module C0).

## 24.4 Prerequisites - Software

- PC DOS 3.3.

## 24.5 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 15. 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 21.

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.

## 24.6 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.

## 24.6.1 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.

## 24.6.2 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.

## 24.7 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. 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:

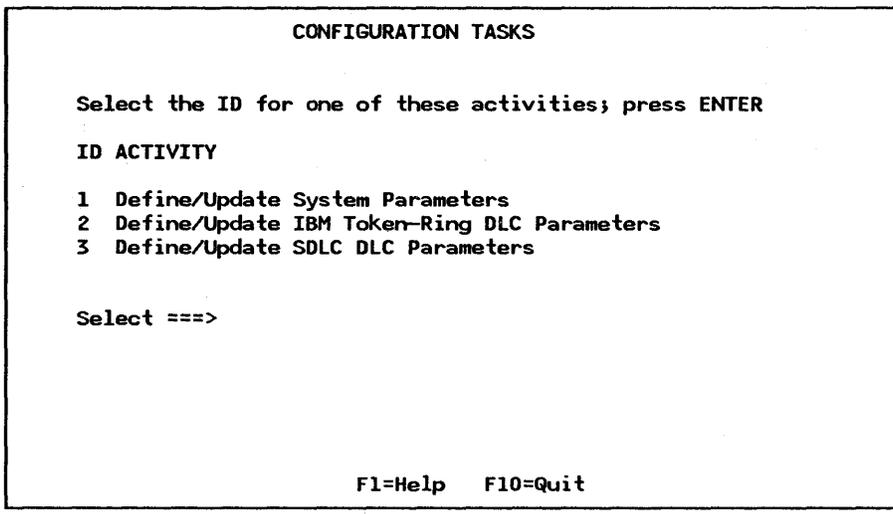


Figure 179. Configuration Tasks Menu

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:

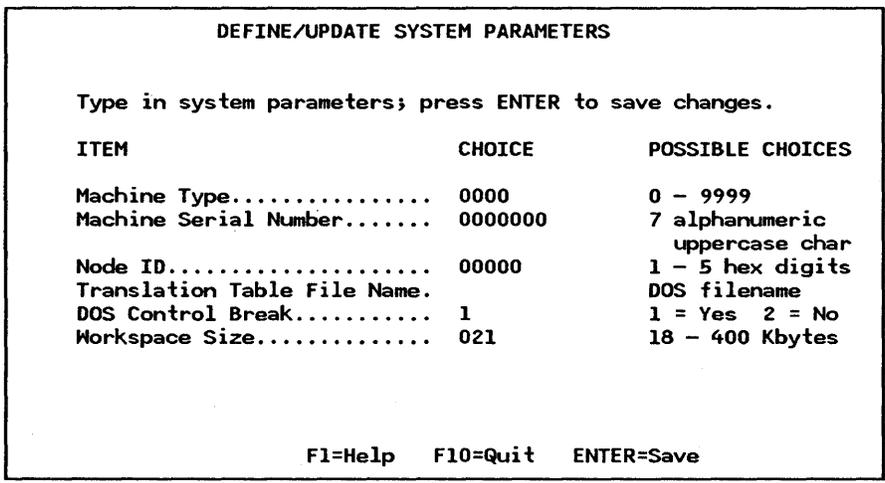


Figure 180. Define/Update System Parameters Menu

The only parameter relevant for the Token-Ring is "Node ID". If you are defining a connection to host through a 37XX gateway<sup>35</sup>, 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 or S/38.

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.

<sup>35</sup> 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 181. 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. (For details refer to "LAN Support Program" on page 83.) The address you specify here consists of 12 hexadecimal digits, the format being 4000yxxxxxx where y is maximum 7 and xx...xx consist of numbers 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.

## 24.8 *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 form SENDTP to RCVTP". The string will be displayed at both screens indicating that your installation works.

## 24.9 *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.*

## 24.10 *Scenarios*

### 24.10.1 *APPC/PC to APPC/PC Connection*

This scenario shows the specifications for two PCs running APPC/PC to communicate with each other over a Token-Ring Network.

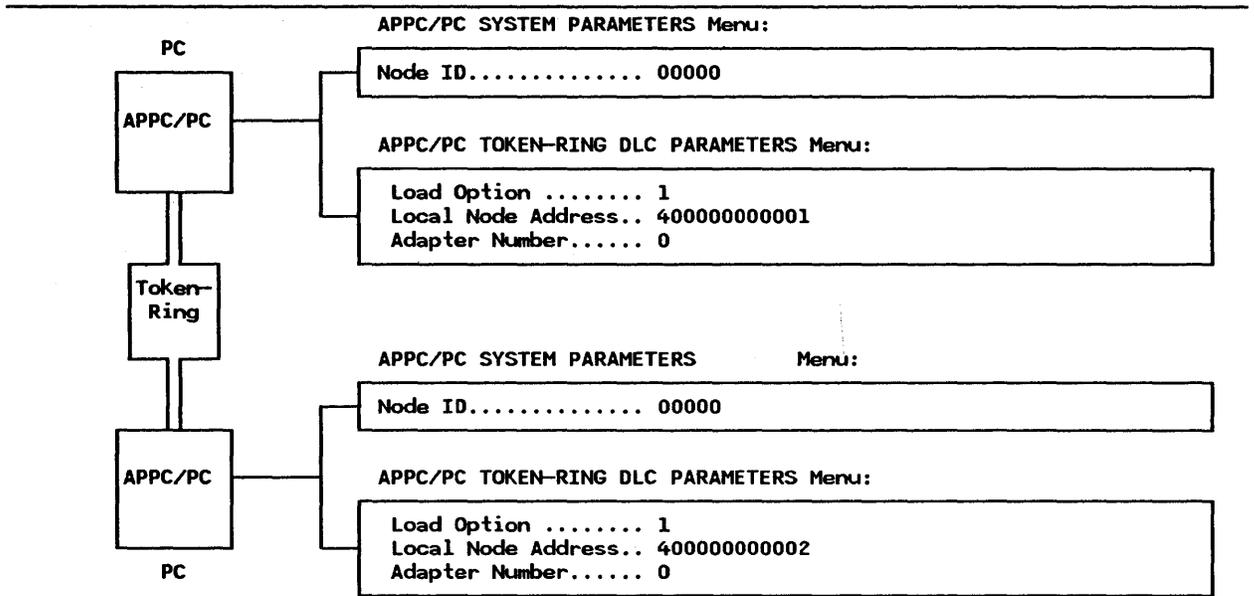


Figure 182. APPC/PC Key Definitions - Scenario

## 24.10.2 APPC/PC Attachment to Host Through a Remote 3174 Gateway

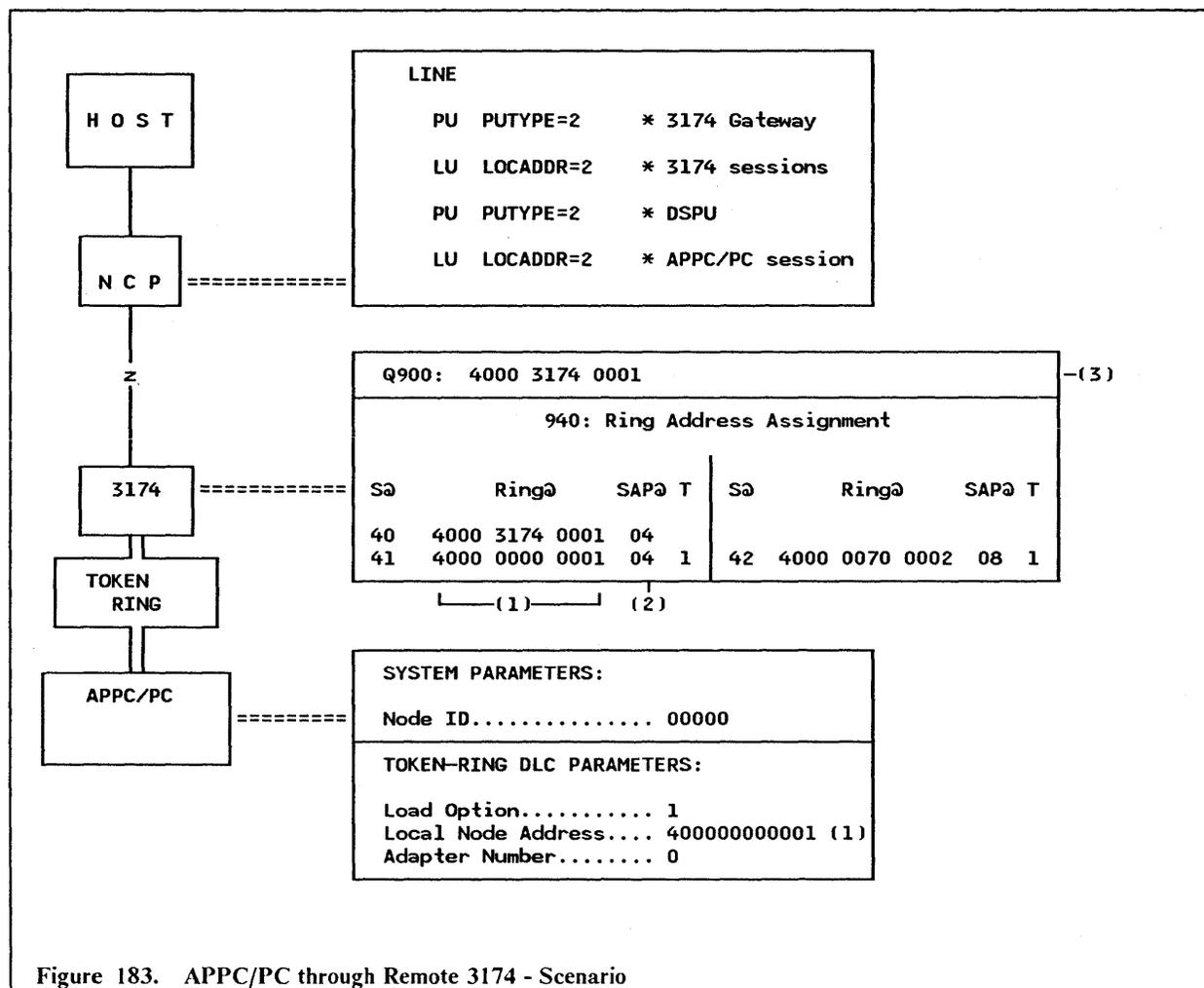
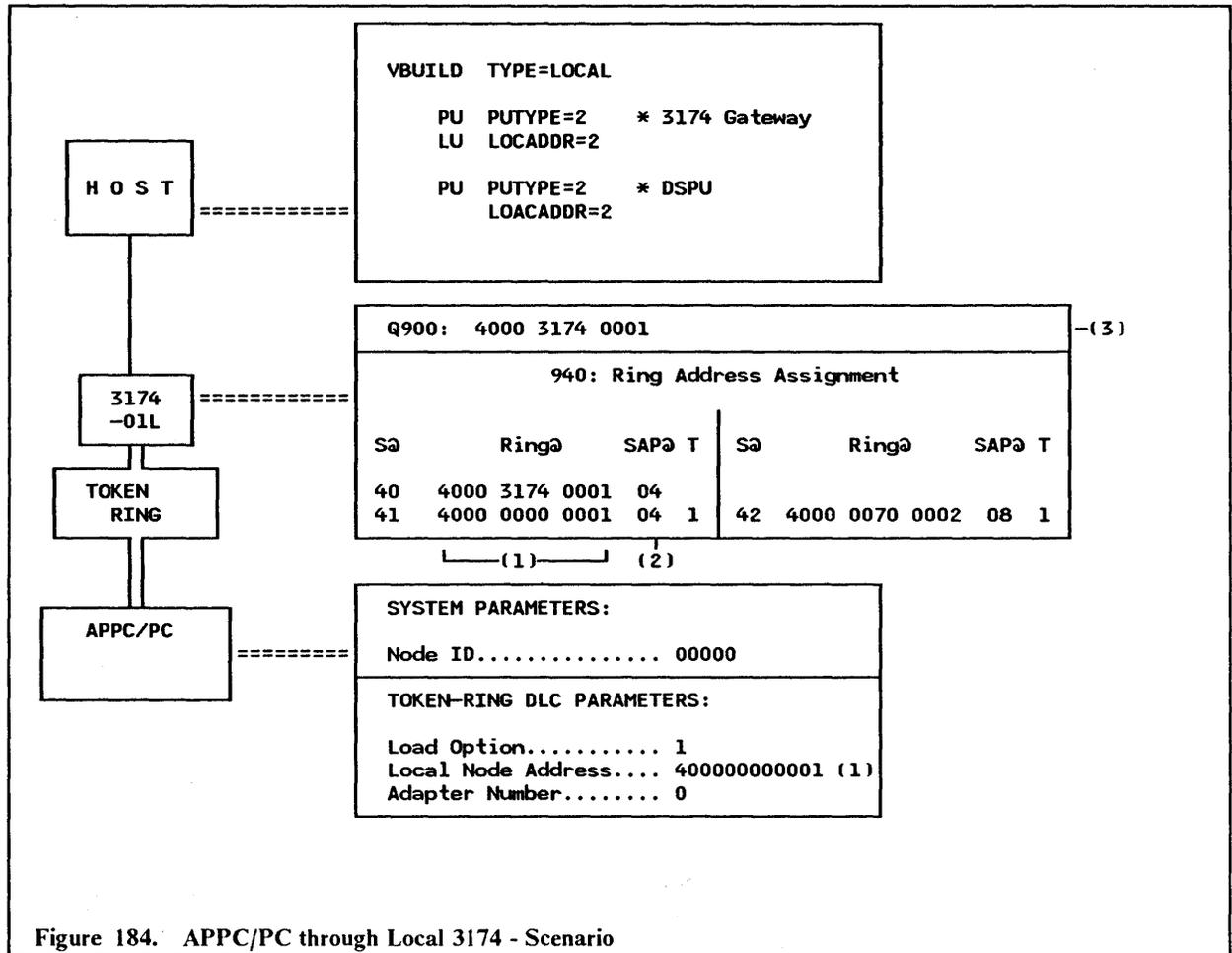


Figure 183. APPC/PC through Remote 3174 - Scenario

### 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 program to establish the communication.

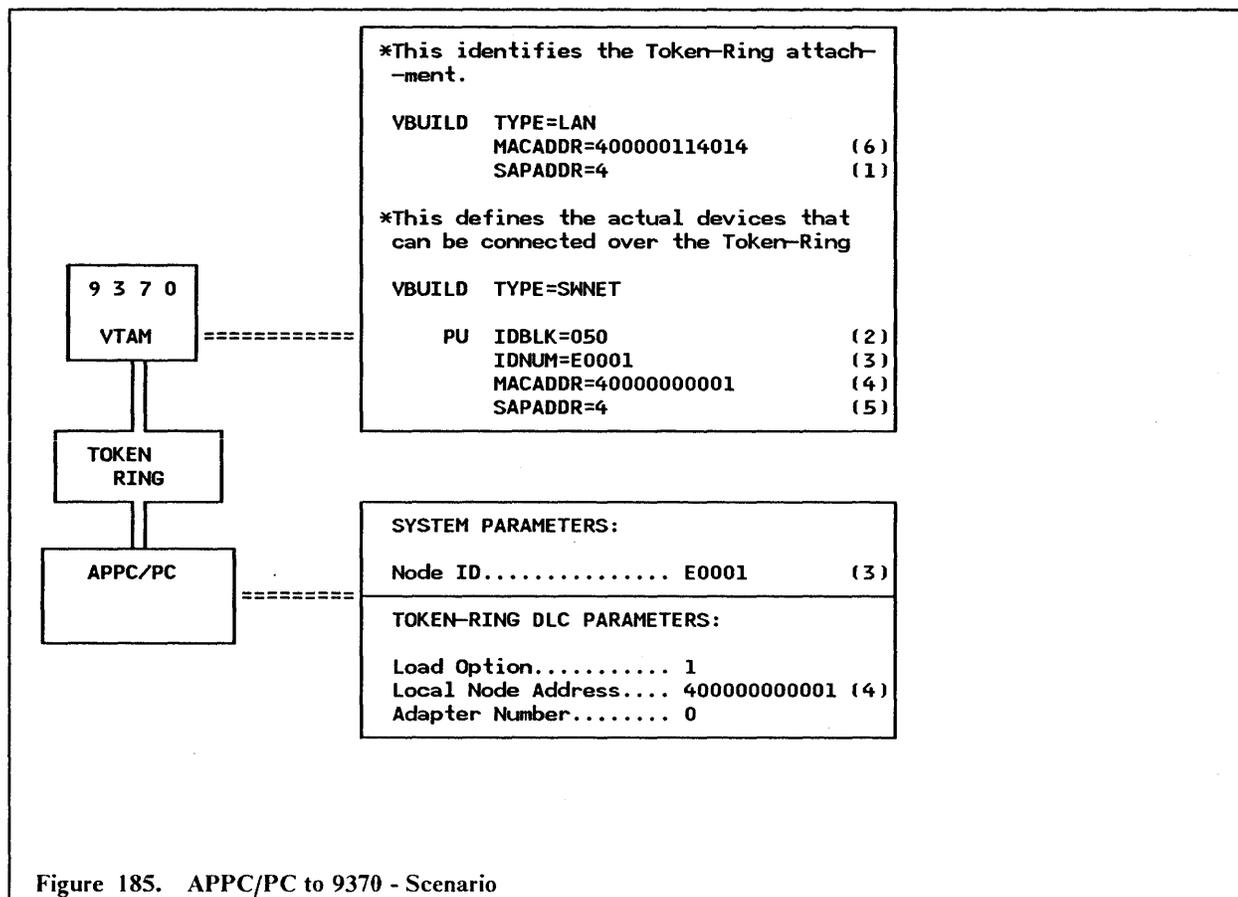
### 24.10.3 APPC/PC Attachment to Host Through a Local 3174 Gateway



#### 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 program to establish the communication.

## 24.10.4 APPC/PC Attachment to CICS in a Token-Ring Connected 9370



### 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 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 program to establish the communication.

## 24.10.5 APPC/PC Attachment to Host Through a Local or Remote 37XX Gateway

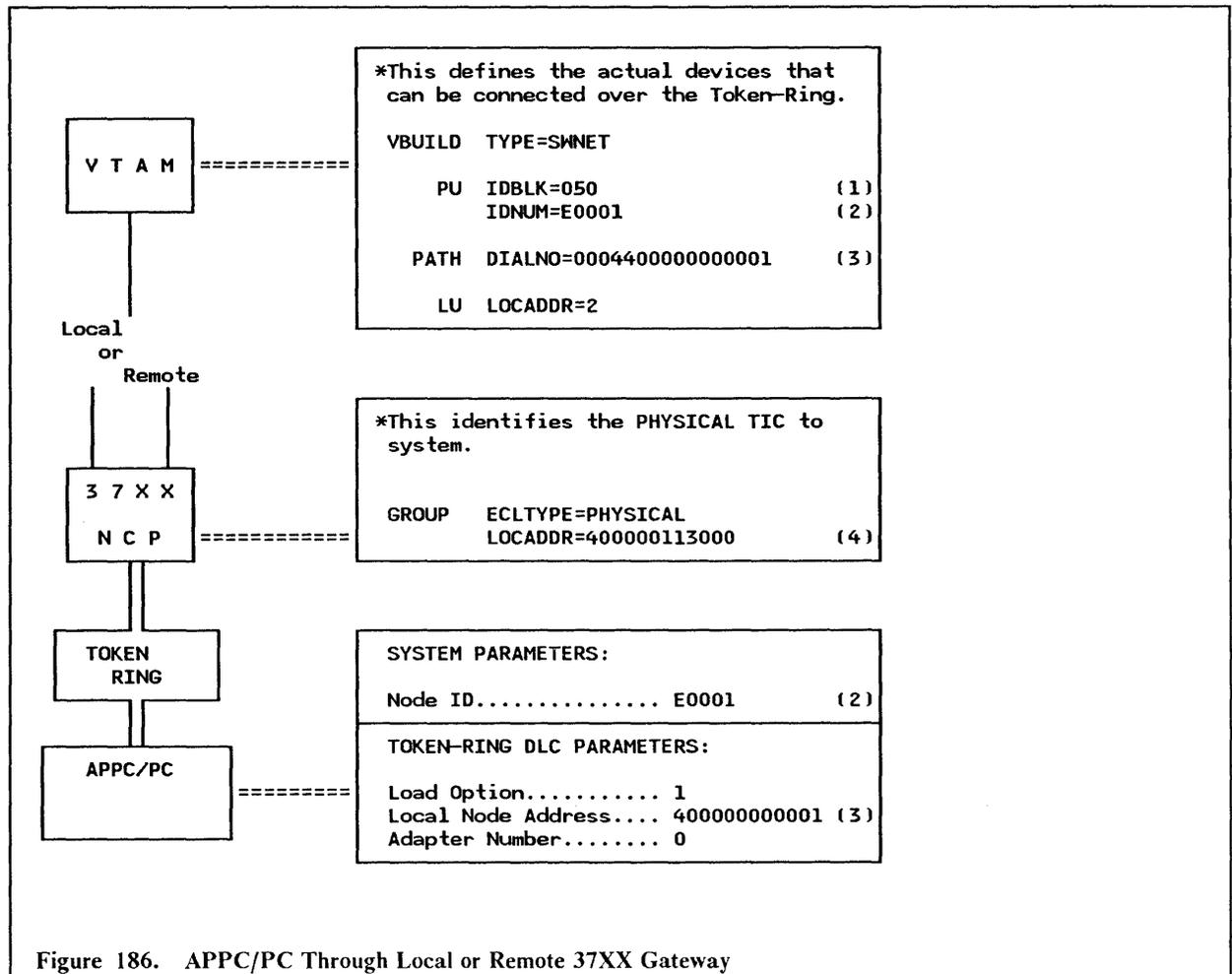


Figure 186. APPC/PC Through Local or Remote 37XX Gateway

### 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.



## 25.0 9370 Software

### 25.1 *VTAM Support for 9370 LAN*

#### 25.1.1 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 will be available in VSE/VTAM V3R2 (fourth quarter 1988).

VM/VTAM can communicate either to a PU T2 (with one or more workstations) or to a PU T4/5 (another 9370's VM/VTAM or a NCP with Token-Ring support).

The PU T2 sessions are supported by VTAM as taking place over switched lines. The PU T4/5 sessions are supported as taking place 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.

#### 25.1.2 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, 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,                X
          LANCN=(5,2),              SAME AS IN SNET PU'S  X
          MACADDR=400000114014,     X
          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,         X
              LANACK=(0,0),           X
              LANCN=(5,2),           X
              LANINACT=3,            X
              LANRESP=(5,2),         X
              LANSMDW=(7,1),         X
              LNCTL=SDLC,            X
              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,                X
              SAPADDR=4,                X
              ISTATUS=ACTIVE
*
              STATOPT='PU FOR SA15'
*
GD114T10 GROUP DIAL=YES,                GROUP FOR SWITCHED PU'S (PU T2) X
              ISTATUS=ACTIVE,         X
              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 187. VTAM LAN Major Node for 9370 Token-Ring 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 attachment, code TYPE = LAN.

**The PORT statement:**

- CUADDR =

Defines the channel unit address for the Token-Ring. This should be the first subchannel address in the range of addresses that you have assigned to CETI group. Each PORT statement defines one CETI group consisting of four subchannel addresses. For an explanation of CETI group see "9370 Hardware" on page 27. 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 Adapter (using different SAP addresses). See SAPADDR below. For an explanation of how subchannel addresses are assigned to the Token-Ring Subsystem of the 9370, see "9370 Hardware" on page 27.

- **LANCON =**  
Timer for the Token-Ring Network, the value in the example (5,2) will be OK for a start.
- **MACADDR =**  
Specifies the Token-Ring address of the Token-Ring Adapter that is opened by this VTAM system. If you omit this parameter, the address specified to the 9370 Token-Ring 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 Adapter. The default of 2000 will be OK for a start.
- **MAXSTN =**  
Specifies the maximum number of Token-Ring 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 Adapter.
- **SAPADDR =**  
Specifies the Service Access Point for the 9370's connection to the Token-Ring 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 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 "sift-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, and specifies its Token-Ring Network address. This could be the Token-Ring address (universal or locally administered address).
- **PUTYPE =**  
If you are defining a GROUP or LINE for another 9370 on the Token-Ring, 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 LANSDDWDW are different timers for the Token-Ring. 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"*.

### **25.1.3 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
                LANSMDWH=(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 188. VTAM Switched Major Node for 9370 Token-Ring 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 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 MACADDRESS 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 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 LANSDDWD are different timers for the Token-Ring. 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.

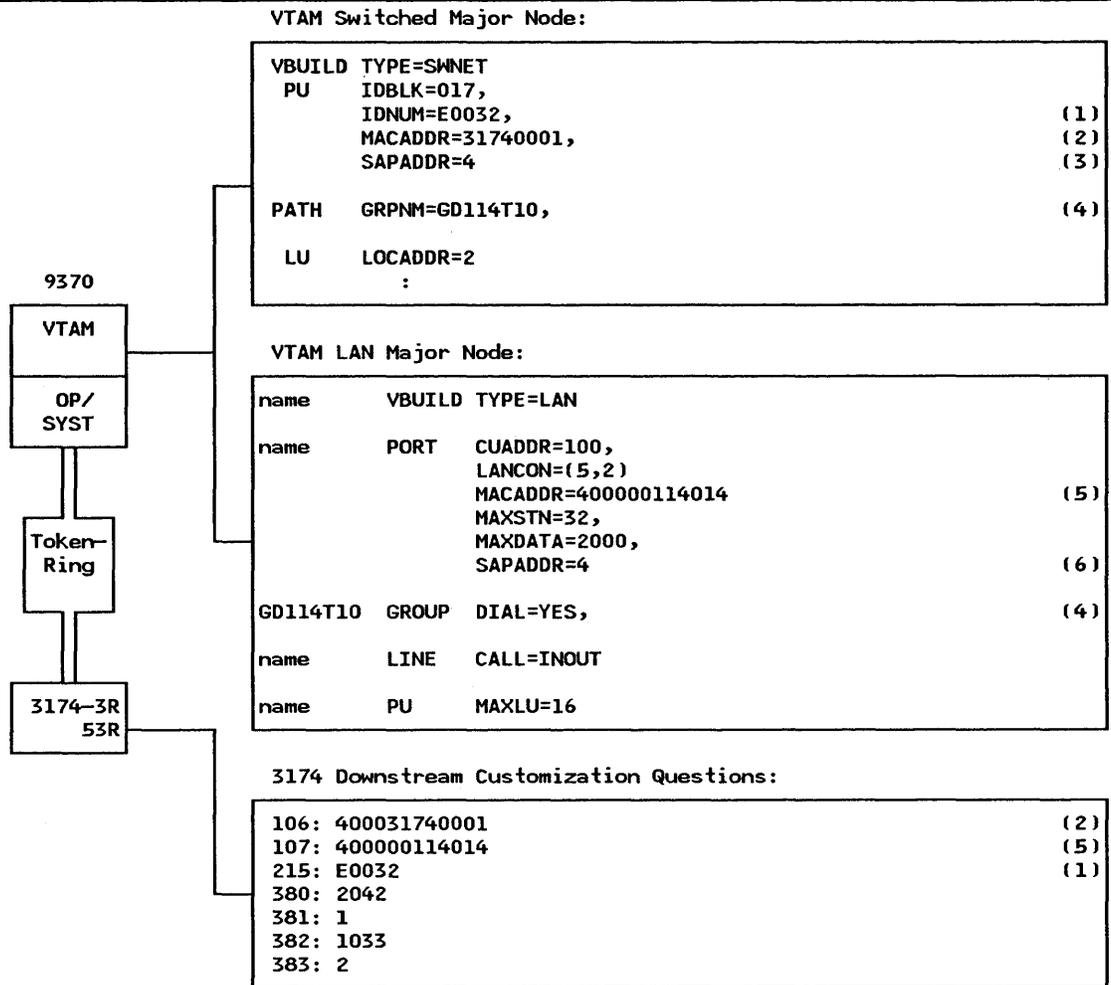
All the other statements and parameters are the same as for a traditional SDLC-attached, switched PU.

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 Figure 212 on page 280.

#### **25.1.4 Where To Go For More Information**

- SC23-0111 *VTAM Installation and Resource Definition*
- GG24-3240 *IBM 9370 LAN, Volume 1: Token-Ring Support*.



Key parameters for a 9370 supporting a 3174 Down Stream PU (DSPU). If the numbers within brackets appear at two places, that indicates the parameter values must match.

Figure 189. 9370 Token-Ring Subsystem Key Definitions - Scenario

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.

## 25.2 TSAF

### 25.2.1 Overview

This section describes how Transparent Services Access Facility (TSAF) is specified to support communication over a Token-Ring Network to other TSAF nodes.

TSAF allows application programs in different virtual machines to communicate. This communication is transparent to the user.

TSAF does not use VTAM to communicate. It has its own support for (among others) the 9370 Token-Ring Subsystem.

The capability to communicate across multiple Token-Rings through Token-Ring bridges is not supported, unless the TSAF virtual machine itself acts as the bridge.

Figure 190 shows how eight 9370 processors can join a "TSAF collection" (maximum configuration), using the Token-Ring Network for physical connection.

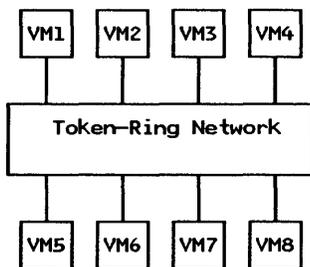


Figure 190. TSAF Virtual Machines Communicating Over a Token-Ring

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Figure 191 shows how a 9370 with TSAF can connect multiple Token-Ring Networks by attaching two Token-Ring Subsystems to different networks. This connection can only be used by TSAF. The maximum number of systems that can communicate is still eight.

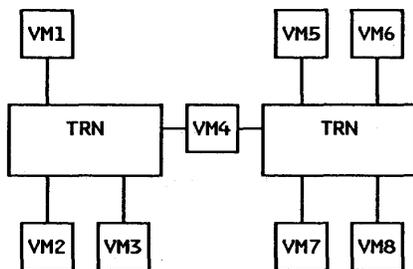


Figure 191. TSAF Virtual Machine Interconnecting Two Token-Rings

---

### 25.2.2 Planning Checklist

#### 25.2.2.1 Prerequisites - Hardware

- The 9370 Token-Ring Subsystem must be installed and customized according to the instructions in "9370 Hardware" on page 27.

- A 'CETI group' consisting of four contiguous subchannel addresses must have been reserved for TSAF. For a description of CETI groups, see "9370 Hardware" on page 27.

### 25.2.2.2 Prerequisites - Software

- TSAF must be at the right service level to support Token-Ring Network. Information about the required service level can be obtained from your local IBM support organization.
- A maximum of eight TSAF systems can exist within a TSAF collection.

### 25.2.2.3 Coexistence and Compatibility

TSAF can share the Token-Ring Subsystem with up to two other applications, but TSAF puts some restrictions on the subsystem:

- TSAF **always** uses the SAP address 80.
- If the Token-Ring Network Adapter is not open when TSAF connects to the Token-Ring, then TSAF will open the adapter. In this case, TSAF will use the Token-Ring address specified during the customization of the 9370 Token-Ring Subsystem or the Universal address if no address was specified during customization. If the adapter is already open when TSAF connects to the ring, TSAF will use the Token-Ring address and other parameters that were used when the adapter was opened.

If you are sharing or will be sharing the Token-Ring Subsystems with applications other than TSAF, the above-mentioned restrictions will require careful planning concerning operation and Token-Ring address assignment.

## 25.2.3 Installation Steps

This describes only the steps that are involved in defining the Token-Ring to TSAF. For a complete description of how to install TSAF refer to the manuals listed in "Where To Go For More Information" on page 257.

1. In the TSAF CP Directory, specify option DIAG98 on the OPTIONS statement as in this example:

---

```

USER TSAFVM password 4M 8M G
OPTIONS . . . DIAG98 . . .
.
.
.

```

Figure 192. DIAG98 Option for TSAF CP Directory

---

This lets the TSAF virtual machine perform the I/O on the CETI group without disrupting CP and other virtual machines.

2. For each group of subchannel addresses (also called CETI group) that TSAF uses, you must dedicate (DEDICATE statement) or attach (CP ATTACH command) four devices to the TSAF virtual machine. The real and virtual device addresses must be consecutive. If you have defined the Token-Ring Subsystem as in the examples in "9370 Hardware" on page 27 and you have reserved the four last addresses 108, 109, 10A and 10B for TSAF, the DEDICATE statements in TSAF's CP directory could look like this:

---

```

DEDICATE 308 108
DEDICATE 309 109
DEDICATE 30A 10A
DEDICATE 30B 10B

```

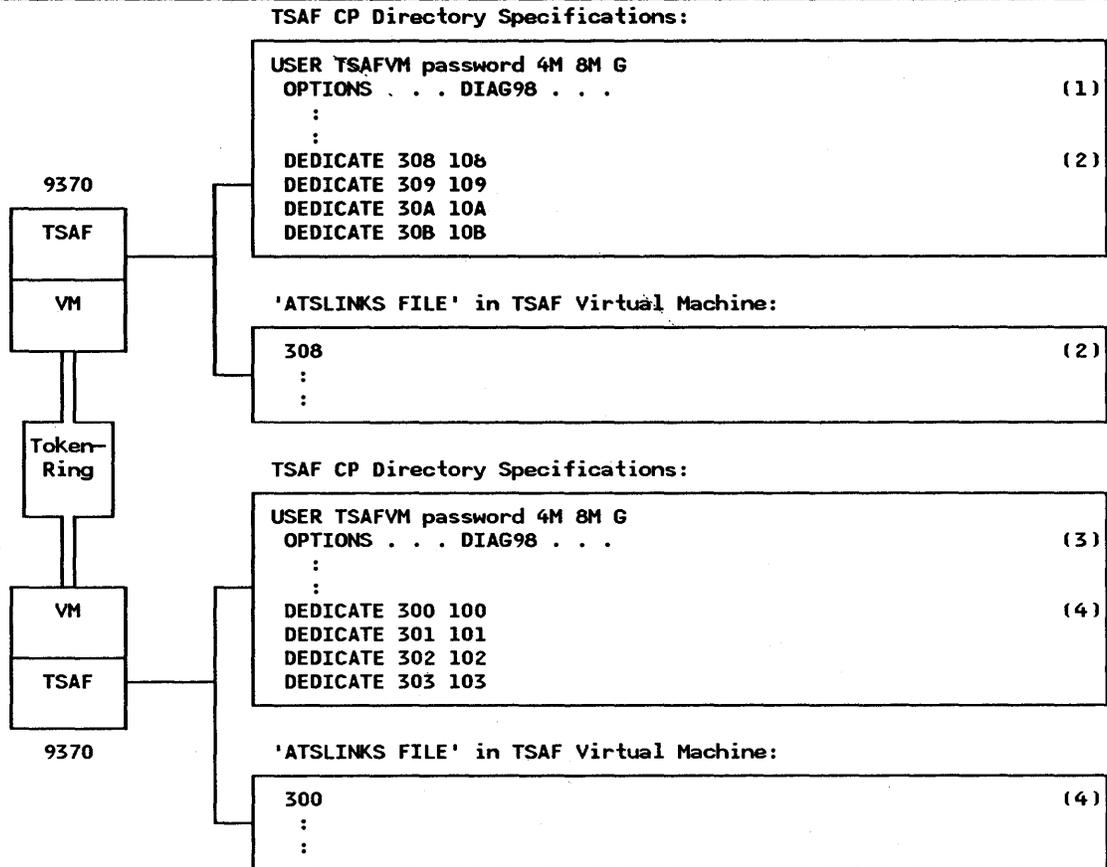
Figure 193. DEDICATE Statements for TSAF CP Directory

---

The virtual subchannel addresses do not have to be the same as the real subchannel addresses, but they must be consecutive and start within the range of X'00' and X'F8'.

3. Include the first virtual address for the Token-Ring Subsystem (in the example above that will be the address 308) in the file named ATSLINKS FILE in the TSAF virtual machine. The ATSLINKS FILE is a table of virtual addresses that TSAF accesses.
4. Include in the TSAF profile the command to start TSAF.

The scenario on the next page shows the most important parameters in the definitions and how they must match.



Key parameters for a 9370 with TSAF connected to another 9370 with TSAF. If the numbers within brackets appear at two places, that indicates the parameter values must match.

Figure 194. 9370 TSAF Key Definitions - Scenario

NOTES:

1. The DIAG98 OPTION for nondisruptive I/O.
2. The first address in the CETI group of four addresses.
3. The DIAG98 OPTION for nondisruptive I/O.
4. The first address in the CETI group of four addresses.

### 25.2.4 Where To Go For More Information

For more information on installing TSAF in general and in a Token-Ring environment, refer to these publications:

- SC19-6201 *VM/SP Planning Guide and Reference*
- SC24-5287 *Transparent Services Access Facility Reference*
- GC24-5363 *Transparent Services Access Facility 9370 Local Area Network Subsystems*
- GG24-3240 *IBM 9370 LAN, Volume 1: Token-Ring Support.*



## 26.0 VTAM and NCP Definitions

The following sections describe how VTAM and NCP support the different Token-Ring host gateways and the Token-Ring stations using these gateways.

### 26.1 3174 Local Gateway and Downstream PUs

This section describes the VTAM definitions needed for a 3174-1L as a local gateway. It also describes how the stations (PUs) on the ring that are communicating through this gateway are defined.

#### 26.1.1 VTAM Major Node Definitions

The 3174 Gateway is defined as any SNA channel-attached control unit. Each Token-Ring station (for example, a 3174 model 3R or a PC running 3270 Emulation Program V3 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 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 it's PU definition 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,MAXBFRU=12, *
MODETAB=AMODETAB,DLOGMOD=M2SDLCQ,USSTAB=US327X, *
VPACING=0
*
H040T00 LU LOCADDR=2
H040T01 LU LOCADDR=3,MODETAB=MTJS328X,DLOGMOD=SCS3262
H040T02 LU LOCADDR=4
:
:
*-----*
* LOCAL DEFINITIONS FOR DSPU *
*-----*
H041PU PU CUADDR=041,ISTATUS=ACTIVE,PUTYPE=2,MAXBFRU=12, *
MODETAB=AMODETAB,DLOGMOD=M2SDLCQ,USSTAB=US327X, *
VPACING=0,SECNET=YES
*
H041T00 LU LOCADDR=2
H041T01 LU LOCADDR=3,MODETAB=MTJS328X,DLOGMOD=SCS3262
H041T02 LU LOCADDR=4
:
:

```

Coax attached  
LUs to gateway

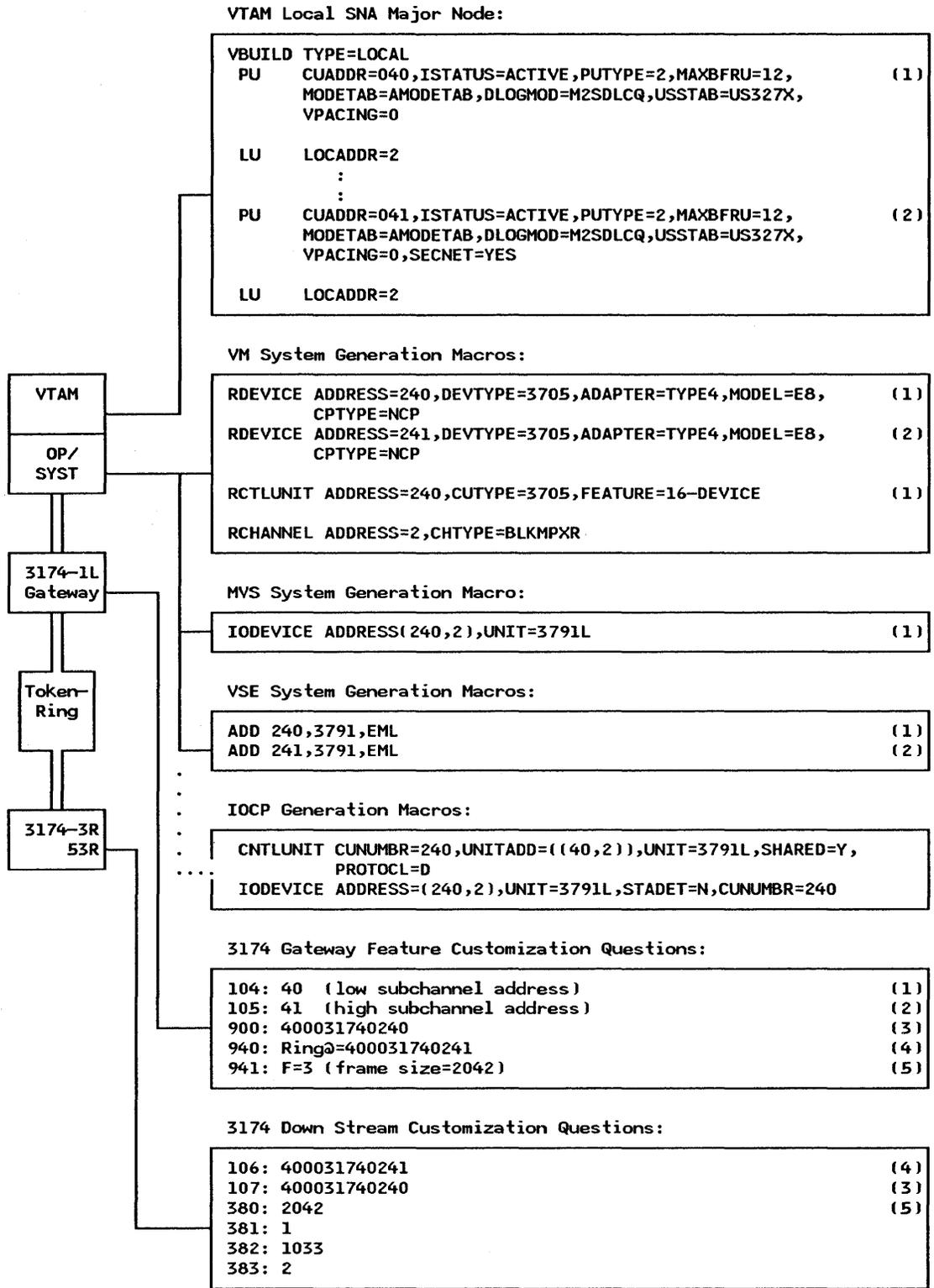
LUs on DSPU

Figure 195. VTAM Local Definitions for 3174 1L Gateway

Some parameters on the PU statement that are important for the Token-Ring, 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. The customization of the different 3174 Gateways is described in "3174 Control Unit" on page 45. 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 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 with 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 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 the next page shows the most important parameters in the definitions and how they must match.



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.

Figure 196. Local Gateway Key Definitions - Scenario

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.

## 26.2 3174 Remote Gateway and Downstream PUs

This section describes the VTAM and NCP definitions for the SDLC link-attached 3174-1R, 2R, 51R or 52R acting as gateways in a Token-Ring environment. It also describes how the Token-Ring stations using this gateway for host communication are defined.

To enable VTAM to communicate with the Token-Ring stations, the only thing you have to do in 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 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 is a leased point-to-point line. No multi-drop configurations are allowed.

Define the 3174 Remote Gateway and its supported Token-Ring 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.

The LINE and SERVICE macros for defining a remote gateway and five DSPUs look like this:

```
*****
*      LINE MACRO FOR REMOTE 3174 GATEWAY AND DSPUS      *
*****
L13008  LINE  ADDRESS=(08,HALF),
          ATTACH=MODEM,
          ANS=CONTINUE,
          CLOCKNG=EXT,
          DUPLEX=(HALF),
          ETRATIO=30,
          ISTATUS=ACTIVE,
          LPDATS=LPDA2,
          MAXPU=6,
          NPACOLL=YES,
          PAUSE=0.2,
          SERVLIM=255,
          SPEED=9600,
          SRT=(,64),
          OWNER=M20
*****
*      SERVICE MACRO SPECIFICATION FOR SDLC (LINE 008)   *
*****
          SERVICE MAXLIST=6,
          ORDER=(P13008A,P13008B,P13008C,P13008D,P13008E,P13008F)
```

Figure 197. NCP 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,          3174 SUPPORTS UP TO 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

```

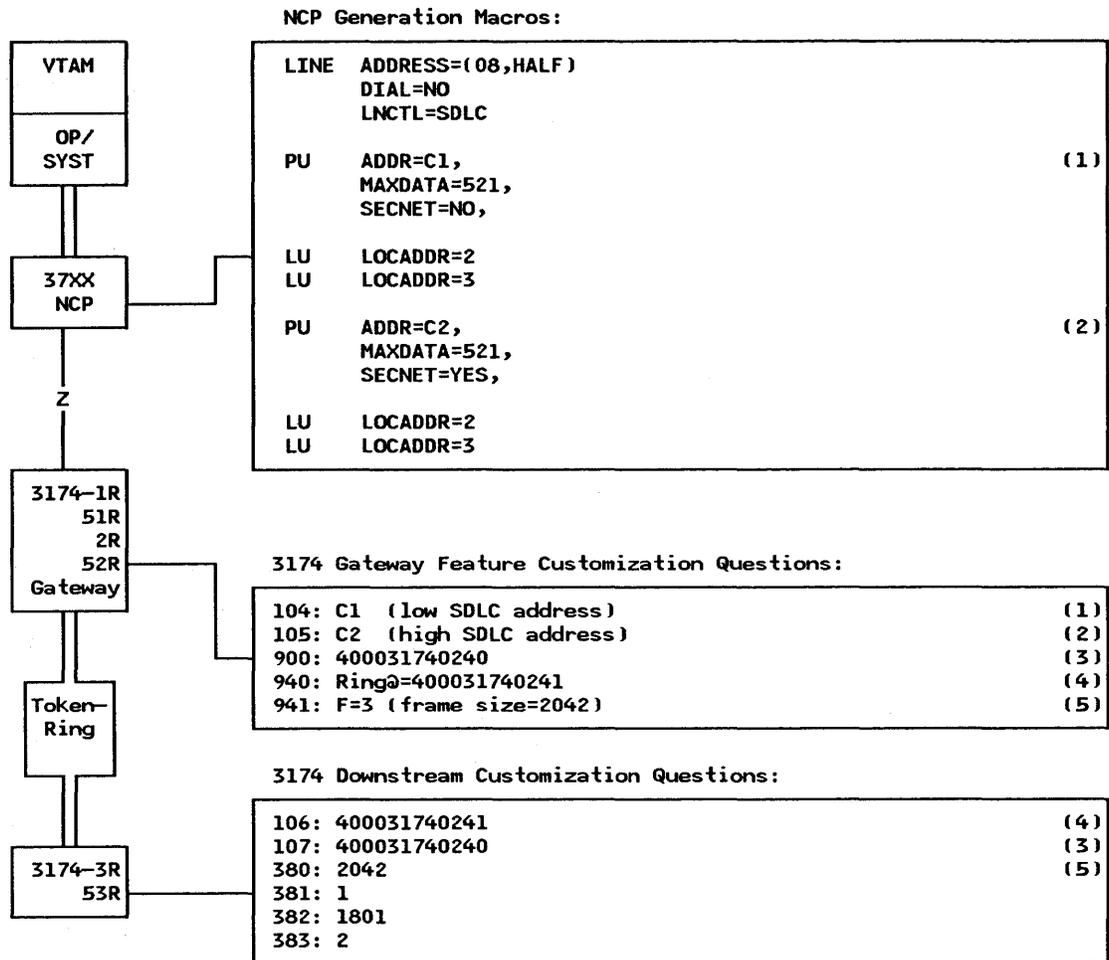
Figure 198. NCP PU and LU Macros for a 3274 Remote Gateway

The parameters involved in defining the 3174 Remote Gateway are described in detail below.

- LINE macro
  - ADDRESS =
    - Must be (XXX,HALF); DSPUs are half-duplex devices.
  - 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

- **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 the next page show the most important parameters in the definitions and how they must match.



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.

Figure 199. Remote Gateway Key Definitions - Scenario

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.

## 26.3 37XX Gateway and Downstream PUs

This section describes the VTAM and NCP definitions needed to allow stations on a Token-Ring 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.

### 26.3.1 Installation Steps

1. Generate new NCP

To get the NCP Token-Ring Interface (NTRI) function of NCP V5 (NCP V4R3 for 3725) to work and support the Token-Ring, 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 200. 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 gen 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 201. New BUILD Macro Parameters

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 202. 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 203. 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
*
E061088 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=2044              TRANSMIT FRAME SIZE
EP061088 PU
EU061088 LU  ISTATUS=INACTIVE
*****
*      PHYSICAL GROUP FOR NTRI TIC #2 - CCUA    *
*****
EG06P01  GROUP ECLTYPE=PHYSICAL          PHYSICAL GROUP
*
E061089 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=2044              TRANSMIT FRAME SIZE
EP061089 PU
EU061089 LU  ISTATUS=INACTIVE
*****
*      PHYSICAL GROUP FOR NTRI TIC #1 - CCUB    *
*****
EG06P02  GROUP ECLTYPE=PHYSICAL          PHYSICAL GROUP
*
E061092 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=2044              TRANSMIT FRAME SIZE
EP061092 PU
EU061092 LU  ISTATUS=INACTIVE
*****
*      PHYSICAL GROUP FOR NTRI TIC #2 - CCUB    *
*****
EG06P03  GROUP ECLTYPE=PHYSICAL          PHYSICAL GROUP
*
E061093 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=2044              TRANSMIT FRAME SIZE
EP061093 PU
EU061093 LU  ISTATUS=INACTIVE

```

Figure 204. 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 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
          PHYPORT=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
          PHYPORT=1           POINTS TO TIC (PORTADD)

```

Figure 205. 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
          PHYPORT=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
          PHYPORT=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
          PHYPORT=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
          PHYPORT=3           POINTS TO TIC (PORTADD)

```

Figure 206. Logical GROUP Definitions for 3745

Following is a detailed description of the parameters involved in defining the Token-Ring 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 3720. 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.
- **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 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.
- **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).

- **LINE macro:**

If you have specified AUTOGEN = x<sup>36</sup> 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.

- **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)**

---

<sup>36</sup> 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 station.

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 2044)**  
Specifies the largest PIU (in bytes) that NTRI can transmit. The value 2044 is recommended for best performance.

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, its 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
*
*****
E13SM  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
          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            INITIALY INACTIV * X
**
**
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            INITIALY INACTIV * X
**
**
E13L0203 LU  LOCADDR=2          FOR THE PC APPC
**
**
E13L0204 LU  LOCADDR=3          FOR THE PC APPC
**

```

Figure 207. 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 environment, but it must be coded anyhow.
- **MAXDATA =**  
This parameter is not used in Token-Ring environment, and can be omitted.

The PATH statement:

- **DIALNO =**  
Code 16 digits in the format  
DIALNO = aabb4000cccccccc

where:

aa = the port number (TIC) to which this station is connected; it is the number defined in NCP by PORTADD = .

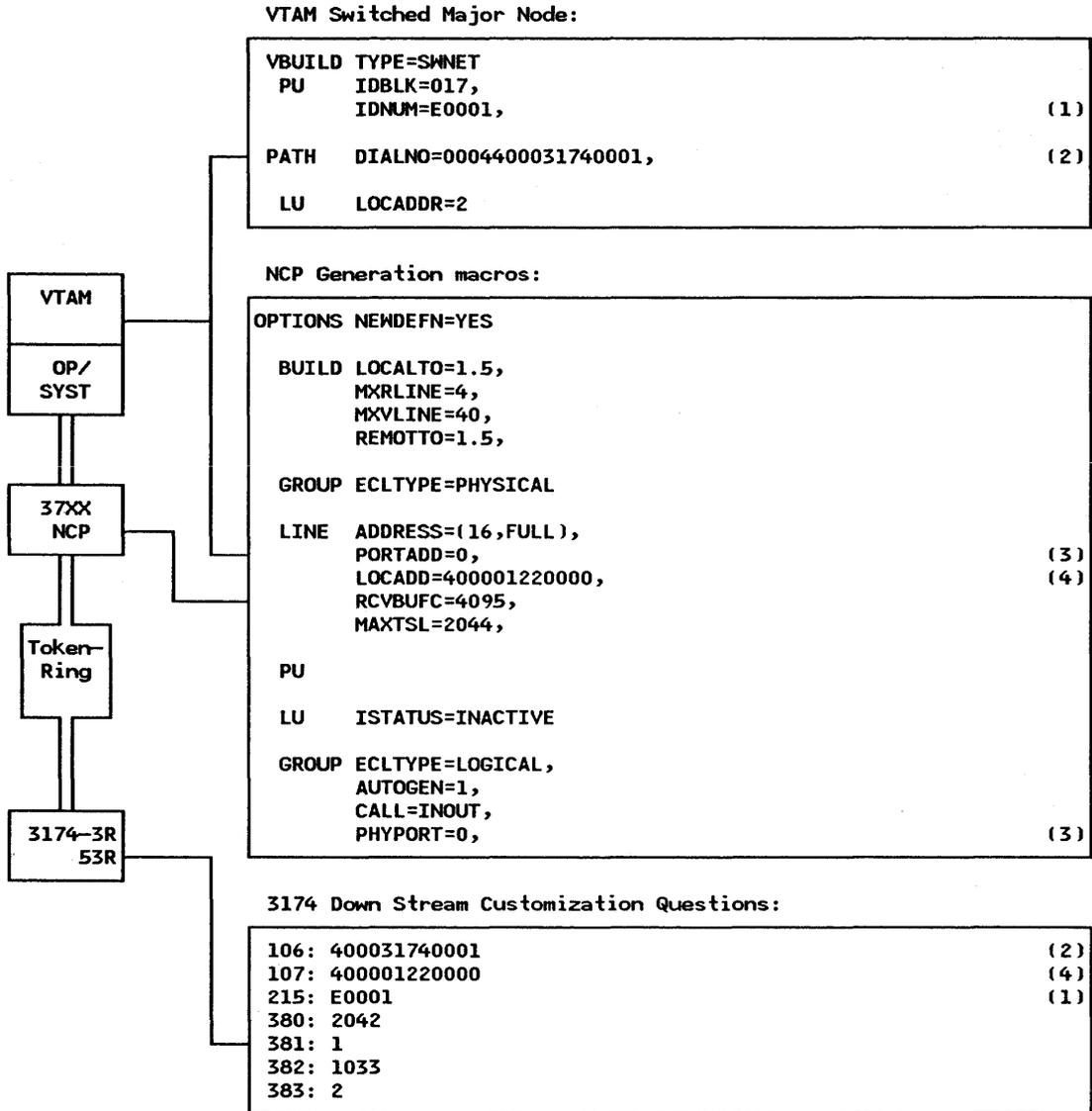
bb = the Service Access Point of this station. This is normally 04 in SNA environment. One important exception is Workstation Program 1.1, which uses 08.

cccccccc = the eight last digits in the station's Token-Ring Network address.

- **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 stations (that call in to, 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 the next page shows the most important parameters in the definitions and how they must match. In this case the DSPU is a 3174-3R.



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.

Figure 208. 37XX Gateway Key Definitions - Scenario

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 twelve digits), used for outgoing calls to the 3174. The last twelve 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.

## 26.4 *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 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'

## 26.5 *INN Sessions over Token-Ring*

NCP V4R3.1 (for 3725 and 3720) and NCP V5R2.1 (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) cannot be mixed on the same TIC, but they can be mixed on the same Token-Ring Network.

### 26.5.1 **Configuration Parameters**

To support these INN connections some parameters have been changed in the NCP releases mentioned above. These are:

- ECLTYPE
- LOCADD
- ADDR.

### 26.5.2 **Planning Checklist**

- It is not possible to load and dump an NCP over the Token-Ring.
- Only one NTRI INN link is allowed per TG.
- A mixture of BNN and INN links are not allowed on the same TIC.

### 26.5.3 **Installation Steps**

This section only describes how to define a TIC for INN sessions. For information about installing Token-Ring 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 "VTAM Support for 9370 LAN" on page 247.

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, 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=2044             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),  X
                ANS=CONTINUE,            X
                TGN=8
*
IN1LL00 LINE
*
IN1PL00 PU

```

Figure 209. 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=2044             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),  X
                ANS=CONTINUE,            X
                TGN=8
*
IN2LL00 LINE
*
IN2PL00 PU

```

Figure 210. PHYSICAL and LOGICAL GROUP Macros for INN Sessions (Subarea 2)

New and changed parameters for defining the the Token-Ring 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 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 = aabbbbbbbbbbb

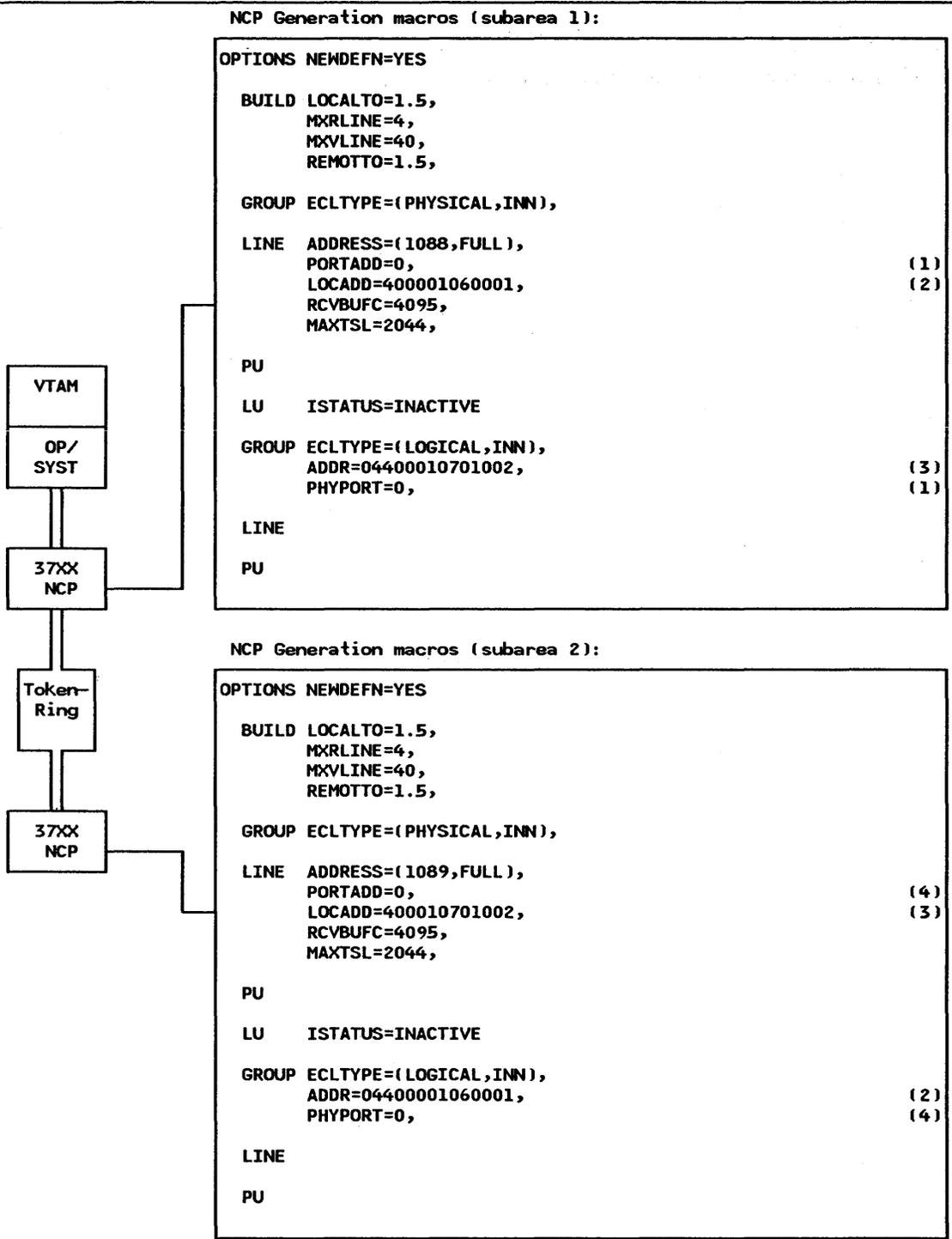
where:

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

bbbbbbbbbb = the 6-byte Token-Ring 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
  - **MAXTSL =**  
The minimum value for MAXTSL is changed from 265 to 266.
  - **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 code. 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 two scenarios on the following pages show the most important parameters in the definitions for 37XX INN sessions and 9370 INN sessions, and how they should match.



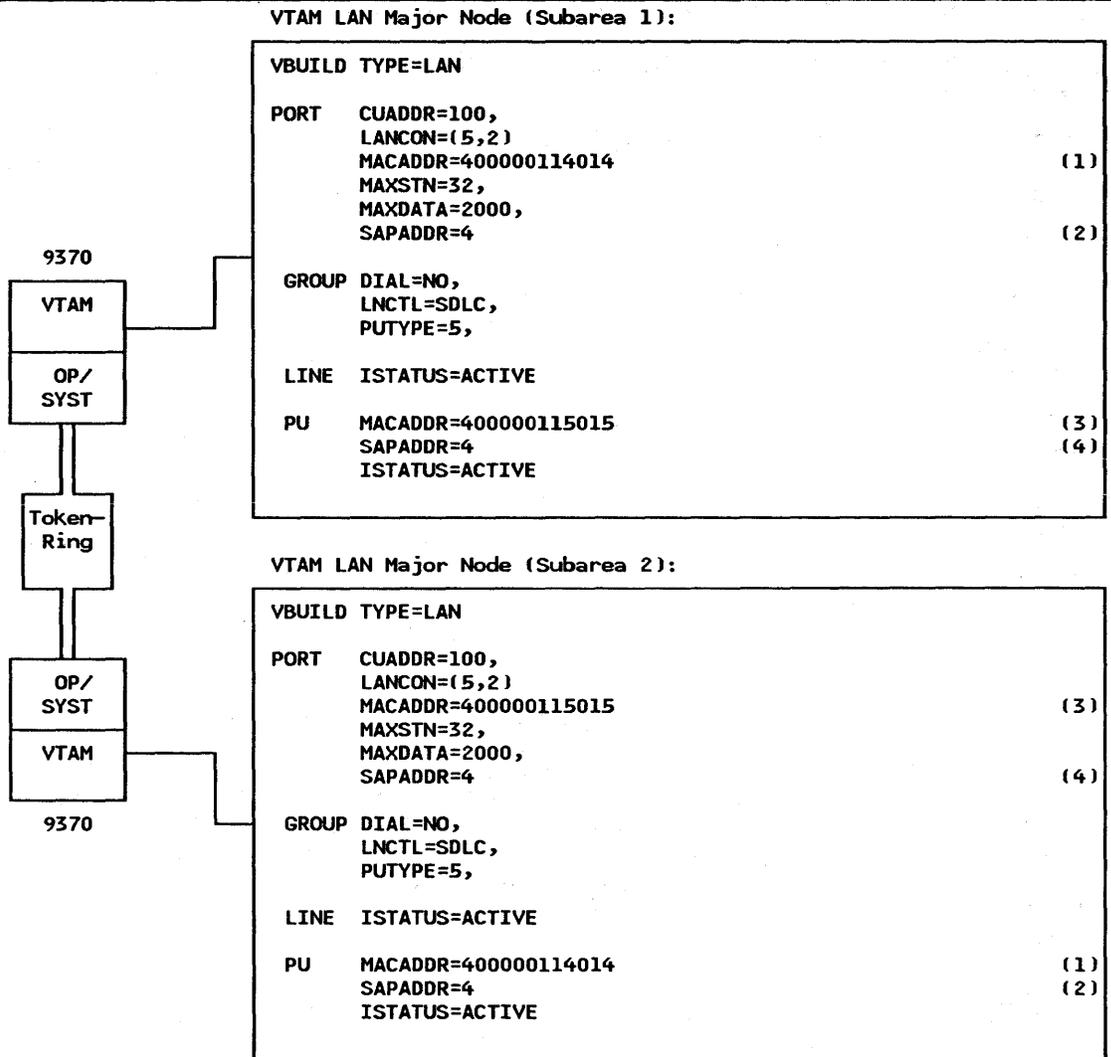
Key parameters for 37XX NCP supporting INN sessions over a Token-Ring Network. If the numbers within brackets appear at two places, that indicates the parameter values must match.

Figure 211. 37XX INN Sessions Key Definitions - Scenario

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.



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.

**Figure 212. 9370 INN Sessions Key Definition - Scenario**

**NOTES:**

1. Token-Ring address of TRN Adapter in subarea 1. The MACADDR parameter value in the PU macro in subarea 2 must match this address.
2. SAP address of TRN Adapter in subarea 1. The SAPADDR parameter value in the PU macro in subarea 2 must match this address.
3. Token-Ring address of TRN Adapter in subarea 2. The MACADDR parameter value in the PU macro in subarea 1 must match this address.
4. SAP address of TRN Adapter in subarea 2. The SAPADDR parameter value in the PU macro in subarea 1 must match this address.

## 26.6 *Where To Go For More Information*

For more information on VTAM and NCP definitions for a 3720 in a Token-Ring 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 Interface, Planning and Implementation.*

For more information on VTAM and NCP definitions for a 3725 in a Token-Ring 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 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.*



## **27.0 Using The System/36 on The LAN**

### ***27.1 Overview***

In this chapter, we will describe the various methods by which the System/36 can communicate with other workstations using the IBM Token-Ring Network.

Only the configurations of the different communications subsystems that are used will be discussed as the application programs are not affected by the different modes of communication.

The figure below highlights the topics presented.

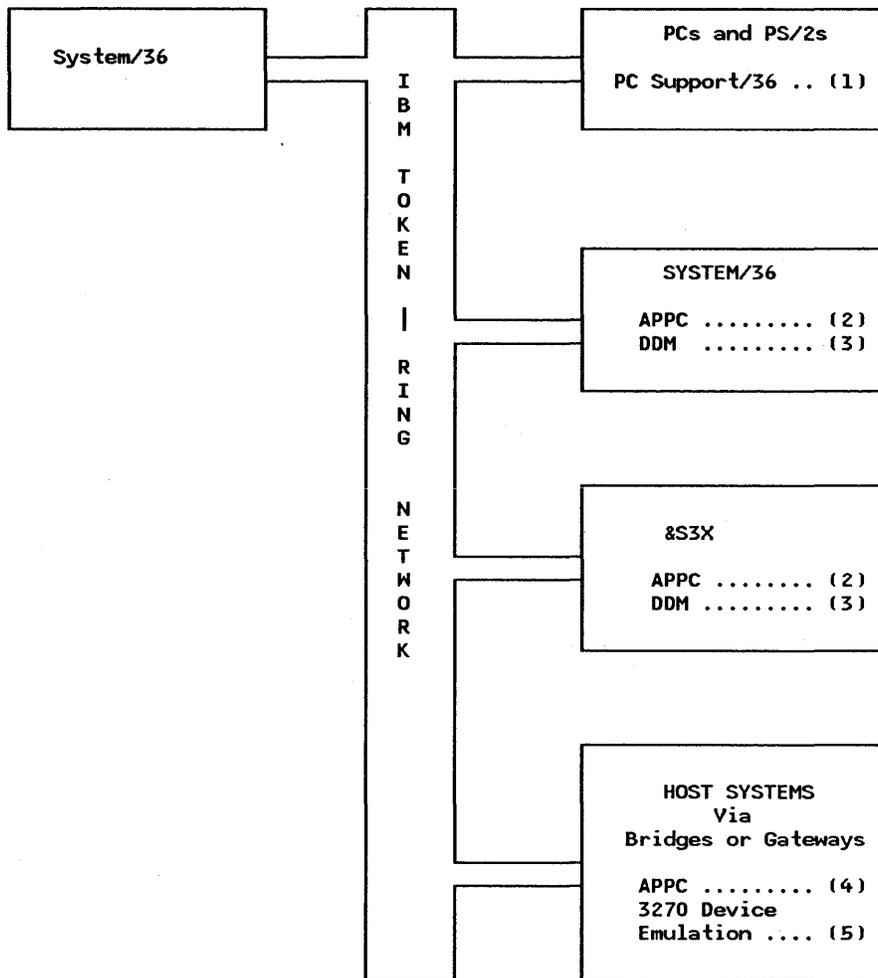


Figure 213. Using the System/36 on the IBM Token-Ring Network

1. See section "System/36 Communicating With The PC and PS/2" on page 285.
2. See section "APPC Peer Communication" on page 297.
3. See section "System/36 Distributed Data Management (DDM)" on page 315.
4. See section "APPC Host Communication" on page 306.
5. See section "System/36 3270 Device Emulation" on page 321.

## 28.0 System/36 Communicating With The PC and PS/2

### 28.1 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.

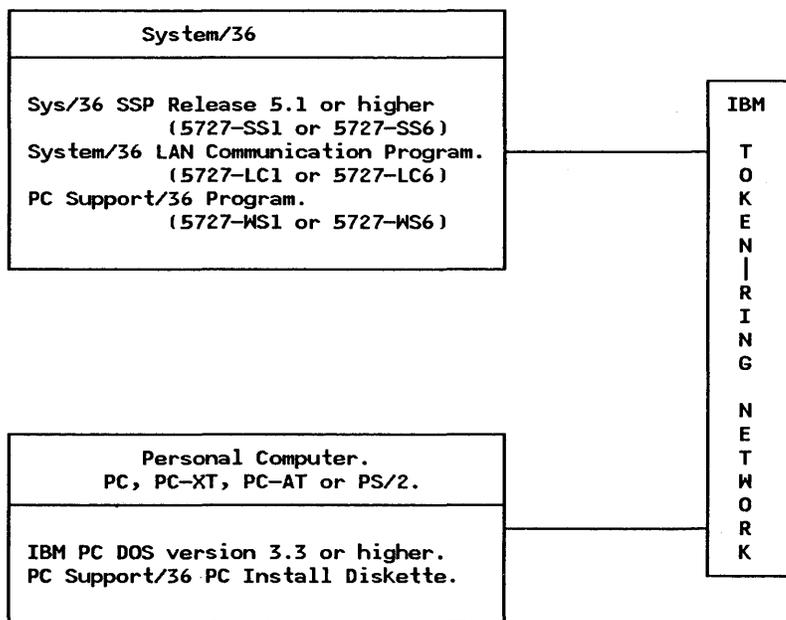


Figure 214. System/36 Communicating With PCs and PS/2s Via The IBM Token-Ring Network

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### 28.2 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 65, "PC Token-Ring Network Adapter Installation" on page 15, and "PS/2 Token-Ring Adapter/A Installation" on page 21.

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)

## 28.3 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. This screen will appear.

```
SYSTEM/36 - PC ATTACHMENT

Select type of attachment

1. Emulation
2. IBM Token-Ring Network
3. 5364 System Console

Select ==> 2
```

- Select option 2: IBM Token-Ring Network.
- Press Enter

7. This screen will now appear.

```
FIXED DISK DRIVE AND DIRECTORY

Enter the drive and directory names in which the PC Support/36
programs are to be installed. To specify the root directory, enter
blanks.

If the directory does not exist, it will be created in the root
directory.

Fixed Disk Drive name..... C

PC Support/36 directory name..... PCS36
```

- In this example the hard disk drive 'C' was used. Any other active drive could be used (A or B if your PC has no hard disk).
- Press Enter.

8. This screen will appear next.

**IBM TOKEN-RING NETWORK**

Enter the values below as specified on the PC Support/36 install form.

PC location name..... EXSCRTY  
System/36 link name..... S5360  
IBM Token-Ring Network Adapter address..... 400051130005  
IBM Token-Ring Network program name..... TOKREUI.COM

Notes:

**PC Location name** This is a symbolic name by which your PC can be identified on the network.

**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 "User's Guide" on page 289.

**IBM Token-Ring Adapter address** This is the address of the System/36 LAN Attachment Adapter. This address was obtained when you ran the diagnostics on the PC-AT that acts as the dedicated LAN Controller for the 5360/5362, or, on the 5363, or Online Problem Determination (OLPD) on the 5364.

Alternatively this could be the user-defined address given the LAN Controller Adapter when it was installed. Refer to chapter "Attaching The System/36 To A Token-Ring Network" on page 65. 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.

**IBM Token-Ring program name** TOKREUI.COM is the name of a file that should have been transferred to your PC hard disk from the Token-Ring Adapter diskette. It contains the Adapter Support Interface program. See "PC Token-Ring Network Adapter Installation" on page 15. Use this name or you can delete it if the LAN Support Device Drivers in the CONFIG.SYS file are to be used.

Leave this field BLANK if you are installing on a PS/2 model 50, 60 or 80. This will allow the Token-Ring device drivers (DXMA0MOD.SYS and DXMC0MOD.SYS) from the LAN Support Program to be used (supplied with the Token-Ring Adapter/a).

9. Press Enter

- If the program TOKREUI.COM is already installed in more than one directory, the following screen will be displayed, allowing you to select the required directory.

**MULTIPLE PROGRAMS FOUND.**

Selected program: TOKREUI.COM

The selected program was found in each of the listed directories:

- 1.\'directory name'
- 2.\'directory name'
- 3.\'directory name'

SELECT ==> \_

- If this screen does appear, select the directory you want to work with and press Enter.
- Otherwise this screen will appear next.

**ADDITIONAL PROGRAM SUPPORT.**

Will you be using:

Organizer? .....(1=Yes, 0=No) 1  
Shared Folders Facility?.....(1=Yes, 0=No) 1  
Work Station Feature?.....(1=Yes, 0=No) 1

- Enter the desired responses. Note that:
  - The Organizer requires both Shared Folders and Workstation Features .
  - The Workstation Feature is required if your PC is to act as a System/36 work station (5250 emulation).

10. Press Enter. The next screens show the progress of the installation.

**INSTALLATION FILE COPY**

The following files will be copied from the PC Support/36 Install diskette to the specified directory. Press ENTER to start.

CFGVDSK.COM	File copied
STARTRTR.EXE	File copied
ITRNRTR.EXE	
STOPRTR.EXE	
VDSK.SYS	
FSDDX.SYS	
FSDD.SYS	

### INSTALLATION COMPLETE

PC Support installation is now complete.

You must now do one of the following:

1. Remove the PC Support/36 INSTALL diskette from drive A:→  
Press the Ctrl-Alt-Del Keys to restart your Personal Computer.  
After the Personal Computer is restarted, Type:  
C:>\PCS36\LINK36

NOTE: You may want to add this command to your Autoexec file.  
or

2. Press ENTER to end.

#### 11. 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\FSDD.SYS
- Device = C:\PCS36\FSDDX.SYS
- Files = 15.

## 28.4 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 chose 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.

On 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 this screen:

```

PC Support/36 Work Station Feature.
Version 1.00 Copyright IBM Corp. 1987

Master profile name
MSF.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.

```

COMMAND          PC SUPPORT/36 ORGANIZER          #2

Select one of the following:

1. Work with Documents
2. Open Mail
3. Send Mail
4. Send Note
5. Work with Calendar
6. DOS Commands
7. PC Support/36 Commands
8. Exit PC Support/36 Organizer

Cmd3-Previous menu   Cmd12-How to use help   Home-Sign on menu

Ready for option number or command
7

```

Select option 7 and the PC Support/36 commands menu will be presented.

Select one of the following:

1. Shared Folder Utilities
2. Work with Virtual Disks
3. Work with Virtual Printers
4. Transfer data from S/36 to PC
5. Transfer data from PC to S/36
6. Profile Options
7. Shared Folders Status

Cmd3-Previous menu

Cmd12-How to use help

Home-Sign on menu

Ready for option number or command

2

Select option 2 and this screen will be presented. Note this is a PC screen.

SET VIRTUAL DISK					
DRIVE	DISK NAME	ACCESS LEVEL	SIZE (KB)	DIR	SIZE
D	.	.	.	.	.
E	.	.	.	.	.
F	.	.	.	.	.
G	.	.	.	.	.
H	#IMPCLD4	Read	1124		96
I	#IMPCLD2	Read	1390		96
J	.	.	.	.	.
K	.	.	.	.	.

OPTIONS	
Select on of these options; press ENTER.	
1	Assign Virtual Disk
2	Release Virtual Disk
3	Create a new Virtual Disk
4	Delete an existing Virtual Disk
5	Exit
Select ==> 3	

Esc = Exit

To create a virtual disk, select option 3 and press Enter.

SET VIRTUAL DISK : CREATE

DRIVE	DISK NAME	ACCESS LEVEL	SIZE (KB)	DIR SIZE
D	.	.	.	.
E	.	.	.	.
F	.	.	.	.
G	.	.	.	.
H	#IWPCLD4	Read	1124	96
I	#IWPCLD2	Read	1390	96
J	.	.	.	.
K	.	.	.	.

Type in requested information; press ENTER

ITEM	CHOICE	POSSIBLE CHOICES
Virtual Disk Name . . . . .	DOUG.VD	Virtual disk to create
Disk size . . . . .	1024	5 - 32765 Kilobytes
Directory size . . . . .	256	16 - 2048 entries
Optional description . . . . .	personal ID or comment	

---

F1=Help    Esc=Exit to Options menu

A message at the lower right-hand corner of the screen will inform you that the virtual disk has been created. The options menu will return.

SET VIRTUAL DISK

DRIVE	DISK NAME	ACCESS LEVEL	SIZE (KB)	DIR SIZE
D	.	.	.	.
E	.	.	.	.
F	.	.	.	.
G	.	.	.	.
H	#IWPCLD4	Read	1124	96
I	#IWPCLD2	Read	1390	96
J	.	.	.	.
K	.	.	.	.

----- OPTIONS -----

Select on of these options; press ENTER.

- 1 Assign Virtual Disk
- 2 Release Virtual Disk
- 3 Create a new Virtual Disk
- 4 Delete an existing Virtual Disk
- 5 Exit

Select ==> 1

Esc = Exit

We can now assign the virtual disk to a drive so that it can be accessed by the PC. Select option '1' and press Enter.

**SET VIRTUAL DISK : CREATE**

DRIVE	DISK NAME	ACCESS LEVEL	SIZE (KB)	DIR SIZE
D	.	.	.	.
E	.	.	.	.
F	.	.	.	.
G	.	.	.	.
H	#IWPCLD4	Read	1124	96
I	#IWPCLD2	Read	1390	96
J	.	.	.	.
K	.	.	.	.

Type in requested information; press ENTER

ITEM	CHOICE	POSSIBLE CHOICES
Drive letter . . . . .	D	D E F G H I J K
Virtual disk name . . . . .	DOUG.VD	Virtual disk to assign
Your access level . . . . .	1	1=Exclusive 2=Read/Write 3=Read

F1=Help    Esc=Exit to Options menu

Fill in the required responses and press Enter.

**SET VIRTUAL DISK : CREATE**

DRIVE	DISK NAME	ACCESS LEVEL	SIZE (KB)	DIR SIZE
D	DOUG.VD	Exclusive	1025	304
E	.	.	.	.
F	.	.	.	.
G	.	.	.	.
H	#IWPCLD4	Read	1124	96
I	#IWPCLD2	Read	1390	96
J	.	.	.	.
K	.	.	.	.

Type in requested information; press ENTER

ITEM	CHOICE	POSSIBLE CHOICES
Drive letter . . . . .	D	D E F G H I J K
Virtual disk name . . . . .	DOUG.VD	Virtual disk to assign
Your access level . . . . .	1	1=Exclusive 2=Read/Write 3=Read

F1=Help    Esc=Exit to Options menu

DOUG.VD was assigned to drive D

Your virtual disk is now assigned and ready to go.

Next let's look at the System/36 as a printer server and assign one of its printers to the PC.

Keep pressing the ESC key until the PC Support/36 commands menu is displayed.

Select one of the following:

1. Shared Folder Utilities
2. Work with Virtual Disks
3. Work with Virtual Printers
4. Transfer data from S/36 to PC
5. Transfer data from PC to S/36
6. Profile Options
7. Shared Folders Status

Cmd3-Previous menu

Cmd12-How to use help

Home-Sign on menu

Ready for option number or command

3

Now select option '3' - Work with virtual printers. This PC screen will be presented.

#### SET VIRTUAL PRINTER

Current configuration	LPT1	LPT2	LPT3
System/36 printer ID	.	.	.
Printer type	.	.	.
Characters per line	.	.	.
Lines per inch	.	.	.
Page length	.	.	.
Lines per page	.	.	.
Number of copies	.	.	.

#### OPTIONS

Select on of these options; press ENTER.

- 1 Assign or change virtual printers
- 2 Release virtual printers
- 3 Close or view print file status
- 4 Advanced options
- 5 Exit

Select ==> 1

Esc=Exit

Select option 1 - Assign or change virtual printers. This screen will be presented.

SET VIRTUAL PRINTER

Current configuration	LPT1	LPT2	LPT3
System/36 printer ID	.	.	.
Printer type	.	.	.
Characters per line	.	.	.
Lines per inch	.	.	.
Page length	.	.	.
Lines per page	.	.	.
Number of copies	.	.	.

Type in requested information; press ENTER.

ITEM	CHOICE	POSSIBLE CHOICES
PC printer . . . . .	1	1=LPT1 2=LPT2 3=LPT3
System/36 printer . . . . .	P1	System/36 printer ID
Characters per inch . . . . .	132	80, 132, 198
Lines per inch . . . . .	6	6, 8 lines
Page length . . . . .	66	1-127 lines
Lines per page . . . . .	66	1-page length
Number of copies . . . . .	1	1-255 copies

F1=Help Esc=Exit to options

After filling in your choices, enter and the next screen will be shown.

SET VIRTUAL PRINTER

Current configuration	LPT1	LPT2	LPT3
System/36 printer ID	P1	.	.
Printer type	5224/25	.	.
Characters per line	132	.	.
Lines per inch	6	.	.
Page length	66	.	.
Lines per page	66	.	.
Number of copies	1	.	.

Type in requested information; press ENTER.

ITEM	CHOICE	POSSIBLE CHOICES
PC printer . . . . .	1	1=LPT1 2=LPT2 3=LPT3
System/36 printer . . . . .	P1	System/36 printer ID
Characters per inch . . . . .	132	80, 132, 198
Lines per inch . . . . .	6	6, 8 lines
Page length . . . . .	66	1-127 lines
Lines per page . . . . .	66	1-page length
Number of copies . . . . .	1	1-255 copies

F1=Help Esc=Exit to options  
LPT1 has been assigned with specified values

Your System/36 is now also a printer server.

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.

## **28.5 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 Adapter card.

## **28.6 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.*

## **28.7 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.

## 29.0 System/36 Advanced Program-to-Program Communication (APPC)

### 29.1 APPC Peer Communication

#### 29.1.1 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).

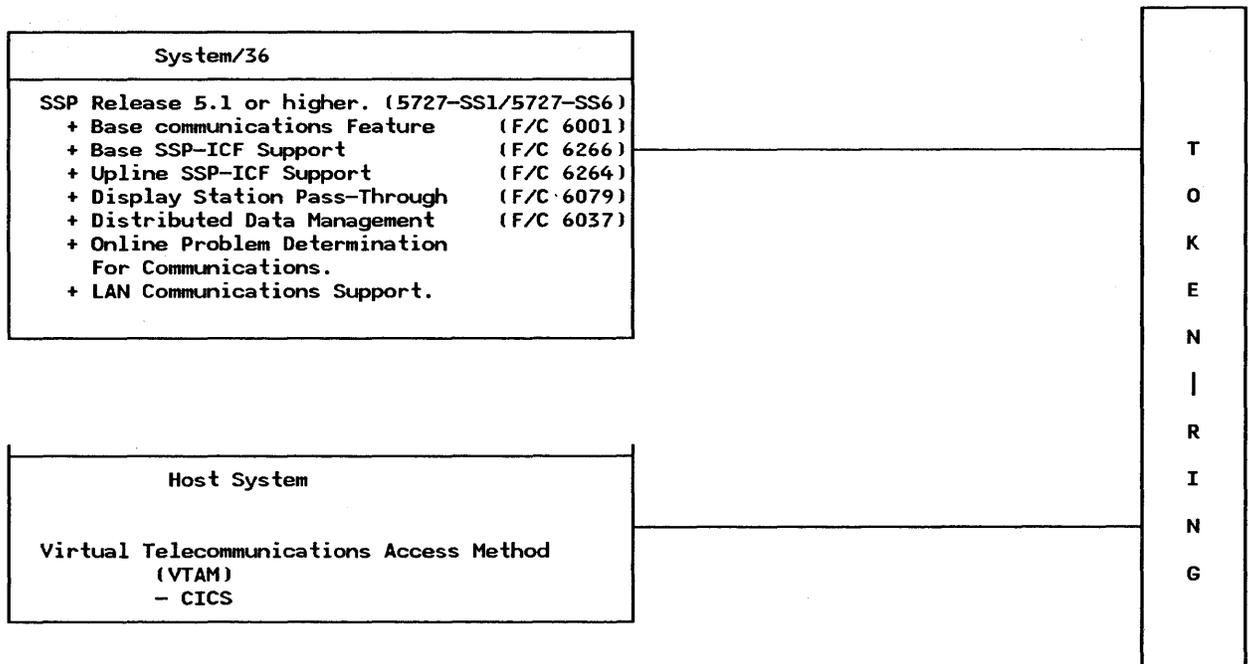


Figure 215. System/36 Communicating With Peer or Host Systems on The IBM Token-Ring Network

## 29.1.2 Planning Checklist

- The latest level of the System Support Program must be installed on all systems communicating with each other, (SSP Rel. 5.1 on the System/36) and must include the following features:
  - Base Communication Feature
  - Base SSP-ICF Support
  - LAN Communications Support
  - Display Station Pass-through Support.

## 29.1.3 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 65 sections "Hardware Installation" on page 70, and in the sections, "Software Installation" on page 73.

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 screen will be displayed.

```
SSP-ICF CONFIGURATION MEMBER DEFINITION.

1. Configuration member name ..... APPCLINE
2. Library name ..... #COMMLIB
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 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.
- 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.
- In this case you will select option 1: "Create a new member".

2. After entering your responses as prompted, this screen will be displayed.

```
                SSP-ICF CONFIGURATION MEMBER TYPE.

Select one of the following options

    1. Intra
    2. BSC
    3. SNA
    4. Async
    5. PC Support/36

Option 3
```

- Select option 3: SNA. This means you are creating a line member using System Network Architecture. APPC is supported with SNA.

3. The following screen will be displayed.

```
                SNA CONFIGURATION MEMBER TYPE

SNA member type .....1-4 4
    1. SNA subsystem member
    2. SNA/SDLC line member
    3. SNA/X.25 line member
    4. SNA/IBM Token-Ring line member
```

- Select option 4. This indicates that you are configuring a SNA/ IBM Token-Ring line member and therefore the line definition will include Token-Ring support.

4. Selecting option 4 will cause this screen to be displayed.

```
                SNA CONFIGURATION MEMBER TYPE

1. SNA member type .....1-4 4
    1. SNA subsystem member
    2. SNA/SDLC line member
    3. SNA/X.25 line member
    4. SNA/IBM Token-Ring line member

2. Will APPC or APPN be used? .....Y,N Y
```

- Since we are defining an APPC line, we must enter 'Y' for yes.

5. The following screen will be displayed.

```
                SNA LINE MEMBER ATTRIBUTES.

6. Local system's station XID in hexadecimal ..... 00001
7. Source Service Access Point (SSAP) value ..... 04
```

- **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.
- **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).

6. Enter the responses shown in the example and this screen will be displayed.

```

                REMOTE SYSTEM SELECTION

1. Select from the following options
  1. Create

      Option . . . . . 1
2. Remote system name . . . . . SYS36B

.....
OPTION  REMOTE SYSTEM  OPTION  REMOTE SYSTEM  OPTION  REMOTE SYSTEM

```

- "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.

7. Enter the responses shown in the example and this next screen is displayed.

```

                REMOTE SYSTEM ATTRIBUTES

1. Remote system type . . . . . 2
  1 = HOST             2 = PEER

```

8. In this example we are configuring for peer communication so enter the response shown and this screen will be displayed.

```

                REMOTE SYSTEM ATTRIBUTES

1. Remote system type . . . . . 2
  1 = HOST             2 = PEER

3. Remote system's block id in hexadecimal . . . . . 03E

4. Remote system's station XID in hexadecimal . . . . . 00002

```

- Remote system's Block ID specifies the three-digit hexadecimal character block identification for the remote system. The default value shown is unique to the System/36 and should therefore be used.
- 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.

9. Enter the responses shown and this next screen is displayed.

REMOTE SYSTEM ATTRIBUTES	
1. Remote adapter address	400051130007
2. Destination Service Access Point (DSAP) value	10

- Remote adapter address is the hexadecimal address of the Token-Ring adapter in the remote system. This is the same address that was determined when the adapter was installed.
- 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.

10. Enter the responses shown. This screen is displayed.

REMOTE SYSTEM SELECTION	
1. Select from the following options	
1. Create	3. Create from existing
2. Edit	4. Remove
5. Review	
Option	1
2. Remote system name	SYS36B
.....	
OPTION	REMOTE SYSTEM
	SYS36B
OPTION	REMOTE SYSTEM
OPTION	REMOTE SYSTEM

- This completes the line configuration.
- We now have to configure the subsystem that will use this line to establish communication.  
Press CMD 7.

11. This returns you to the first screen. Now we will configure the subsystem.

SSP-ICF CONFIGURATION MEMBER DEFINITION.	
1. Configuration member name	APPCSUBS
2. Library name	#COMMLIB
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

- Note that the member name has changed since this is a new member.

12. Press the Enter key and this screen will be displayed.

**SSP-ICF CONFIGURATION MEMBER TYPE.**

Select one of the following options

- 1. Intra
- 2. BSC
- 3. SNA
- 4. Async
- 5. PC Support/36

Option 3

- Select Option 3: SNA. This means you are creating a subsystem member using System Network Architecture. APPC is supported with SNA.

13. Press Enter and this screen will be displayed.

**SNA CONFIGURATION MEMBER TYPE**

SNA member type .....1-4 1  
1. SNA subsystem member  
2. SNA/SDLC line member  
3. SNA/X.25 line member  
4. SNA/IBM Token-Ring line member

- Select Option 1 to create an SNA subsystem member.

14. This screen is displayed.

**SNA SUBSYSTEM MEMBER SELECTION**

1. Select subsystem type from the following options  
1. Peer  
2. SNA Upline  
3. SNA 3270  
4. Finance  
5. SNA MSRJE  
6. APPC  
7. APPN  
Option ..... 1-7 6

- As we are defining an APPC subsystem, select Option 6.

15. ENTER the response shown and this next screen will be displayed.

**SNA SUBSYSTEM MEMBER SELECTION**

1. Select subsystem type from the following options

- 1. Peer
- 2. SNA Upline
- 3. SNA 3270
- 4. Finance
- 5. SNA MSRJE
- 6. APPC
- 7. APPN

Option . . . . . 1-7    6

2. Line member name . . . . . APPCLINE

- 2. The line member name entered here is the same one just defined.
16. ENTER the response shown and this screen will be displayed.

**SUBSYSTEM MEMBER DEFINITION**

1. Local location name . . . . . LAB5360

- The name you assign here is the name by which this system will be identified on the network.
17. ENTER the response shown and this screen will be displayed.

**REMOTE LOCATION SELECTION**

1. Select from the following options

- 1. Create

Option . . . . . 1

2. Remote location name . . . . . LAB5364

3. Remote system name . . . . . SYS36B

.....

OPTION	LOCATION	REMOTE SYSTEM
		SYS36B

- On this screen you describe the remote system.
18. This screen is displayed next.

**REMOTE LOCATION SELECTION**

1. Select from the following options  
 1. Create

Option . . . . . 1  
 2. Remote location name . . . . . LAB5364  
 3. Remote system name . . . . . SYS36B

.....  
 OPTION      LOCATION      REMOTE SYSTEM  
                  LAB5364              SYS36B

Configuration of the member is now complete. Press CMD 7 twice to exit the CNFIGICF procedure.

**NOTES.**

- 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 Enter. (This command can be included in the "STARTUP2" procedure to cause the subsystem to be enabled automatically at IPL.)
  - Key "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 following screen will be displayed.

Complete		SUBSYSTEM STATUS				WX	
CONFIG NAME	CONFIG TYPE	LINE	LOCATION NAME	STATUS	COMMUNI- CATING	—NO. OF EVOKED	SESSIONS— ACQUIRED
APPCSUBS	APPC	9	LAB5364	ENABLED	Y	—	—
TR5360	PCS/36	9	PS2M80	ENABLED	Y	004	—

Cmd7-End      Cmd8-Help      Cmd15-Update      Cmd16-Restart      Roll-Page

---

CNTLLINE

Start or stop communication lines

1. Start a subsystem	6. Control APPC
2. Stop a subsystem	7. Control alert support
3. Start monitoring a BSC line	
4. Stop monitoring a BSC line	

Ready for option number or command

You have now established communication between peer systems across an IBM Token-Ring Network.

## 29.1.4 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 "STRTGRP" command is used to start a communications session between the two systems. The session need only be started at one system for 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 resides on the remote system.
  - Enter the command 'STRTGRP (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.

## 29.1.5 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.

## 29.2 *APPC Host Communication*

### 29.2.1 Planning Checklist

The System/36 requirements for host communication are the same as for PEER (see "Planning Checklist" on page 298) 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.

### 29.2.2 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 27 and "3745" on page 39. 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 this screen will be displayed.

<b>SSP-ICF CONFIGURATION MEMBER DEFINITION.</b>		
1. Configuration member name .....		HOSTLINE
2. Library name .....		#COMMLIB
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 of the member you want to work with.
- 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.

Enter your responses as prompted. In this case you will select option 1: "Create a new member".

2. This screen will be displayed.

**SSP-ICF CONFIGURATION MEMBER TYPE.**

Select one of the following options

1. Intra
2. BSC
3. SNA
4. Async
5. PC Support/36

Option 3

- Option 3: SNA creates a line or subsystem member using System Network Architecture. It also allows the description of APPC and APPN line and subsystem members.

Select Option 3 and press ENTER.

3. The next screen will be displayed.

**SNA CONFIGURATION MEMBER TYPE**

SNA member type .....1-4 4

1. SNA subsystem member
2. SNA/SDLC line member
3. SNA/X.25 line member
4. SNA/IBM Token-Ring line member

- Option 4: SNA/IBM Token-Ring line member. Every subsystem must have an associated line member. If the line type and mode of communicating are the same, then the same line member can be used by more than one subsystem.
- Select option 4 and press Enter.

4. This screen will be displayed.

**SNA CONFIGURATION MEMBER TYPE**

1. SNA member type .....1-4 4

1. SNA subsystem member
2. SNA/SDLC line member
3. SNA/X.25 line member
4. SNA/IBM Token-Ring line member

2. Will APPC or APPN be used? .....Y,N Y

- For host communication on the Token-Ring Network we will need APPC.
- ENTER 'Y' for yes.

5. This screen will be displayed next.

**SNA LINE MEMBER ATTRIBUTES.**

6. Local system's station XID in hexadecimal ..... 0010

7. Source Service Access Point (SSAP) value ..... 04

- **XID.** Exchange Identifier is used to identify this System/36. Specify a hexadecimal number between 00000 and FFFFF. When using APPC, SNA Upline Facility (SNUF), SNA 3270 Device Emulation or SNA MSRJE, this XID must be the same as the value specified for the IDNUM parameter of the PU macro instructions during NCP/VTAM/ACF generation at the host.
- **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,10,14....FC), and must match the remote system's DSAP.

6. Enter the responses shown in the example and this screen will be displayed.

```

      REMOTE SYSTEM SELECTION

1. Select from the following options
  1. Create

      Option . . . . . 1
2. Remote system name . . . . . HOST370

.....
OPTION  REMOTE SYSTEM  OPTION  REMOTE SYSTEM  OPTION  REMOTE SYSTEM

```

- 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.

7. Enter the responses shown in the example. This screen is displayed.

```

      REMOTE SYSTEM ATTRIBUTES

1. Remote system type . . . . . 1
  1 = HOST          2 = PEER

```

- Option 1: The remote system will be a host for SNA Upline Facility (SNUF), SNA 3270 Device Emulation, SNA MSRJE or APPC subsystem.
- Option 2: The remote system can be a peer for APPC or APPN subsystems.

8. Enter the response shown in the example. This screen is displayed.

```

      REMOTE SYSTEM ATTRIBUTES

      Remote System HOST370
1. Remote system type . . . . . 1
  1 = HOST          2 = PEER

      8. SSCP identification . . . . . 0-65535    00000

```

- **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.

9. Enter the appropriate response and the next screen will be displayed.

REMOTE SYSTEM ATTRIBUTES	
Remote system HOST370	
1. Remote adapter address	400001130000
2. Destination Service Access Point (DSAP) value	04
3. Set INACTIVE status on host on disable?	Y,N N

- 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.
- 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.
- 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.

10. Enter the appropriate response. The following screen is displayed.

REMOTE SYSTEM LOGICAL UNIT ASSIGNMENTS						HOSTLINE			
Specify the subsystem associated with each LU.									
A-SNUF		B-3270		C-MSRJE		D-APPC or APPN		E-DHCF	
F-DHCF (ideographic)		G-Point of sale							
LU Code	LU Code	LU Code	LU Code	LU Code	LU Code	LU Code	LU Code	LU Code	LU Code
1 A	2 A	3 A	4 A	5 B	6 B	7 B	8 B		
9 ..	10 ..	11 ..	12 ..	13 ..	14 ..	15 ..	16 ..		
17 ..	18 ..	19 ..	20 ..	21 ..	22 ..	23 ..	24 ..		
.....									
249 ..	250 ..	251 ..	252 ..	253 ..	254 ..	255 ..			

- 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.

11. Enter the appropriate responses. This following screen will be displayed.

```

                                REMOTE SYSTEM SELECTION          HOSTLINE

1. Select from the following options
  1. Create    3. Create from existing    5. Review
  2. Edit     4. Remove

Option . . . . . -
2. Remote system name . . . . .
3. Existing remote system name . . . . .

.....
OPTION  REMOTE SYSTEM  OPTION  REMOTE SYSTEM  OPTION  REMOTE SYSTEM
      HOST370

```

- This completes the line configuration.
- We now have to configure the subsystem that will use this line to establish host communication.
- Press CMD 7.

12. The first screen will be presented again. Now we are configuring the host subsystem.

```

                                SSP-ICF CONFIGURATION MEMBER DEFINITION.

1. Configuration member name ..... HOSTSUBS
2. Library name ..... #COMMLIB

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

```

- Note that the member name has changed since this is a new member.

13. The next screen is exactly the same as it was when we configured the line member and the response is also the same.

14. On the next screen this time we are configuring an SNA subsystem member.

```

                                SNA CONFIGURATION MEMBER TYPE

SNA member type .....1-4  1
  1. SNA subsystem member
  2. SNA/SDLC line member
  3. SNA/X.25 line member
  4. SNA/IBM Token-Ring line member

```

15. Select option 1 to create the subsystem member and press Enter.

This screen will be displayed.

```

                SNA SUBSYSTEM MEMBER SELECTION

1. Select subsystem type from the following options
  1. Peer
  2. SNA Upline
  3. SNA 3270
  4. Finance
  5. SNA MSRJE
  6. APPC
  7. APPN
Option . . . . . 1-7      6

```

- Select option 6 to configure APPC.
16. This screen is then displayed.

```

                SNA SUBSYSTEM MEMBER SELECTION

1. Select subsystem type from the following options
  1. Peer
  2. SNA Upline
  3. SNA 3270
  4. Finance
  5. SNA MSRJE
  6. APPC
  7. APPN
Option . . . . . 1-7      6

2. Line member name . . . . . HOSTLINE

```

- Enter the response shown.
  - Note that line member we are using is the same one just configured.
17. This screen will be displayed next.

```

                REMOTE LOCATION SELECTION                HOST370

1. Select from the following options
  1. Create

Option . . . . . 1
2. Remote location name . . . . . LABS370
3. Remote system name . . . . . HOST370

.....
OPTION   LOCATION   REMOTE SYSTEM
                HOST370

```

- 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.
  - Enter the responses shown.
18. This screen will be displayed.

REMOTE LOCATION SELECTION		HOST370
1. Select from the following options		
1. Create		
Option	.....	1
2. Remote location name	.....	LABS370
3. Remote system name	.....	HOST370
.....		
OPTION	LOCATION	REMOTE SYSTEM
	LABS370	HOST370

Configuration of the member is now complete. Press CMD 7 twice to exit the CNFIGICF procedure.

### 29.2.3 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 the command "D I" and the following screen will be displayed.

Complete		SUBSYSTEM STATUS				WX	
CONFIG NAME	CONFIG TYPE	LINE	LOCATION NAME	STATUS	COMMUNI- CATING	—NO. OF EVOKED	SESSIONS— ACQUIRED
APPCSUBS	APPC	9	LAB5364	ENABLED	Y	—	—
TR5360	PCS/36	9	PS2M80	ENABLED	Y	004	—
Cmd7-End	Cmd8-Help	Cmd15-Update	Cmd16-Restart	Roll-Page			
CNTLLINE							
Start or stop communication lines							
1. Start a subsystem				6. Control APPC			
2. Stop a subsystem				7. Control alert support			
3. Start monitoring a BSC line							
4. Stop monitoring a BSC line							
Ready for option number or command							

- 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.

### 29.2.4 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.

## 29.2.5 Where to Go for More Information

There are several IBM publications that deal with communications on 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.*

## 29.2.6 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.



## **30.0 System/36 Distributed Data Management (DDM)**

### ***30.1 Overview***

DDM is a feature of the System/36 System Support Program that extends the function of disk management to access data that is stored on disk at a remote system.

DDM controls the processing of remote files. It enables application programs being executed on one System/36 (the source system) to access data files stored on another system (the target system). DDM uses the APPC support to establish distributed file processing between two or more systems.

The functions of DDM are to:

1. Allow access to data in files on remote systems.
2. Create and/or delete files on remote systems.
3. List the VTOC, data or Network Resource Directory (NRD) of a remote file.
4. Copy, save or restore remote files.
5. Sort remote files.
6. Move library members between systems.

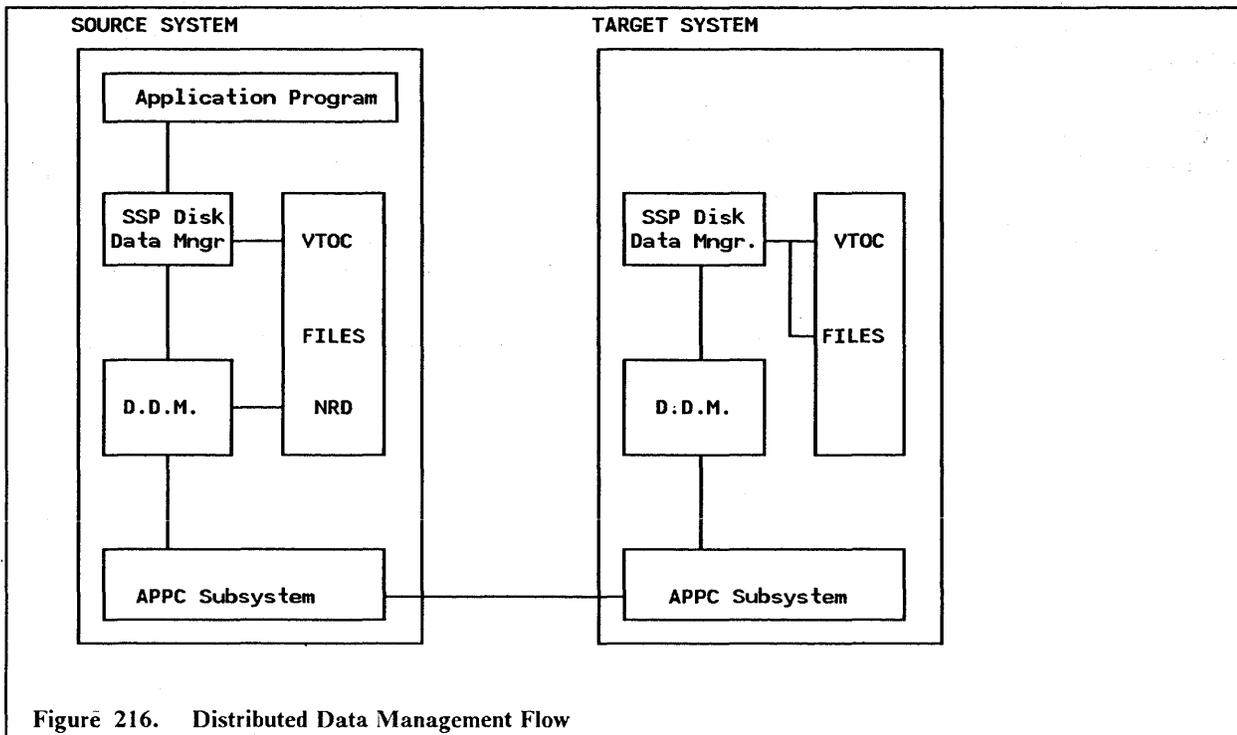


Figure 216. Distributed Data Management Flow

## 30.2 Planning Checklist

Each System/36 that uses DDM for remote file processing must have installed:

- The SSP Communications feature.
  - Make sure that the SSP communications feature (#6001) is installed on your own, and on each remote System/36 with which you intend to perform remote file processing. You can check this on each system by reviewing CNFIGSSP. For information on installing this feature, refer to the *System/36 Changing Your System Configuration* manual.
- The DDM feature.
  - Ensure that this feature is also installed on both the local and remote system. This can be achieved in the same manner as described for the SSP Communications feature.
- APPC communications support.

An APPC subsystem has to be configured in which the target system is identified. Information on how to do this is explained in the section "System/36 Advanced Program-to-Program Communication (APPC)" on page 297

Note: If you are already using an APPC subsystem to communicate with another system, you may be able to change your APPC configuration so that DDM can run concurrently with other APPC applications using the same subsystem.

## 30.3 Installation

An APPC Subsystem must be configured on both the source and target systems. Refer to "Using The System/36 on The LAN" on page 283; for information on how to do this.

Ascertain the names (VTOC entries) of the files you wish to access on the target system. These are the names you must use for the "Remote Label" when you are adding the entries in the Network Resource Directory.

You must create a Network Resource Directory (NRD) on the source System/36 and on any System/36 that will be used as a relay system to other System/36s. (No NRD is required on a non-relaying target system.)

1. In order to create a NRD, enter the procedure command EDITNRD. The system will check to see if the directory already exists. If one does not exist, you will be presented with this screen.

```

NETWORK RESOURCE DIRECTORY

Creates a new directory
Number of entries . . . . . 1-9999 ....
Preferred disk location. . . . A1,A2,A3,A4,block number .... *
```

Here you indicate how many remote files you want to access and the disk location where you want the directory to reside.

- Number of entries indicate the amount of remote files to be contained in the NRD. You must enter a number from 1 to 9999. The directory is created as an extendable disk file labeled #NRD.FLE.
- Preferred disk location indicates where you want the file placed. This field is optional; if it is not filled in the system will allocate the space for the file.

2. Enter the required responses and the file will be created.

Having created the NRD, or if it had already been created, then the EDITNRD command will present this screen:

```

NETWORK RESOURCE DIRECTORY

Edits entries in the directory

Scan for local label . . . . .

-----
Local   Remote   Remote
Label   Location  Label

Cmd4-Delete  Cmd6-Print  Cmd7-end  Cmd8-Reset  Cmd10-add  Roll Keys-Page
```

3. As can be seen, you may perform any of the following functions from here:

- ADD new file entries to the directory.
- EDIT existing entries.
- SCAN for a specific local label within the directory.
- DELETE remote files from the directory.
- PRINT all the entries in the directory.

4. First let us add some entries to the NRD. Press CMD-10 keys. The "add" screen looks like this:

NETWORK RESOURCE DIRECTORY		
Adds entries to the directory		
Local Label	Remote Location	Remote Label
REM01	LAB5364	A.PGMI
REM02	LAB5364	PD1.CTRL

Cmd4-Delete   Cmd6-Print   Cmd7-end   Cmd8-Reset   Cmd10-add   Roll Keys-Page

After keying in the list of files you wish to access remotely, press the Enter key and then CMD-7 to end addition.

It is recommended that some standard naming convention be adopted that will indicate on which machines the files physically reside, for example, A.INVENT, B.INVENT, A.PAYMAST, B.PAYMAST, etc. This will assist greatly in the preparation of OCLs and in problem determination.

### 30.4 User's Guide

All that is necessary for you to use DDM is that the NRD be created and the files on the remote system that you wish to use be described in it. Then the "File" statement will refer to the "Local Label" as though the file existed on the local machine. Of course the APPC subsystems on both machines must be active.

An example of the use of DDM where data is transmitted from one system to another best demonstrates some of its uses. In this example we have two System/36s, both connected to the same Token-Ring Network and both having APPC and DDM configured. We are going to transfer a library named #POPLIB from system-A to system-B. System-A is a 5360 named LAB5360 in the APPC subsystem and system-B is a 5364 named LAB5364.

Since DDM will only access remote files, we first have to copy the library on the donor system to a file. Use the 'FROMLIBR' utility to do this:

```
( FROMLIBR ALL,LIBRARY,POPFIL, F1,T,100,#POPLIB )
```

Next we add an entry to the NRD of system-B to identify the file.

NETWORK RESOURCE DIRECTORY		
LOCAL LABEL	REMOTE LOCATION	REMOTE LABEL
POP	LAB5360	POPFIL

Now use the copy utility to copy the file from system-A to system-B and the build library utility to build #POPLIB on system-B and copy the contents of popfile to this library. You now have a copy of #POPLIB on your system-B.

NOTE: Password and resource security is maintained with the use of DDM. If either or all systems have password security invoked, you can:

- Limit access to the target system, and verify the identity of the source system.

- Limit access to specific remote files, and also which users can access them and with what levels of access.

## ***30.5 Basic Troubleshooting***

Errors detected while the NRD is being created or used will generate error messages which will be displayed at the user's display station. These messages will take the form NRD-xxxx or occasionally it will be a system message in the form SYS-xxxx where 'xxxx' is a four-digit identification code. Complete descriptions of these error messages and methods of recovery are listed in the *System/36 Distributed Data Management Guide* and the *System/36 System Messages Manual*.

## ***30.6 Where to Go for More Information***

A very comprehensive coverage of DDM and its uses is to be found in the manual *System/36 Distributed Data Management Guide SC21-8011*.

## ***30.7 Migration Issues***

DDM is upgraded along with the System Support Programs; therefore a new copy is shipped with each upgrade or new release of the SSP.



## 31.0 System/36 3270 Device Emulation

### 31.1 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.

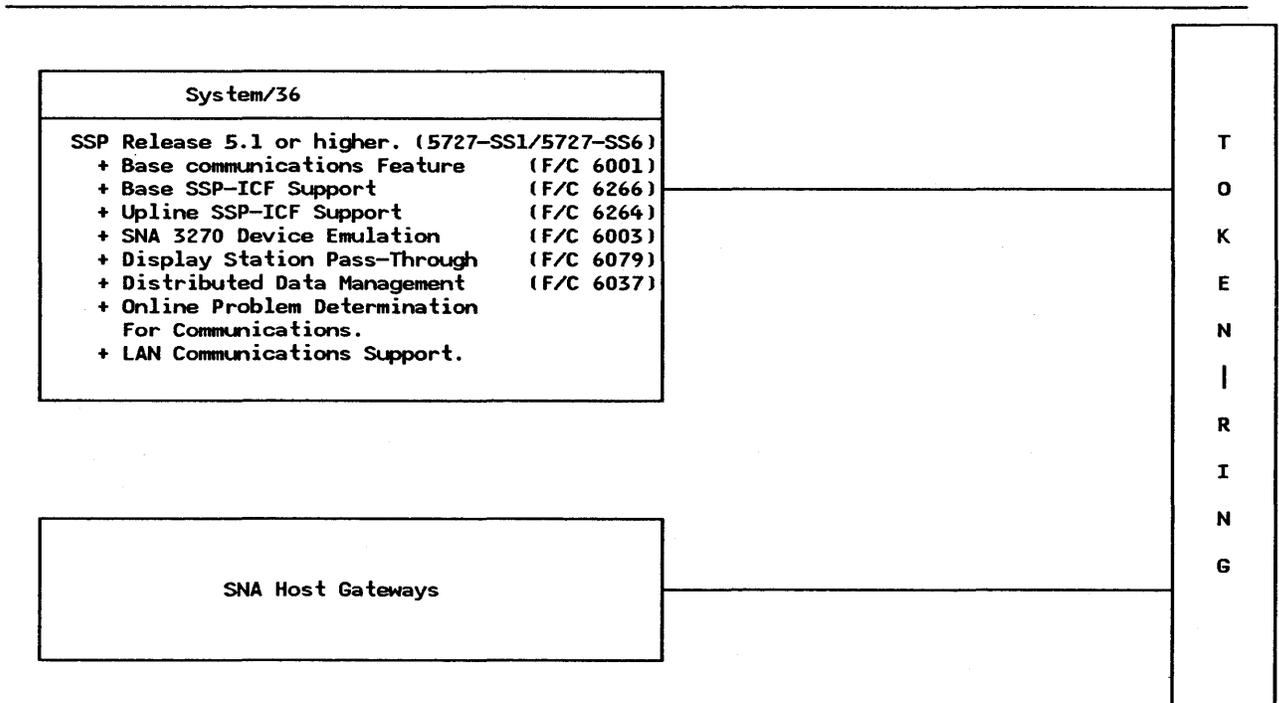


Figure 217. System/36 Communicating With Peer or Host Systems on The IBM Token-Ring Network

### 31.2 Planning Checklist

- The latest level of the System Support Program must be installed on the Systems/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 Sys/36 are to be used as workstations in emulation mode).

### 31.3 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 65, and in the sections "Hardware Installation" on page 70 and "Software Installation" on page 73.

Connection of the host system to the network is described in sections "9370 Hardware" on page 27, "3745" on page 39, and "37XX Gateway and Downstream PUs" on page 265 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 this screen will be displayed.

```

SSP-ICF CONFIGURATION MEMBER DEFINITION.

1. Configuration member name ..... HOSTLINE
2. Library name ..... #COMMLIB
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 of the member you want to work with.
- 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.

Enter your responses as prompted. In this case you will select option 1: "Create a new member".

2. This screen will be displayed.

SSP-ICF CONFIGURATION MEMBER TYPE.

Select one of the following options

- 1. Intra
- 2. BSC
- 3. SNA
- 4. Async
- 5. PC Support/36

Option 3

- Option 3: SNA - Creates a line or subsystem member using System Network Architecture. Select option "3" and press Enter.

3. The next screen will be displayed.

SNA CONFIGURATION MEMBER TYPE

- SNA member type .....1-4 4
- 1. SNA subsystem member
  - 2. SNA/SDLC line member
  - 3. SNA/X.25 line member
  - 4. SNA/IBM Token-Ring line member

- Option 4: SNA/IBM Token-Ring line member. Every subsystem must have an associated line member. If the line type and mode of communicating is the same, then the same line member can be used by more than one subsystem.
- Select option 4 and press Enter.

4. This screen will be displayed.

SNA CONFIGURATION MEMBER TYPE

1. SNA member type .....1-4 4
- 1. SNA subsystem member
  - 2. SNA/SDLC line member
  - 3. SNA/X.25 line member
  - 4. SNA/IBM Token-Ring line member
2. Will APPC or APPN be used? .....Y,N Y

- 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.
- Enter the appropriate response.

5. This screen will be displayed next.

SNA LINE MEMBER ATTRIBUTES.

6. Local system's station XID in hexadecimal ..... 00010
7. Source Service Access Point (SSAP) value ..... 04

- **XID.** Exchange Identifier is used to identify this System/36. Specify a hexadecimal number between 00000 and FFFFF. When using APPC, SNA Upline Facility, SNA 3270 Device Emulation or SNA MSRJE, this XID must be the same as the value specified for the IDNUM parameter of the PU macro instructions during NCP/VTAM/ACF generation at the host. If you are using APPC or APPN for peer communication, then this value must match the remote system's station XID.
- **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 (i.e. 04,08,0C,10,14....FC), and match the remote system's DSAP.

6. Enter the responses shown in the example and this screen will be displayed.

```

                                REMOTE SYSTEM SELECTION

1. Select from the following options
  1. Create

      Option . . . . . 1
2. Remote system name . . . . . HOST370

.....
OPTION REMOTE SYSTEM  OPTION REMOTE SYSTEM  OPTION REMOTE SYSTEM

```

- "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.

7. Enter the responses shown in the example. This screen is displayed.

```

                                REMOTE SYSTEM ATTRIBUTES

1. Remote system type . . . . . 1
  1 = HOST          2 = PEER

```

- Option 1: The remote system will be a host for SNUF, SNA 3270 Device Emulation, MSRJE or APPC subsystem.

8. Enter the response shown in the example. This screen is displayed.

```

                                REMOTE SYSTEM ATTRIBUTES

                                Remote System HOST370
1. Remote system type . . . . . 1
  1 = HOST          2 = PEER

8. SSCP identification . . . . . 0-65535  00000

```

- **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.

9. Enter the appropriate response and the next screen will be displayed.

REMOTE SYSTEM ATTRIBUTES	
Remote system HOST370	
1. Remote adapter address	400001130000
2. Destination Service Access Point (DSAP) value	04
3. Set INACTIVE status on host on disable?	Y,N N

- 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 gateway adapter.
- 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.
- 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.

10. ENTER the appropriate response. The following screen is displayed.

REMOTE SYSTEM LOGICAL UNIT ASSIGNMENTS						HOSTLINE			
Specify the subsystem associated with each LU.									
A-SNUF		B-3270		C-MSRJE		D-APPC or APPN		E-DHCF	
F-DHCF (ideographic)		G-Point of sale							
LU Code	LU Code	LU Code	LU Code	LU Code	LU Code	LU Code	LU Code	LU Code	LU Code
1 B	2 B	3 B	4 B	5 ..	6 ..	7 ..	8 ..		
9 ..	10 ..	11 ..	12 ..	13 ..	14 ..	15 ..	16 ..		
17 ..	18 ..	19 ..	20 ..	21 ..	22 ..	23 ..	24 ..		
.....									
249 ..	250 ..	251 ..	252 ..	253 ..	254 ..	255 ..			

- The following screens allow you to specify which of the possible 255 logical units are to be used by the remote subsystem. You must assign ALL the LUs that are 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.

11. ENTER the appropriate responses. This following screen will be displayed.

```

                                REMOTE SYSTEM SELECTION                HOSTLINE

1. Select from the following options
  1. Create   3. Create from existing   5. Review
  2. Edit    4. Remove

Option . . . . . -
2. Remote system name . . . . .
3. Existing remote system name . . . . .

.....
OPTION  REMOTE SYSTEM  OPTION  REMOTE SYSTEM  OPTION  REMOTE SYSTEM
      HOST370

```

- 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.

12. The first screen will be presented again. Now we are configuring the subsystem for 3270 emulation.

```

                                SSP-ICF CONFIGURATION MEMBER DEFINITION.

1. Configuration member name ..... EM3270SS
2. Library name ..... #COMMLIB

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

```

- Note that the member name has changed since this is a new member.

13. The next screen is exactly the same as it was when we configured the line member and the response is also the same.

14. On the next screen we are configuring an SNA subsystem member.

```

                                SNA CONFIGURATION MEMBER TYPE

SNA member type .....1-4  1
  1. SNA subsystem member
  2. SNA/SDLC line member
  3. SNA/X.25 line member
  4. SNA/IBM Token-Ring line member

```

15. Select Option 1 to create the subsystem member and ENTER.

This screen will be displayed.

```

                                SNA SUBSYSTEM MEMBER SELECTION

1. Select subsystem type from the following options
  1. Peer
  2. SNA Upline
  3. SNA 3270
  4. Finance
  5. SNA MSRJE
  6. APPC
  7. APPN
Option . . . . . 1-7      3

```

- Select Option 3 to configure a SNA 3270 subsystem.

16. This screen is then displayed.

```

                                SNA SUBSYSTEM MEMBER SELECTION

1. Select subsystem type from the following options
  1. Peer
  2. SNA Upline
  3. SNA 3270
  4. Finance
  5. SNA MSRJE
  6. APPC
  7. APPN
Option . . . . . 1-7      3

2. Line member name . . . . . HOSTLINE

```

- Enter the response shown.
- Note that line member we are using is the same one just configured.

17. This screen will be displayed next.

```

                                REMOTE LOCATION SELECTION                                HOST370

1. Select from the following options
  1. Create

Option . . . . . 1
2. Remote location name . . . . . LABHOST
3. Remote system name . . . . . SYS3

.....
OPTION  LOCATION  REMOTE SYSTEM
                   SYS3

```

- 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.

- Enter the responses shown.

18. This screen will be displayed.

```

REMOTE LOCATION SELECTION                                HOST370

1. Select from the following options
  1. Create

Option . . . . . 1
2. Remote location name . . . . . LABHOST
3. Remote system name . . . . . SYS3

.....
OPTION      LOCATION  REMOTE SYSTEM
          LABHOST    SYS3

```

19. The next screen to be displayed is:

```

30.0          REMOTE LOCATION DEFINITION                EM3270SS X

Remote system SYS3          Remote location LABHOST

1. Activate location at enable? . . . . .Y,N  Y

```

- The answer to this prompt should be yes if this is the only remote location in this subsystem member.

20. This screen will be displayed next:

```

40.0      SNA 3270 SUBSYSTEM MEMBER DEVICE ATTRIBUTES    EM3270SS  X1

Remote system SYS3      Remote location LABHOST    Page 1 of 2

1. Logical unit address . 1-255  001  002  003  004  005  006  007  008
2. Device type* . . . . 2,3,5,6  2    2    2    3    3    2    2    2
3. S/36 logical ID. . . . . WA    WB    WC    X1   X2   X3   X4   X5
4. Lowercase? . . . . . Y,N    N    -    -    -    -    -    -    -

5. Logical unit address . 1-255  ___  ___  ___  ___  ___  ___  ___  ___
6. Device type* . . . . 2,3,5,6  -    -    -    -    -    -    -    -
7. S/36 logical ID. . . . . ___  ___  ___  ___  ___  ___  ___  ___
8. Lowercase? . . . . . Y,N    -    -    -    -    -    -    -    -

* 2-3270 Display  3-3270 with numeric lock  5-328x printer
  6-3278/9 Emulation via IBM PC

Cmd3-Previous display      Cmd5-Restart CNFIGICF
Cmd7-End                   Cmd19-Cancel          Copr IBM Corp. 1986

```

- 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.
- 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.
- Enter appropriate responses as per the S/36 configuration.

Configuration of the member is now complete. Press CMD 7 twice to exit the CNFIGICF procedure.

## 31.4 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 following screen will be displayed.

Complete		SUBSYSTEM STATUS				WX	
CONFIG NAME	CONFIG TYPE	LINE	LOCATION NAME	STATUS	COMMUNI- CATING	—NO. OF EVOKED	SESSIONS— ACQUIRED
TR5360	PCS/36	9	PS2M80	ENABLED	Y	004	—
EM3270SS	3270SNA	9	LABHOST	ENABLED	Y	—	—

Cmd7—End      Cmd8—Help      Cmd15—Update      Cmd16—Restart      Roll—Page

---

CNTLLINE

Start or stop communication lines

1. Start a subsystem	6. Control APPC
2. Stop a subsystem	7. Control alert support
3. Start monitoring a BSC line	
4. Stop monitoring a BSC line	

Ready for option number or command

- 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.

## 31.5 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. (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.

## ***31.6 Where to Go for More Information***

There are several IBM publications that deal with communications on 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.*

## ***31.7 Migration Issues***

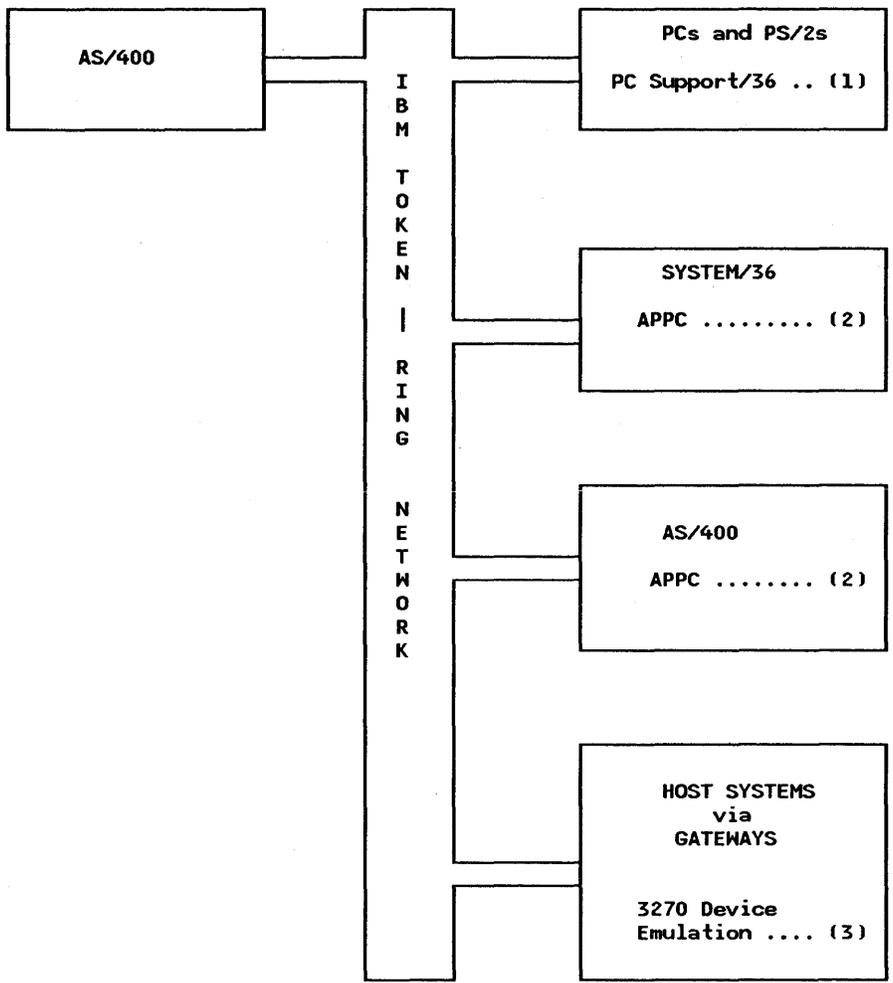
A new version of the base communication feature, and of those other features for which you are a registered user, such as APPC, DDM, PC Support/36, etc. is shipped with each upgrade or new release of the SSP. There is usually no concurrent need to either re-configure the ICF members or to make adjustments 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.

## **32.0 Using The AS/400 on The IBM Token-Ring LAN**

### ***32.1 Overview***

In this chapter we will describe how the AS/400 communicates with other workstations attached to the IBM Token-Ring Network. Except for the installation of AS/400 PC Support on the PC, only the configuration of the AS/400 will be discussed. However references will be made to other sources of information where applicable.

The following figure indicate the topics presented.



**Figure 218. Using the AS/400 on the IBM Token-Ring Network**

1. See section "AS/400 Communicating with Personal Computers" on page 333.
2. See section "AS/400 To PEER Systems Communication (APPC)" on page 347.
3. See section "AS/400 3270 Device Emulation" on page 357.

## 33.0 AS/400 Communicating with Personal Computers

### 33.1 Overview

This chapter discusses the planning, installation and use of AS/400 PC Support Program on both the AS/400 and the PC. After installation, the PC user will be able to use the following functions:

- Organizer
- Workstation function
- Shared folders
- Virtual printer
- Transfer function
- Message function.

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.

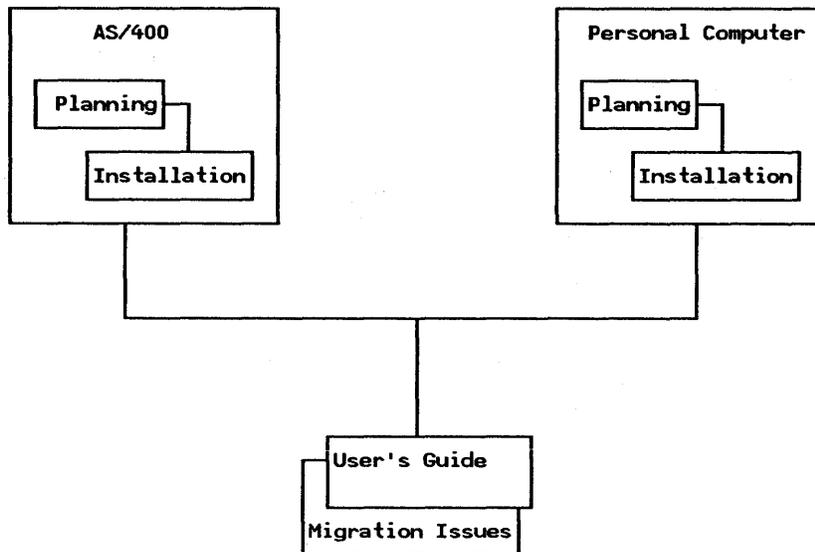


Figure 219. AS/400 to PCs and PS/2s Across the Token-Ring LAN

## 33.2 *Planning Checklist*

### 33.2.1 Prerequisites - Hardware

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 chapter "Attaching The AS/400 To A Token-Ring Network" on page 77.)
- 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 15 and "PS/2 Token-Ring Adapter/A Installation" on page 21).

### 33.2.2 Prerequisites - Software

The AS/400 SSP must be installed and configured on the AS/400. Also both DOS 3.3 or higher and the LAN Support Program must be installed and configured on the PC before you install AS/400 PC Support. Refer to "LAN Support Program" on page 83.

You should have:

- AS/400 PC Support Program for the AS/400 (supplied on magnetic tape).
- AS/400 PC Support Program PC installation diskettes.

### 33.2.3 Prerequisites - Other

- Planning Worksheet (sample displayed below).

Note: The values shown below are examples only and are not to be used in configuring your system. Enter the appropriate data as they pertain to your specific environment.

COMMAND	Parameter	Value	Parameter Description
ADDIRE	USER	JSMITH..... SCLERK..... ..... .....	User Profile
	USRD	JACK SMITH.. SONIA CLERK.. ..... .....	User Description
	USRID	JSMITH MKT.. SCLERK DE... ..... .....	User Identification
CHGNETA	LCLCPNAME	RALYS39.....	Local Control Point Name.
	LCLLOCNAME	RALYS39.....	Local Location Name
	LCLNETID	APPNET.....	Local Network ID.
	SYSNAME	RALYS39.....	System Name
CRTCTLAPPC	ADPTADR	400001130001	Token-Ring Adapter Address - PC
	CTLD	PCAT01.....	Controller Description
	RMTCPNAME	PCAT01.....	Remote Control Point Name.
	SMTLINLST *PC Location	TRNLINE01... PCAT01.....	Switched Line List. PC Location Name
CRTLINTRN	ADAPTER	10005A0403B5	Token-Ring Adapter Address - Host.
	LIND	TRNLINE01...	Line Description
	MAXCTL	40.....	Maximum Number of Controllers
	RSRCNAME	LIN011.....	Resource Name.
	*System Name	RALYS39.....	AS/400 System Name
	*NS Address	PCAT01.....	Work Station Address

Figure 220. AS/400 PC Support Installation Planning Worksheet

## 33.3 Installation

### 33.3.1 Installation on The AS/400

The first step to be performed is to install the AS/400 PC Support program on the AS/400. Refer to the *AS/400 Licensed Programs Installation Guide* for instructions on how to do this.

Next the code must be initialized. Use the CL command INZPCS to do this. The format is: INZPCS KBDTYPE(keyboard type) ASCII(ascii code page) EBCDIC(ebcdic code page).

Confirm that the PC Support library "QIWS", is added to the user library list.

In order for the AS/400 to establish communication with the PC the following objects must be created:

**Line** This describes the characteristics of the TRN line. Only one line description is required.

**Control Unit** This describes the configuration of the PC. A control unit description must be created for each PC or PS/2 using the AS/400 PC Support program.

**User Profile** One must be created for each user and added to the system directory.

#### 1. Creating the Line Description.

The CL command 'CRTLINTRN' is used to create the line description for a Token-Ring Network connection. You can enter the command and its parameters as shown here:

```
CRTLINTRN LIND(value1) RSRCNAME(value2) MAXCTL(value3) ADPTADR(value4)
```

Or key the command and press "F4", and the following screen will be displayed.

```
CRTLINTRN          Create Line Desc. (Token-Ring)

Type choices, press ENTER.

Line Description . . . . . TRNLINE01      Name
Resource name . . . . . LIN011           Name
Online at IPL . . . . . *YES             *YES, *NO
Maximum controllers . . . . . 40         1-256
Maximum frame size . . . . . 1994       265, 512, 1033, 1994
Local adapter address . . . . . 10005A0403B5 100000000000-40007FFFFFFF...
Exchange identifier . . . . . 05600001    05600000-056FFFFF, *SYSGEN
SSAP list;
  Source Service Access point . . . . . 04      *SYSGEN, 04, 08, 0C, 10...
  + for more values
Text 'description'          Token-Ring Line description

Bottom
F3=Exit  F4=List  F5=Refresh  F10=Additional parameters  F11=Keywords
F12=Previous  F13=Prompter help
```

Refer to the sample planning chart as a guide to the responses shown. Each of the key parameters used is explained below:

#### Line Description Name (LIND)

This is the name by which the line will be known to the system. It is the name you use when working with commands that address the line. (for example VRYCFG, WRKCFGSTS etc.)

#### Resource name (RSRCNAME)

This is the unique name that is assigned to the communications line by the system. You can find out what this name is by using the CL command WRKHDWCFG which will display the resource names of all the physical items attached to the system.

#### **Maximum controllers (MAXCTL)**

This represents the maximum number of controllers you want to allow to be active concurrently on this line. The maximum is 256 and the default is 40.

#### **Local adapter address (ADPTADR)**

This is the address of the Token-Ring Adapter to which the line being described is attached. You can use the default value (\*ADPT) which is the address assigned by the manufacturer, or you may specify a locally administered address of a unique 12 digit hexadecimal number in the range 400000000000 to 40007FFFFFFF. This is the address that must be used by any station communicating with the AS/400 over this line, and corresponds to the configuration parameter "Remote Adapter Address" of that station.

#### **Exchange Identifier (EXCHID)**

The local exchange identifier is used to identify the AS/400 to the remote system and is a combination of the block ID (056 for the AS/400) and a unique 5 digit hexadecimal number from 00000 to FFFFF. This value must match the "Remote System Block ID" and "Remote System XID" parameters in the remote system's line configuration. (This parameter is not required for communicating with PCs, however we recommend that you include it in the line configuration as this same line description can be used in communicating with other work stations attached to the network).

#### **Source Service Access Point (SSAP)**

The set of source service access points represents the logical addresses (up to 16) to and from which data is transmitted. These are hexadecimal numbers in the range 04 through 9C and must be a multiple of 4. One of these numbers must match the DSAP parameter in the remote system's line configuration.

2. On completing the line description, you must next create a control unit description.

A control unit description has to be created for each PC that will communicate with the AS/400 over this line.

The CL command 'CRTCTLAPPC' is used to create the control unit description. Again the command and its parameters can be entered as

```
CRTCTLAPPC CTLD(value1) LINKTYPE(*TRLAN) SWITCHED(*YES) SWTLINLST(value2)
+   RMTCPNAME(value3)   INLCNN(*ANS)   SWTDSC(*NO)   ADPTADR(value4)
NODETYPE(*LENNODE)
```

Or key the command and press the F4 key and the following screen will be displayed.

```

CRTCTLAPPC                Create Ctl Desc (APPC)

Type choices, press ENTER.

Controller description . . . . . TRNCUDPC01   Name
Link type . . . . . *TRLAN                *SDLC, *TDLC, *TRLAN, *X25
Online at IPL . . . . . *YES, *NO

                                                    Bottom
F3=Exit  F4=List  F5=Refresh  F10=Additional parameters  F11=Keywords
F12=Previous  F13=Prompter help

```

Enter the appropriate responses and press the Enter key. This screen will be displayed.

```

CRTCTLAPPC                Create Ctl Desc (APPC)

Type choices, press Enter.

Controller description . . . . . TRNCUDPC01   Name
Link type . . . . . *TRLAN                *SDLC, *TDLC, *TRLAN, *X25
Online at IPL . . . . . *YES                *YES, *NO
APPN capable . . . . . *NO                 *YES, *NO
Switched line list . . . . . TRNLINE01      Name
      + for more values
Remote network identifier . . . . . APPN      Name, *NETATR, *NONE
Remote control point name . . . . . PCAT01   Name
Exchange identifier . . . . .                00100000-FFFFFFFF
Initial connection . . . . . *ANS          *DIAL, *ANS
TRLAN remote adapter address . . . . . 400051130007 000000000001-FFFFFFFF
                                                    Bottom
F3=Exit  F4=List  F5=Refresh  F10=Additional parameters  F11=Keywords
F12=Previous  F13=Prompter help

```

Enter the appropriate responses and press the Enter key. This screen will be displayed.

```

CRTCTLAPPC          Create Ctl Desc (APPC)

Type choices, press ENTER.

Controller description . . . . . TRNCUPC01      Name
Link type . . . . . *TRLAN          *SDLC, *TDLC, *TRLAN, *X25
Online at IPL . . . . . *YES         *YES, *NO
APPN capable . . . . . *NO          *YES, *NO
Switched line list . . . . . TRNLINE01      Name
      + for more values
Remote network identifier . . . . . APPN       Name, *NETATR, *NONE
Remote control point name . . . . . PCAT01     Name
Exchange identifier . . . . .              00100000-FFFFFFF
Initial connection . . . . . *ANS         *DIAL, *ANS
TRLAN remote adapter address . . . . . 400001130001 000000000001-FFFFFFFFFFFFAPPN C
APPN node type . . . . . *ENDNODE       *ENDNODE, *LENNODE...
APPN transmission grp number . . . . . 1        1-20, *CALC
Text 'description' . . . . . Controller for PC-AT on TRN.

Bottom
F3=Exit  F4=List  F5=Refresh  F10=Additional parameters  F11=Keywords
F12=Previous  F13=Prompter help

```

The key parameters for creating the control unit description are:

**Controller Description (CTLD)**

This is the name by which this control unit will be known to the system. It is the name you use when working with commands that address the control unit. (for example VRYCFG, WRKCFGSTS etc.)

**Link Type (LINKTYPE)**

The type of line to which this controller will be attached. In this case its is \*TRLAN signifying that the line is a Token-Ring Local Area Network.

**Switched Line List (SWTLINLST)**

This is the name of the line description associated with this controller. The line name specified here must have already been created.

**Remote Network Identifier (RMTNETID)**

This is the name used to identify the remote network. It must be the same as the one described in the RTLN parameter in the "CONFIG.PCS" file on the PC. AS/400 PC Support creates a default value of APPN when installing on the PC, so use this value here.

**TRLAN Adapter Address (ADPTADR)**

This is the address of the Token-Ring adapter installed in the PC. It is the address the system will send data to when it communicates with the PC.

3. Creating a user profile.

Use the CL command CRTUSRPRF to create a user profile which will identify the PC Support user to the AS/400. Type the command and press the F4 key. This screen will be displayed.

```

CRTUSEPRF                Create User Profile

Type choices, press ENTER.

User profile . . . . . SCLERK      Name
User password . . . . . SONIA      Name, *USRPRF,*NONE X25
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
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.

### 33.3.2 Installation on the PC

Perform the following steps to install the AS/400 PC Support on your PC or PS/2.

**Note:** Before attempting to install the software, you should ensure that the proper Token-Ring Network Adapter card is installed in your PC, and that the LAN Support Program is also installed. Instructions on how to do this are given in the sections "PC Token-Ring Network Adapter Installation" on page 15, "PS/2 Token-Ring Adapter/A Installation" on page 21 and "LAN Support Program" on page 83 of this document.

1. Boot-up the PC in DOS (version 3.3 or higher).
2. Insert AS/400 PC Support diskette PCS01 in drive A
3. Type the command:  
A:> INSTALL
4. Follow the instructions displayed, making the appropriate selections for your configuration and use.

The following describes the installation of the AS/400 PC Support Program on a PC-AT. When the Program logo is displayed, press Enter and this screen will be displayed.

**\_Install Exit**

**| F1=Help**

**AS/400 PC Support Installation**

To select an action shown above, first press F10.

Before you install AS/400 PC Support on your personal computer, ensure the AS/400 system and personal computer requirements are complete, and you have obtained the required information to complete this installation program. For more information, refer to the AS/400 PC Support Installation Guide.

1. Select the option to install by placing the cursor beside "Install" at the top left of the screen and press Enter. This screen will be displayed.

**Install Exit**

**| F1=Help**

- 1. Work station emulation
- 2. Enhanced 5250 emulation
- 3. Token-ring

**C Support Installation**

**Esc=Cancel**

, first press F10.

Before you install AS/400 PC Support on your personal computer, ensure the AS/400 system and personal computer requirements are complete, and you have obtained the required information to complete this installation program. For more information, refer to the AS/400 PC Support Installation Guide.

2. Select Option 3 and Enter. This screen will be displayed.

Installing AS/400 PC Support  
(Token-ring)

Complete the following with the information from the form; press ENTER.

PCS directory drive. . . . . [C]  
PC location name . . . . . [PCAT01 ]  
System name. . . . . [RALYS39 ]  
System  
token-ring address . . . . . [10005A0403B5]

Which functions . . . . . Organizer  
will you use? . . . . . Work Station Function  
Message Function  
Virtual Printer

Press the space bar to select.

---

ENTER Esc=Cancel F1=Help F3=Exit Space bar

Enter the data from your installation planning worksheet and press Enter. This screen will be displayed.

Installing AS/400 PC Support  
(Token-ring)

Complete the following with the information from the form; press ENTER.

PCS directory drive. . . . . [C]  
PC location name . . . . . [C]  
System name. . . . . [RALYS39 ]  
System  
token-ring address . . . . . [10005A0403B5]

Copy Installation Files  
Files from the Installation diskette  
will be copied to the PCS directory.  
Press ENTER to start the copy.  
Press Esc to cancel.

Which functions . . . . . Organizer  
will you use? . . . . . Work Station Function  
Message Function  
Virtual Printer

- There will be a short period before the next screen is displayed. During this period the PCS subdirectory is created and the files copied to it from the diskette.

Installing AS/400 PC Support  
(Token-ring)

Complete the following with the information from the form; press ENTER.

PCS directory drive. . . . . [C]

PC location n

System name. Insert Installation diskette PCS02 in drive A.  
Press ENTER when ready.

System  
token-ring address . . . . . [10005A0403B5]

Which functions  
will you use? . . . . . Organizer  
Work Station Function  
Message Function  
Virtual Printer

---

4. After another few minutes, the following screen will be displayed.

Install	Exit		F1=Help
AS/400 PC Support Installation			
T B t h F	<p style="text-align: center;">Using AS/400 PC Support</p> <p>The installation is now complete. For a complete list of the files copied to the PCS directory, refer to the AS/400 PC Support Installation Guide. A STARTPCS command has been created in the PCS directory that allows you to use the AS/400 PC Support functions.</p> <p>To use the AS/400 PC Support functions, you must start your personal computer again and run the STARTPCS command.</p> <p>For more information, refer to the installation form.</p> <hr/> <p>Esc=Cancel F1=Help</p>		m.

5. Remove the program diskette and store them in a secure place.

The PC Support program is now installed in the PCS subdirectory on your fixed disk. Re-boot your personal computer and change to the PCS subdirectory.

## 33.4 User's Guide

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.

Next you need to ensure that a user profile for each PC user is added to the system directory.

In order to use this command, your user ID must have the security administrator's special authority (\*SECADM). Use the CL command ADDDIRE; its format is:

ADDDIRE USRID(SCLERK DE) USER(SCLERK) USRD(Sonia Clerk).

Then run STARTPCS at the PC. If start PC support 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.

## 33.5 Basic Troubleshooting

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.

## **33.6 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.*

## **33.7 Migration Issues**

There is 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.



## **34.0 AS/400 To PEER Systems Communication (APPC)**

### ***34.1 Overview***

The AS/400 attaches to the IBM Token-Ring Network via its integrated Token-Ring Network Adapter which allows it to communicate with other systems, controllers and personal computers on the network. These other devices are called stations and are described to the AS/400 by controller descriptions.

This chapter will discuss the configuration requirements to allow the AS/400 to communicate with the System/36 on a Token-Ring LAN.

### ***34.2 Planning Checklist***

It is assumed that the physical connection of the IBM Token-Ring Network Adapter to the Token-Ring Network has already been done. (This was described in "Attaching The AS/400 To A Token-Ring Network" on page 77).

There are certain parameters in the configuration of both systems that must correspond with each other. These are indicated on the following chart:

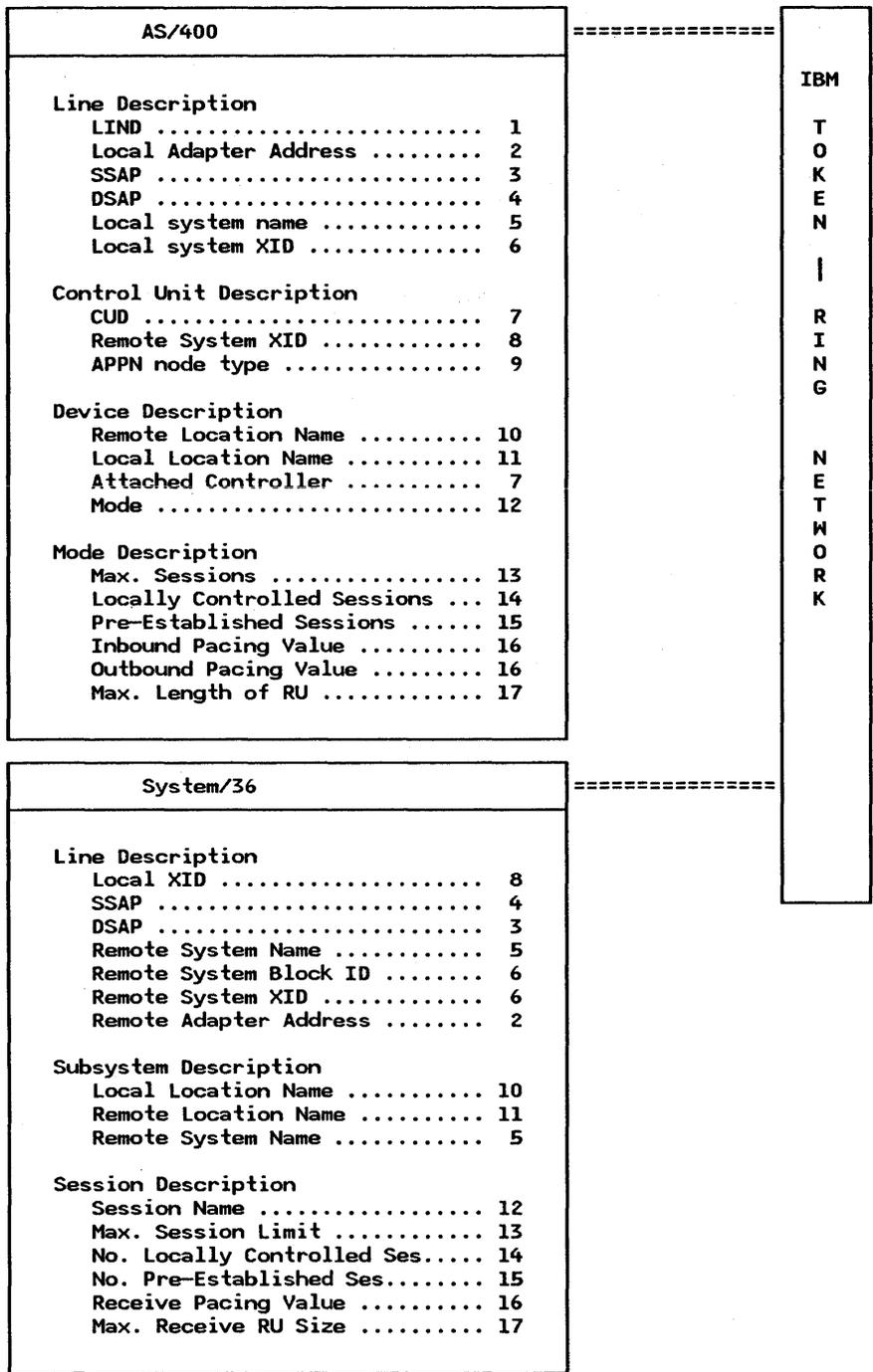


Figure 221. Relationship of Key Configuration Parameters

Key to figure:

1. Name of the line description in the AS/400.
2. AS/400 adapter address is the address that must be described as the remote adapter address in the System/36.

3. The SSAP identifier of the AS/400 is the same as the DSAP of the System/36.
4. The DSAP identifier of the AS/400 is the same as the SSAP of the System/36.
5. The local system name of the AS/400 corresponds to the remote system name in the System/36 line configuration.
6. An eight-digit hexadecimal number that identifies the system to other users of the network. It must be unique for each system. The first three digits identifies the system type and corresponds to the remote Block ID on the System/36. The remaining five digits identify the particular unit and correspond, to the remote XID on the System/36.
7. The name of the control unit description in the AS/400.
8. A combination of the remote System/36's Block ID and XID.
9. This parameter describes how the AS/400 sees the system it is communicating with. The value must be \*LENNODE if it is communicating with a System/36.
10. Location name for the remote system.
11. This system's location name.
12. This is the AS/400 counterpart to the System/36 session group.
13. thru 17. are session parameters of 'mode' and 'session group' that must be the same on both systems.

In order to help the user in his network planning activities, a Planning Worksheet has being designed ( sample displayed below ).

Note: The values shown on the planning worksheet are EXAMPLES only and are not to be used in configuring your system. Insert the appropriate data as they pertain to your specific environment. The parameter names are given on the worksheet for the user who prefers to issue the command directly instead of using the prompt screens.

COMMAND	Parameter	Value	Parameter Description
ADDIRE	USER	JSMITH..... JOHND..... ..... .....	User Profile
	USRD	Jack Smith.. John Doe.... ..... .....	User Description
	USRID	JSMITH MKT.. JDOE STOCK.. ..... .....	User Identification
CHGNETA	LCLCPNAME	RALYS39.....	Local Control Point Name.
	LCLLOCNAME	RALYS39.....	Local Location Name
	LCLNETID	.....	Local Network ID.
	SYSNAME	RALYS39.....	System Name
CRTCTLAPPC	ADPTADR	400051130007	Token-Ring Adapter Address - Remote System
	CTLD	TRNCUD5364..	Controller Description
	RMTCPNAME	.....	Remote Control Point Name.
	SWTLINLST *Location	TRNLINE001.. LAB5364.....	Switched Line List. Remote Location Name
CRTLINTRN	ADAPTER	40005A040362	Token-Ring Adapter Address - Local system
	LIND	TRNLINE001..	Line Description
	MAXCTL	40.....	Maximum Number of Controllers
	RSRCNAME	LIN011.....	Resource Name.
	*System Name	.....	AS/400 System Name
	*MS Address	.....	Work Station Address

Figure 222. AS/400 APPC Planning Worksheet

### 34.3 Installation

There is no specific software to be installed in the AS/400. All the support required for communication are already included in the system support program.

In order for the AS/400 to establish communication with the System/36 using the IBM Token-Ring Network, the following objects must be created:

- A line description. Here the characteristics of the line are described.
- A Control unit description.
- A Device description.

- A Mode description
  - An APPC Subsystem on the System/36.
1. Creating the Line Description.

The CL command "CRTLINTRN" is used to create the line description for a Token-Ring Network connection. Key this command and press "F4"; the following screen will be displayed.

```

CRTLINTRN                Create Line Desc. (Token-Ring)

Type choices, press ENTER.

Line Description . . . . . TRNLINE001      Name
Resource name . . . . . LIN011             Name
Online at IPL . . . . . *YES              *YES, *NO
Maximum controllers . . . . . 40           1-256
Maximum frame size . . . . . 1994         265, 512, 1033, 1994
Local adapter address . . . . . 40005A040362 400000000000-40007FFFFFFF...
Exchange identifier . . . . . 05600000     05600000-056FFFFF, *SYSGEN
SSAP list;
  Source Service Access point . 04         *SYSGEN, 04, 08, 0C, 10...
    + for more values
Text 'description'           Token-Ring Line description

                                                    Bottom
F3=Exit  F4=List  F5=Refresh  F10=Additional parameters  F11=Keywords
F12=Previous  F13=Prompter help

```

Refer to the sample planning chart as a guide to the responses shown. Each of the key parameters used is explained below (the name of the parameters is enclosed in brackets).

**Line Description Name (LIND)**

This is the name by which the line will be known to the system. It is the name you use when working with commands that address the line. (for exampl VRYCFG, WRKCFGSTS etc.) The name you give to the line must conform to AS/400 naming conventions.

**Resource name (RSRCNAME)**

This is the unique name that is assigned to the communications line by the system. You can find out what this name is by using the CL command "WRKHDWCFG" which will display the resource names of all the physical items attached to the system.

**Maximum controllers (MAXCTL)**

This represents the maximum number of controllers you want to allow to be active concurrently on this line. The maximum is 256 and the default is 40.

**Local adapter address (ADPTADR)**

This is the address of the Token-Ring Adapter to which the line being described is attached. You can use the default value (\*ADPT) which is the address assigned by the manufacturer, or you may specify a locally administered address of a unique 12-digit hexadecimal number in the range 400000000000 to 40007FFFFFFF. This is the address that must be used by any station communicating with the AS/400 over this line, and corresponds to the configuration parameter "Remote Adapter Address" of that station.

**Exchange Identifier (EXCHID)**

The local exchange identifier is used to identify the AS/400 to the remote system and is a combination of the block ID (056 for the AS/400) and a unique 5-digit hexadecimal number from 00000 to FFFFF. This value must match the "Remote System Block ID" and "Remote System XID" parameters in the remote system's line configuration.

### Source Service Access Point (SSAP)

The set of source service access points represents the logical addresses (up to 16) to and from which data is transmitted. These are hexadecimal numbers in the range 04 through 9C and must be a multiple of 4. One of these numbers must match the DSAP parameter in the remote system's line configuration.

2. On completing the line description, you must next create a control unit description.

A control unit description has to be created for each station that will communicate with the AS/400 over this line.

The CL command CTRCTLAPPC is used to create the control unit description. Key this command and press the F4 key and the following screen will be displayed.

```
CRTCTLAPPC                Create Ctl Desc (APPC)

Type choices, press ENTER.

Controller description . . . . . TRNCUD5360      Name
Link type . . . . . *TRLAN                      *SDLC, *TDLC, *TRLAN, *X25
Online at IPL . . . . . *YES, *NO

                                                    Bottom
F3=Exit  F4=List  F5=Refresh  F10=Additional parameters  F11=Keywords
F12=Previous  F13=Prompter help
```

Enter the appropriate responses and press Enter. This screen will be displayed.

```

CRTCTLAPPC                Create Ctl Desc (APPC)

Type choices, press ENTER.

Controller description . . . . . TRNCUD5360      Name
Link type . . . . . *TRLAN          *SDLC, *TDLC, *TRLAN, *X25
Online at IPL . . . . . *YES         *YES, *NO
APPN capable . . . . . *NO          *YES, *NO
Switched line list . . . . . TRNLINE01      Name
      + for more values
Remote network identifier . . . *NETATR      Name, *NETATR, *NONE
Remote control point name . . . SYS36         Name
Exchange identifier . . . . . 03E00001      00100000-FFFFFFFF
Initial connection . . . . . *ANS         *DIAL, *ANS
TRLAN remote adapter address . . 400051130005 000000000001-FFFFFFFF

                                                    Bottom
F3=Exit  F4=List  F5=Refresh  F10=Additional parameters  F11=Keywords
F12=Previous  F13=Prompter help

```

Enter the appropriate responses and press Enter. This screen will be displayed.

```

CRTCTLAPPC                Create Ctl Desc (APPC)

Type choices, press ENTER.

Controller description . . . . . TRNCUD5360      Name
Link type . . . . . *TRLAN          *SDLC, *TDLC, *TRLAN, *X25
Online at IPL . . . . . *YES         *YES, *NO
APPN capable . . . . . *NO          *YES, *NO
Switched line list . . . . . TRNLINE001      Name
      + for more values
Remote network identifier . . . *NETATR      Name, *NETATR, *NONE
Remote control point name . . . SYS36         Name
Exchange identifier . . . . . 03E00001      00100000-FFFFFFFF
Initial connection . . . . . *ANS         *DIAL, *ANS
TRLAN remote adapter address . . 400051130005 000000000001-FFFFFFFF
APPN node type . . . . . *LENNODE      *ENDNODE, *LENNODE...
APPN transmission grp number . . 1           1-20, *CALC
Text 'description' . . . . . 5360 TRN controller description

                                                    Bottom
F3=Exit  F4=List  F5=Refresh  F10=Additional parameters  F11=Keywords
F12=Previous  F13=Prompter help

```

Press F10 to display the screen for additional parameters.

CRTCTLAPPC

Create Ctl Desc (APPC)

Type choices, press ENTER.

SDLC connect poll retry . . . . .	*CALC	0-65534, *CALC, *NOMAX
SDLC NRM poll timer . . . . .	0	0-100, (0.1 seconds) X25
SDLC NDM poll timer . . . . .	*CALC	*CALC, 0-3000 (0.1 seconds)
TRLAN DSAP . . . . .	04	04, 08, 0C, 10, 14, 18, 1C...
TRLAN SSAP . . . . .	04	04, 08, 0C, 10, 14, 18, 1C...
TRLAN frame retry . . . . .	10	0-254
TRLAN connection retry . . . . .	10	1-255
TRLAN response timer . . . . .	10	0-254 (0.1 seconds)
TRLAN connection timer . . . . .	70	0-254 (0.1 seconds)
TRLAN acknowledgment timer . . . . .	1	0-254 (0.1 seconds)
TRLAN inactive timer . . . . .	100	0-255 (0.1 seconds)
TRLAN ack frequency . . . . .	1	1-127
TRLAN access priority . . . . .	0	0-7
X.25 default packet size . . . . .	*LIND	*LIND, 64, 128, 256, 512...
X.25 default window size . . . . .	*LIND	2-15, *LIND
X.25 user group identifier . . . . .		00-99

More...

F3=Exit F4=List F5=Refresh F11=Keyword F12=Previous  
F12=Previous F13=How to use this display

The key parameters for creating the control unit description are:

#### Controller Description (CTLD)

This is the name by which this control unit will be known to the system. It is the name you use when working with commands that address the control unit. (for example VRYCFG, WRKCFGSTS etc.) This name must also conform to AS/400 naming conventions.

#### Link Type (LINKTYPE)

The type of line to which this controller will be attached. In this case it is \*TRLAN signifying that the line is a Token-Ring Local Area Network.

#### Switched Line List (SWTLINLST)

This is the name of the line description associated with this controller. The line name specified here must have already been created.

#### Exchange Identifier (EXCHID)

This is the remote system's block ID and XID, and is how the remote system is identified to the AS/400.

#### TRLAN Adapter Address (ADPTADR)

This is the address of the remote controller's Token-Ring Network adapter. It is the address the system will send data to when it communicates with the remote controller. You should obtain this address from the remote system's administrator.

#### APPN Node Type

The AS/400 sees the System/36 as a Low Entry Networking Node, so in this case the value \*LENNODE must be selected.

#### TRLAN DSAP

This must correspond to the SSAP configured in the corresponding System/36 subsystem and conform to the same rules.

#### TRLAN SSAP

This must correspond to the DSAP configured in the corresponding System/36 subsystem and conform to the same rules.

After entering all the appropriate responses, press the Enter key and the control unit description will be entered in the system. This concludes the configuration for communicating with the System/36.

The AS/400 will automatically create the device and mode descriptions for you. **IMPORTANT:** The mode description created by the AS/400 (named BLANK) does not contain the same parameter values as the session (\*BLANK) created by the System/36. You should ensure that these parameters are the same by changing the mode description parameters to match those of the System/36. Use the CL command 'CHGMOOD' to do this.

This concludes the configuration for the AS/400.

**NOTE** Configuration for AS/400 to AS/400 communication is the same as for the System/36 with the following exceptions:

- To the AS/400 another AS/400 looks like an ENDNODE therefore APPN node type should be \*ENDNODE.

## ***34.4 User's Guide***

An APPC Subsystem must be configured on the System/36 with the AS/400 identified as the remote system. Follow the instructions in "System/36 Advanced Program-to-Program Communication (APPC)" on page 297.

Contact the system operator on the System/36 and ask him to enable the subsystem, and you must now vary on the line, control unit and device descriptions on the AS/400 in that order. When this is done, the two systems will be ready to communicate over the LAN.

The CL command STRPASTHR is used to initiate a session with the System/36 from the work station that issued the command. When the command has executed successfully, a System/36 sign-on screen will be displayed.

## ***34.5 Basic Troubleshooting***

Any problems encountered during configuration of the AS/400 will generate messages in either the system operator message queue, the job log or as a break message on your screen. Use the help function and problem determination facility to discover the recovery procedure.

## ***34.6 Where To Go For More Information***

Additional information can be found in the following publications:

- *SC21-9598 APPC Communications and APPN User's Guide*
- *SC21-9661 Communications and Systems Management Guide*
- *SC21-9590 Communications Programmer's Guide*
- *SC21-9530 Interactive Communications Feature Reference Manual.*

## ***34.7 Migration Issues***

If you wish to run System/36 programs on the AS/400, there is conversion assistance available through the *System/36 to AS/400 Migration Aid* package.



## 35.0 AS/400 3270 Device Emulation

### 35.1 Overview

The SNA 3270 device emulation allows the AS/400 to appear to 370 type hosts as a 3274 control unit with attached displays and/or printers. AS/400 and 3270 devices can share the same Token-Ring Network. Concurrent multiple sessions can operate on the same network depending on the host configuration.

### 35.2 Planning Checklist

The AS/400 systems software offers full 3270 device emulation support; therefore no additional program support is necessary.

### 35.3 Installation

When you are setting up SNA 3270 device emulation, you must configure for the line, control unit and device to be emulated.

1. The line configuration is the same for any Token-Ring line. An example of this is shown below.

```
CRTLINTRN          Create Line Desc. (Token-Ring)

Type choices, press ENTER.

Line Description . . . . . TRNLINE001      Name
Resource name . . . . . LIN011           Name
Online at IPL . . . . . *YES             *YES, *NO
Maximum controllers . . . . . 40         1-256
Maximum frame size . . . . . 1994       265, 512, 1033, 1994
Local adapter address . . . . . 100000040362 400000000000-40007FFFFFFF...
Exchange identifier . . . . . 05600000   05600000-056FFFFFF, *SYSGEN
SSAP list;
  Source Service Access point . . . . . 04      *SYSGEN, 04, 08, 0C, 10...
  + for more values
Text 'description'          Token-Ring Line description

                                                    Bottom
F3=Exit  F4=List  F5=Refresh  F10=Additional parameters  F11=Keywords
F12=Previous  F13=Prompter help
```

2. The controller description is an indication of the address the host system will poll.

The controller description is created by the CL command 'CTRCTLHOST'. ENTER this command and press F4 and this screen will be displayed.

```

CRTCTLHOST                Create Ctl Desc (SNA Host)

Type choices, press ENTER.

Controller description . . . . . TRNSNAHOST      Name
Link type . . . . . *TRLAN                    *SDLC, *TRLAN, *X25
Online at IPL . . . . . *YES                  *YES, *NO
Switched line . . . . . *NO                   *NO, *YES
Switched network backup . . . . . *NO          *NO, *YES
APPN capable . . . . . *NO                    *NO, *YES
Attached nonswitched line . . . . . TRNLIN04     Name
Remote network identifier . . . . . *NETATR      Name, *NETATR, *NONE
Remote control point name . . . . . _____   Name
SSCP identifier . . . . . _____           0500000000000000-05FFFFFFFF
Station address . . . . . C1
Text 'description' . . . . . Controller for 3270 device emulation.

                                                    Bottom
F3=Exit  F4=List  F5=Refresh  F10=Additional parameters  F11=Keywords
F12=Previous  F13=Prompter help

```

The two-digit station address must be the same as the local station address specified during host controller configuration.

As many as 50 control unit descriptions can be created for the same line description.

3. A device description must be created for each device (display or printer) that will emulate a 3270 type device. It provides an address to which the host will communicate as well as the definition of the type of device being emulated.

The CL command "CRTDEVHOST" is used to create this description. Type this command and press F1 to display the prompts.

```

CRTDEVHOST                Create Device Desc (SNA Host)

Type choices, press ENTER.

Device description . . . . . EMUDSP1           Name
Local location address . . . . . 02            01-FE
Remote location name . . . . . AS4EMU          Name
Online at IPL . . . . . *YES                  *YES, *NO
Attached controller . . . . . TRNSNAHOST      Name
Application type . . . . . *EMU               *RJE, *EML, *PGM
Max length of request unit . . . . . 256       *CALC, 241, 245, 247, 256...
Emulated device . . . . . 3278                3278, 3284, 3286, 3287...
Emulated keyboard . . . . . *LOWER           *UPPER, *LOWERonds)
Emulated numeric lock . . . . . *NO          *NO, *YES
Emulation work station . . . . . DSP01        Name
Text 'description' . . . . . 5291 DSP01 emulating a 3278

                                                    Bottom
F3=Exit  F4=List  F5=Refresh  F10=Additional parameters  F11=Keywords
F12=Previous  F13=Prompter help

```

The key parameters in this description are:

**Device Description (DEVD)**

The name of the device description.

**Local Location Address (LOCADR)**

This is a two-digit location address in the range 01 to FE. This must match the LOCADR parameter in the host system's NCP generation.

**Remote Location Name (RMTLOCNAME)**

This identifies the remote location to the AS/400.

**Attached Controller (CTL)**

This is the name of the controller description to which device description will be attached.

**Application Type (APPTYPE)**

This is the type of application that will use the device.

**Emulated Device (EMLDEV)**

This specifies the type of device this workstation will emulate.

**Emulated Keyboard (EMLKBD)**

This determines whether the characters from the keyboard will be uppercase only, or upper-and lowercase. \*UPPER will select uppercase only, \*LOWER will select both.

**Emulated Numeric Lock (EMLNUMLCK)**

This determines whether the numeric shift is automatically set on the 5250 workstation.

**Emulation Workstation (EMLWRKSTN)**

Here you can restrict emulation to the specific device named.

**Text**

A description of the device and its use.

## ***35.4 User's Guide***

To start device emulation you must first vary on the line, the controller and the device descriptions then enter the CL command STREML3270. You will be presented with a 3270 type VTAM logo. Your 5250 workstation will now be emulating the designated 3270 device. Be alert to the deference in keyboard mapping between the two devices.

## ***35.5 Basic Troubleshooting***

The AS/400 provides extensive error information and problem determination facilities that will help you to locate and correct any problems that may occur. There is also a comprehensive help facility to guide you through the configuration and use of this facility.

## ***35.6 Where To Go For More Information***

Additional information on 3270 device emulation is provided in the following publications.

- *SC21-9602 3270 Device Emulation User's Guide*

- *SC21-8082 Operator's Guide*
- *SC21-9601 Communications User's Guide*
- *SC21-9661 Communications and Systems Management User's Guide.*

## 36.0 Financial Branch System Services Version 2

### 36.1 Overview

Financial Branch System Services Version 2 is the system that supports financial operations over PC or PS/2 processors. It is an extension of the IBM Personal Computer DOS operating system and can be used in single, stand-alone personal computers or in a PC Token-Ring Local Area Network or a PC Local Area Network.

The configuration that will be discussed in this section is the following:

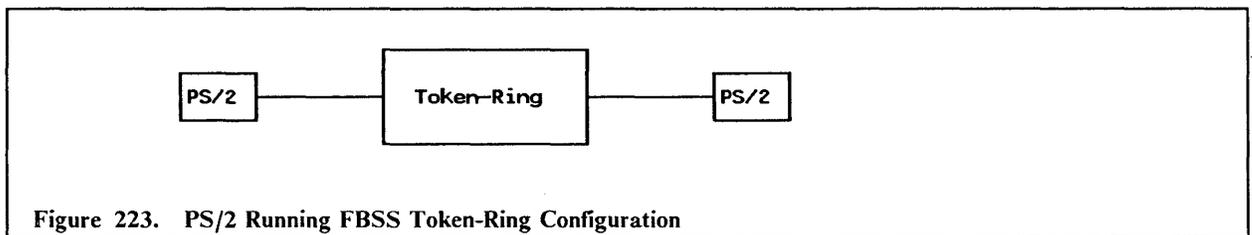


Figure 223. PS/2 Running FBSS Token-Ring Configuration

When installed on a PC LAN, Financial Branch System Services Version 2 enables each PC to share resources of other PCs. The location of these resources is transparent to PC applications.

The shared resources can be:

- Communication control including:
  - 3278 emulation
  - PC user application-to-host application communication
  - File transfer between host and workstation.
- Shared File support including:
  - Multi-index data access
  - Shared File security features
  - Variety of sequential and direct record access.
- Banking device support for:
  - Magnetic stripe reader/encoder
  - PIN keypad
  - Banking printers.
- Shared DOS directory.

A consistent high-level language interface is provided to access the shared resources.

Interactive trace tools and interactive customizing utilities facilitate product installation and application testing.

All native PC DOS functions are available to PC applications, in addition to Financial Branch System Services Version 2 provided functions.

## 36.1.1 LAN Session Services

LAN Session Services maintain communications between the personal computers of a LAN. FBSS uses the NETBIOS interface of the LAN adapter to interconnect workstations.

During FBSS loading, the loader builds a session table based on configuration records. Two sessions are established between each requestor-server machine pair, enabling a full-duplex logical path for server protocol requests and responses.

Through this data path, the requestor supervisor and the server supervisor exchange requests and responses. The LAN sessions between supervisors are dynamically established at supervisor initialization according to the configuration file. Any personal computer can establish a maximum of 31 supervisor-to-supervisor connections.

In case of session interruption and reconnection, or after a personal computer is restarted, session-changed status is reported to the supervisor. The supervisor, in turn, notifies its local servers so they can carry out actions to ensure the integrity of their operations. The supervisor LAN session services reestablish the sessions without operator intervention.

In a LAN configuration, the servers can be distributed according to each personal computer configuration and work load requirement. The assignment of a particular server as a resource on every PC or only on some PCs on the network is done by the configuration procedure.

## 36.2 Planning Checklist

### 36.2.1 Hardware Requirements

FBSS operates with the IBM PS/2 and PC machines.

A minimum of 640K of RAM storage is recommended, although the operating system, resident portions of FBSS, and typical on-line applications will often require less storage.

FBSS works with the standard keyboards for the IBM PS/2 and PC machines. Additionally, the PS/2 machines may use an IBM 50-key Function Keyboard (either alone, or in combination with a PS/2 keyboard).

FBSS operates with the following IBM PS/2 and PC display adapters and the IBM displays that attach to them. The IBM 4707 Monochrome Display is supported on the PS/2 machines.

- Integrated display adapters of the PS/2 machines
- IBM Monochrome Display and Printer Adapter
- IBM Enhanced Graphics Adapter
- IBM Color Graphics Adapter.

These LAN adapters are supported as appropriate to the IBM PS/2 and PC machine:

- IBM Token-Ring Network Adapter (6339100)
- IBM Token-Ring Network Adapter II (67X0438)
- IBM Token-Ring Network Adapter/A (69X8138)
- IBM PC Network Adapter II/A (1501222)
- IBM PC Network Baseband Adapter/A (1501223)
- IBM PC Network Adapter II (1501220)
- IBM PC Network Baseband Adapter (1501221)
- IBM PC Network Adapter (6450213)

Any PC or PS/2 which will be managing host communications for itself or on behalf of another PS/2 on the Token-Ring as a communication server requires one of the following adapters:

- An SDLC Adapter (1501205) for the PC and PS/2 Model 30.
- An X.25 Communication Adapter (2690617) for the PC and PS/2 Model 30.
- A Multi-protocol Adapter (6450348) for the PS/2 Models 50, 60 and 80.

The following printers can be attached to IBM PCs and PS/2s machines and are supported by the FBSS 4712/4722 printer server:

- IBM 4712 Transaction Printer Models 1 and 2
- IBM 4722 Document Printer Models 1 and 2.

The following printers can be attached to IBM PCs and PS/2s model 30 via the appropriate Finance Output Option and are supported by the FBSS 4712/4722 printer server:

- IBM 4710 Receipt/Validation Printer
- IBM 4720 Forms/Passbook Printer.

With FBSS 2.1 the IBM 4201 Proprinter connected on a PC Parallel port is supported for printing from an SNA LU-1 session. Other printers which are interface-compatible with the 4201 may also be used.

Servers for the IBM 4717 MSR/E and IBM 4718 PIN Pad Devices connected to the Pointing Device Port of PS/2 machines are provided.

These versions of the Finance Input Option are supported:

- IBM Finance Input Option for 5150, 5160
- IBM Finance Input Option for 5162, 5170
- IBM Finance Input Option for PS/2 Model 30

The IBM 4704 Keyboards may be used with one of the above Finance Input Option adapters as an alternative to the IBM PS/2 and PC keyboard. Note that function may be limited if fewer keys are available than with the usual IBM PS/2 and PC keyboards.

The IBM Finance Security Option (6236069) may be used in the IBM PCs and PS/2 Model 30 although no specific support is included.

### **36.2.2 Hardware Limitations**

The Finance Output Options cannot be used with these LAN adapters in the same machine:

- IBM PC Network Adapter II (1501220)
- IBM PC Network Baseband Adapter (1501221)

A serial adapter or port cannot be used in a PC or PS/2 Model 30 which employs FBSS SNA communications with the SDLC adapter. Therefore, the 4712 and 4722 printers may not be connected on a serial interface in a PC or PS/2 Model 30 with the SDLC adapter.

### **36.2.3 Software Requirements**

FBSS 2.0 extends and operates with IBM PC DOS 3.3.

The IBM EZ-VU II Runtime Facility is required for use with the configuration and customizing utilities supplied with FBSS 2.0.

If the workstation is LAN interconnected, FBSS 2.0 uses a NETBIOS interface to the LAN. NETBIOS is provided by the IBM LAN Support Program.

Applications invoke FBSS services through a call. FBSS 2.0 provides a call interface (API), or language binding, for:

- IBM PC COBOL Compiler
- IBM PC Macro Assembler
- IBM PC Basic Compiler
- IBM PC C Language Compiler.

An assembler language sample program module, which may be modified for use with other compilers, is provided.

Device drivers for the IBM 4707 Monochrome Display, IBM 4717 MSR/E, IBM 4718 PIN Pad, IBM 4712 Models 1 and 2, and IBM 4722 Models 1 and 2 Printers are provided in the *IBM Financial Systems Hardware I/O Guide* and are required by I/O Servers in FBSS.

Device Drivers for the IBM 4710 and IBM 4720 printers are provided with the Finance Output Option adapter. If the IBM 4720 Model 5 is used, the IBM Extension Program for the IBM Finance Output Option is required.

The file transfer support on the 3270 session is designed to operate with these host file transfer packages:

- for MVS/TSO - IBM 3270 PC File Transfer Program, Release 1
- for VM/SP - IBM 3270 PC File Transfer, Release 1
- for CICS/VS (MVS and VSE) - IBM CICS/VS 3270 PC File Transfer Program Release 1.

### 36.2.4 Software Limitations

A pair of NETBIOS session names is used by FBSS for each FBSS machine for which LAN interconnection has been configured. In FBSS 2.0, a maximum of 30 sessions, or 15 FBSS-to-FBSS connections, are supported; in FBSS 2.1, this is expanded to 22 FBSS-to-FBSS connections. Refer to the LAN adapter and IBM LAN Support Program documentation for the number of available NETBIOS session names. If the IBM LAN Program is also used, the number of available NETBIOS names is reduced; refer to the IBM LAN Program documentation for information on its use of NETBIOS.

FBSS 2.0 may be used in conjunction with the IBM LAN Program. However, the FBSS 2.0 Shared Directory Server may not co-reside with the IBM LAN Program file server function.

FBSS 2.0 is not designed to operate with the IBM Personal Computer BASIC Interpreter nor the IBM TopView programs.

## 36.3 Installation Steps

### 36.3.1 Product Installation

The installation of FBSS on the customizing PC is an easy-to-do task. You should follow the steps described in chapter 7 of the *FBSS Programmer's Reference Manual GA19-5450*.

The customizing PC should have available at least a 5 Mbyte disk space before starting the installation.

Be sure to have available all additional software needed when starting with the installation of FBSS. That is at least the EZ-VU II RUNTIME Facility (6317025). Other additional software needed may be:

- The LAN support program, if the PCs will be connected to a local network (PC Network or Token-Ring).

The following LAN Support Program device drivers must be copied to the FBSS customization system (this make them available when needed):

- DXMA0MOD.SYS
  - DXMC0MOD.SYS
  - DXMT0MOD.SYS
  - DXMG0MOD.SYS.
- Appropriate device drivers delivered with the *4700 Financial I/O Hardware Guide*, if devices such as the IBM 4707 (480 mode), the IBM 4712/4722 printers, the IBM 4717 MSR/E, and/or the IBM 4718 PIN Keypad will be used.
  - The appropriate device drivers from the product installation diskette, if the printers IBM 4710 and/or 4720 are to be connected.

- Device driver and other files from the installation diskette of the IBM PC X.25 Communication Support Version 1.10, if X.25 is to be used.
- User-written server support.

**Note:** Device drivers may need to be customized with the appropriate customization program of the product support before being copied to the FBSS system. This should be done before starting the installation of FBSS.

### 36.3.2 Customization

The customization of the stations that will operate in a particular Financial Branch System Services 2.0 Network is done at once and it can be done in any PC. Once the customization is finished, diskettes for the different stations in the network are produced.

Before starting the FBSS customization, you should consider the following hints:

- If you are using a monochrome display connected to a color/graphics adapter be sure to have an appropriate MODE command in the AUTOUSER.BAT file or enter it temporarily via keyboard (for instance, MODE BW80). Otherwise you will not be able to read all text on the panels of the customization program. This applies also to the System Verification Program which will be used later for testing FBSS calls.
- Before you start, you should format at least as many diskettes as you will have PCs in the network. Do this by using the /s option (to get the DOS system transferred onto the diskette). This will make it easier to test. If you are using a PC with 360 KB diskettes, one diskette may not be sufficient for each PC in the network, for instance, if the PC has the shared file server on it. In that case, format more than one diskette per PC. Only one diskette per PC has to be formatted with the /s option.

To start the customizing process, switch the customizing PC to subdirectory FBSSWORK and enter the name of the customizing procedure which you have entered during the SETUP step of installation (the name defaults to FBSS).

**Note:** In FBSS 2.0, there are fixed names for the seven subdirectories generated during FBSS installation (the names are listed in the *FBSS Programmer's Reference Manual* (GA19-5450), and all begin with FBSS).

There are five main steps for customizing:

1. General customization
2. Developing customization
3. LAN and communication configuration
4. LAN building and distribution
5. Configuration/Workstation for testing.

An EZ-VU tree of menus is provided to group the customization necessities and is following presented:

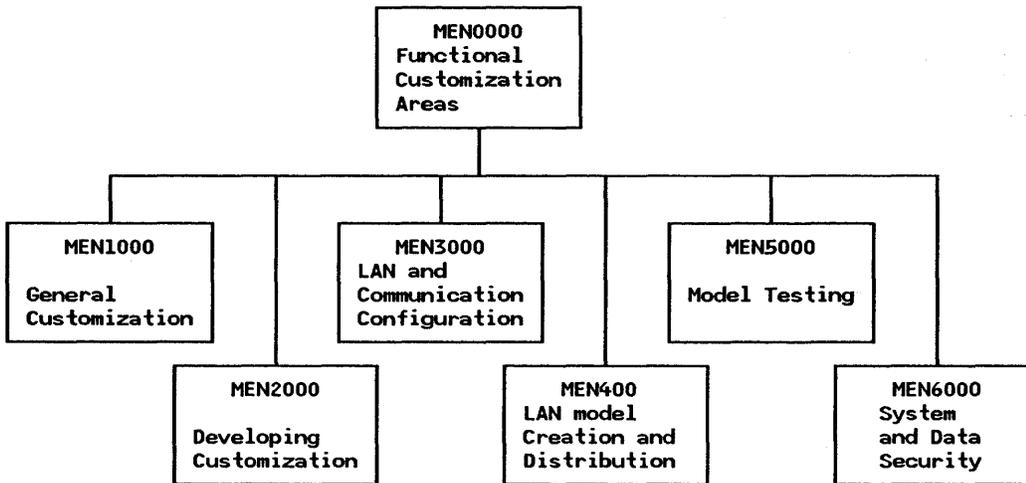


Figure 224. FBSS Menu Structure

The customizer selects the different customization options from the main menu: "Functional Customization Areas".

Seven groups of options are presented in this menu:

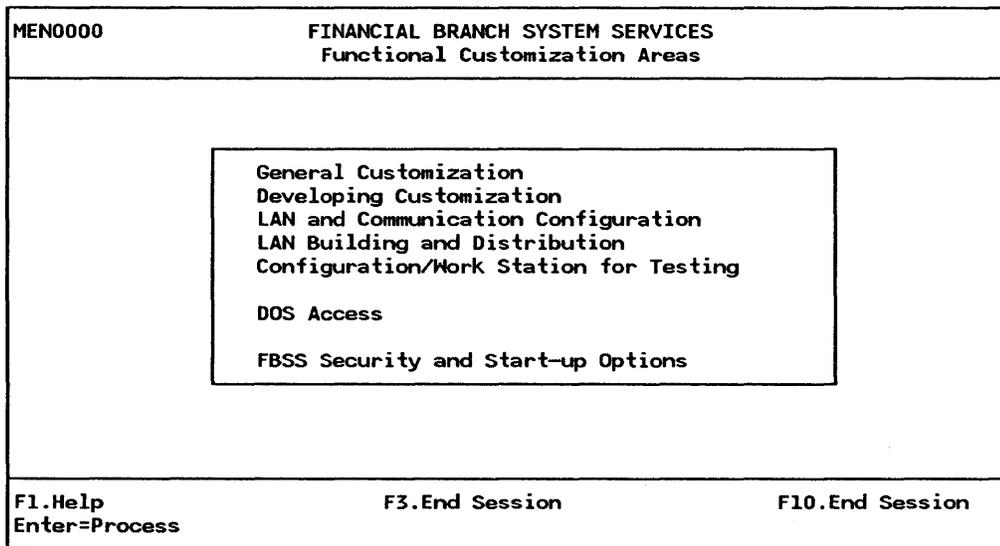


Figure 225. FBSS Functional Customization Areas

The function "DOS Access" allows you to do DOS functions during the customizing process (for instance, you need more diskettes than expected and have more to format). To return to the customization process, type EXIT at DOS prompt.

The easiest way to go through the customization program is to run it step-by-step in the sequence of the panels.

### 36.3.2.1 General Customization

The general customization option is used to establish general characteristics for the network that is being defined.

This step consists of three options:



### 36.3.2.2 *Developing Customization*

The Developing Customization option, is used to define printer formats and record lay outs. The user only needs to go through this panel if the application is using the file server and the printer.

### 36.3.2.3 *LAN and Communication Configuration*

The option LAN and Communication Configuration enables the user to define the individual stations in terms of its support in the network.

This step provides the following functions:

- LAN configuration
- FBSS communication configuration
- Create 'LOG-Files' for shared files
- Release-1 configuration file conversion.

The most important function is "LAN Configuration". It has to be used even if the LAN consists of only one PC.

#### **LAN configuration**

The LAN configuration step in the customization procedure allows you to define the logical structure of your LAN.

This means that you are requested to define:

- Which PCs will run as servers (communications server, shared file server, printer server, and so on).
- How these services are distributed (all in one PC, one service per each server PC, ... ).
- The relationship between a Server PC and a served PC in the LAN (from which server in the LAN a served PC will receive the requested service).
- The resource name of the shared file server (if used).
- The resource name of the 4712/22 printer server (if used) and the way the printer(s) are physically attached to the Server PC.

When you select this option, the CUSLAS panel is displayed. It consists of two parts: "Selected Configuration" and "Pattern Model". It allows you to develop a configuration by modifying an existing one (the pattern model). The first time there is of course no pattern model.

In the "Selected Configuration" you are prompted with the default value 'C:\FBSSCUS\' in the PATH field. We **recommend not to use** this default value but to specify a subdirectory other than FBSSCUS to store the generated configurations. This helps to make the reinstallation of FBSS much easier and to keep all generated configurations. Otherwise you have to delete all configurations stored in FBSSCUS and deleting of FBSSCUS, with its complicated subdirectory structure, could be the most time-consuming task of the entire reinstallation.

When you press the Enter key, then the CUSLAN panel is displayed. This panel (see Figure 227 on page 369 ) may appear somewhat complicated for a first time user (even more, if without experience on EZ-VU II) and is now described in more details.

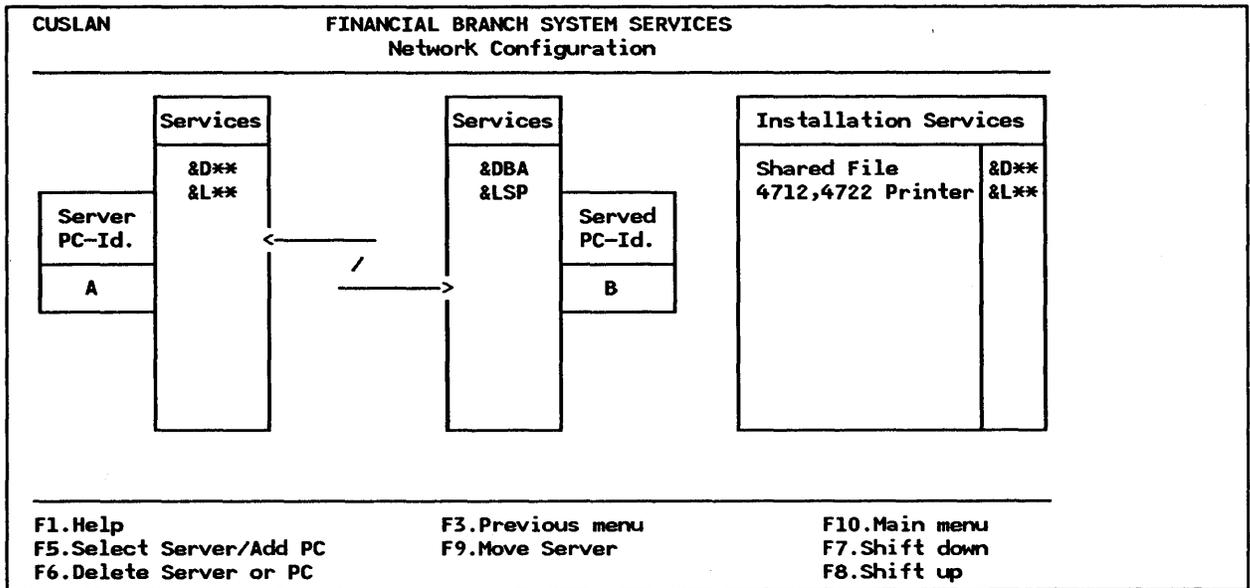


Figure 227. Sample Network Configuration Panel

You have to observe the following **general rules** which are 'EZ-VU II conventions:

- Use the TAB-key to jump from "box" to "box" (that is, "Server PC-ID" to "Services", "Services" to "Served PC-ID", and "Installation Services")
- Use arrow keys to jump inside a box.
- Use F5 key to transfer a function from one box to another.
- Use F6 key (and a second time again for confirmation) to delete a function within a box.
- Press Enter key after each step (to start processing).

As a kind of "cookbook" you should follow this general sequence (in case of a simple configuration, that is only one PC or only one server, some items of the list will be automatically skipped).

1. Enter the ID of server PC in the box "Server PC-ID".
2. Jump to box "Services" (by using the TAB key).
 

**Note:** All services you'll need for your configuration should already be there. Otherwise, return to main menu (by pressing F3) and rerun function "Installation Servers" to include the missing services. Then return to the CUSLAN panel.
3. Select the first service that will be provided by the server PC (by using the appropriate arrow key) and press F5 to transfer the service to the box "Services". (See Remark 1.)
4. Repeat this step for each service provided by this PC.
5. If there are services on other PCs jump to "Server PC-ID" box (by using TAB key) and enter the ID of each of these PCs.
6. Jump again to "Services" box and transfer services by using F5 key as it was described in step 3.
7. If necessary, repeat steps 5 and 6 until all server PCs are defined.
8. Jump to box "Server PC ID" and type the ID of the first server PC.
9. Jump (by TAB key) to box "Served PC-ID". Enter the Id of first PC served by this server (this may be the same Id as in "Server PC-ID" box if there are no dedicated server PCs).

10. Jump to box "Services" (by TAB key) and select the service provided by the server PC that this served PC will use.
11. Press F5 to transfer the service to the served PC (see remark 2).
12. Repeat steps 10-11 for all servers of the same server-requester pair.
13. Repeat steps 9-12 for all other served PC's of this server PC.
14. Repeat steps 8-13 for all other server PC's and their appropriate served PC's.
15. Leave the function by F3 key.

Remark 1:

- If you are transferring a "Shared File Server" to the "Services" box of "Server PC-ID" the resource name is still "&Dxx". Therefore, a pop-up panel CUSLDB is shown. On this you are prompted to enter a two-byte extension for "&D\*\*" (each byte consisting of either a character or a number) to generate a unique four-byte resource-name which is referred to by the application. This name has to be transferred to the resource-name field of the parameter list COMAREA of your program when calling the FBSS Supervisor. In COBOL this is, for instance, done by the instruction.

MOVE '&DBA' TO RESOURCE.

- If you are transferring a 4712/4722 service, the following pop-up panel CUSTSR is displayed:

<b>CUSTSR</b>		
<b>4722,12 Adapter configuration</b>		
<b>Parallel port:</b>	Yes	No
<b>Port 1:</b>	>Yes<	No
	>Shared (A/B)<Common	None
<b>Port 2:</b>	Yes	No
	Shared (A/B) Common	None
<b>Port 3:</b>	Yes	No
	Shared (A/B) Common	None
<b>Port 4:</b>	Yes	No
	Shared (A/B) Common	None
Press Esc, F3 or F10 to Cancel.		

Figure 228. 4712, 4722 Adapter Configuration (Shared Printer on Ser. Port 1)

Through this panel, you define how the printer(s) is(are) attached to the PC where the Printer Server function will be installed, whether through the parallel and/or serial interface, and the way (shared or common) the printer can be used.

- "Shared" means that the printer can be used only by two PCs in the LAN
- "Common" means that the printer can be used by any PC in the LAN.<sup>38</sup>

Remark 2:

- If the service you are going to provide to a served PC is the 4712/4722 Printer Server function, you are prompted through an additional panel (CUSTSD, see Figure 229 on page 371) to define unique resource names. This is in order to address a specific printer from the application by using the appropriate value in the COMAREA resource name field of the CALL statement.

<sup>38</sup> A parallel attached printer can only be used in "common mode".

CUSTSD							
FINANCIAL BRANCH SYSTEM SERVICES							
Define 4722,4712 Services							
PC Server.....: A				PC Served.....: B			
Port	Usage	Service ID	PC Served	Port	Usage	Service ID	PC Served
Parallel	Common		---				
1	Common		---	3	Common		---
	>Shared A<	02	B		Shared A		
	>Shared B<	01	A		Shared B		
2	Common		---	4	Common		---
	Shared A				Shared A		
	Shared B				Shared B		
F1.Help							
F3.Cancel							
F10.Cancel							

Figure 229. Define 4712, 4722 Services (Shared use by PCs with IDs A and B)

Define names only for servers already defined on screen CUSTSR (which are discernible on panel CUSTSD by a different background color). Jump to the appropriate line by TAB key, and enter the two-byte extension to "&L\*\*" to make the server ID unique. (For printers used in "shared mode" there should be different server names).

If you entered all values correctly, the ENTER key will automatically return you to the CUSLAN panel. You will see the four-byte-printer server names in the box "Services" of "Served PC-ID".

#### Create "LOG-FILES" for Shared File Server

There is only one log file per shared file server. Each log file has the name LOG.DAT (if you rename it, the system will not work). This is done due to the needs of a production system. But that requires some special consideration if you have to test with various shared file servers on the same PC during the development phase (of course, there can be loaded one shared file server only at any one time). After each test run you have to save the current log file (we suggest on diskette) and reload it before the next test run.

It may be wise to give different sizes to the log files of the various shared file servers used during test phase. In that manner it is visible which one is currently in the root directory of drive c. But you should be aware that the size of the log file may increase during intensive test activities if no CB, ET, or RB call is given for longer periods of testing.

The first screen of this function is CUSLOG, where you select the configuration by path and name.

The next screen is SERLOG, where you chose the PC at which the log file is to reside (there can be more than one PC with a shared file server in one configuration).

On screen DBSLOG you select the number of initial 4K blocks and the number incremental 4K blocks. Be aware, that a new log file is created on the root directory of drive c. The existing one is saved by renaming it LOG.OLD. If not already done, you should store it to the diskette with the appropriate shared file server (you can do it immediately by using the DOS ACCESS function of FBSS).

#### FBSS Communication Configuration

The communication customization allows you to define the different circuits and sessions for each communication server in the LAN.

The communication customization requires that the PS/2s acting as communication servers have already been defined. Through the different steps, the user defines an SDLC environment.

- The link characteristics of the server (number of buffers, physical address, and so on)
- The LU IDs used for the PS/2s in the LAN

- The Session IDs used by the applications.

When the "FBSS Communication Configuration" option is selected, you will be prompted with the definition of the number of buffers used by the communication server (COMVER panel) when exchanging messages with the host, and the definition of the communication link (COMSDL panel if an SDLC link is used).

COMVER	FINANCIAL BRANCH SYSTEM SERVICES Communication Servers
Path .....	Configuration .....
	PC Server .....=
	Data Link Control .....=
	Number of buffers .....=

Figure 230. Communications Server

- PC server is the PC ID of the communication server.  
In this field, the FBSS Customization program provides you with the PC ID of the PS/2 defined in the LAN customization as communication server. If more than one communication server defined in the configuration, the first one is displayed. You can go through the other communication servers using the F7/F8 keys.
- Data Link Control indicates the type of communications used. It can be &SDL for SDLC or &X25 for X.25.
- "Number of buffers" is a required input field where you specify the number of link buffers that must be allocated in the Communications Server PC.

Allowed values are:

- For SDLC: from 8 to 184.
- For X.25: from 20 to 2000.

Each buffer contains 256 bytes for SDLC and 128 bytes for X.25. Based on the number of buffers specified through this panel, the system allocates a buffer pool in the communication server storage. The buffers on this pool are used by the server in order to send messages to the host application when requested by an FBSS application or to provide host messages to the FBSS application.

The number of buffers to be allocated must be carefully evaluated when designing the FBSS network. It is dependent on the number of PS/2s served by the communication server, the length and the load of the messages exchanged with the host applications, the storage available in the communication server, and the performance expected by the user.



Once you have entered all the LU IDs and you have pressed the Enter key, a message will inform you whether the SNA session values have been successfully updated.

#### 36.3.2.4 LAN Building and Distribution

Once the network has been defined, by selecting the LAN building and Distribution option, the user will be able to generate diskettes to be loaded in the different stations to operate under FBSS.

This step consists of the functions (see Figure 233):

- Building software and Data for each PC
- Getting diskettes for distribution.

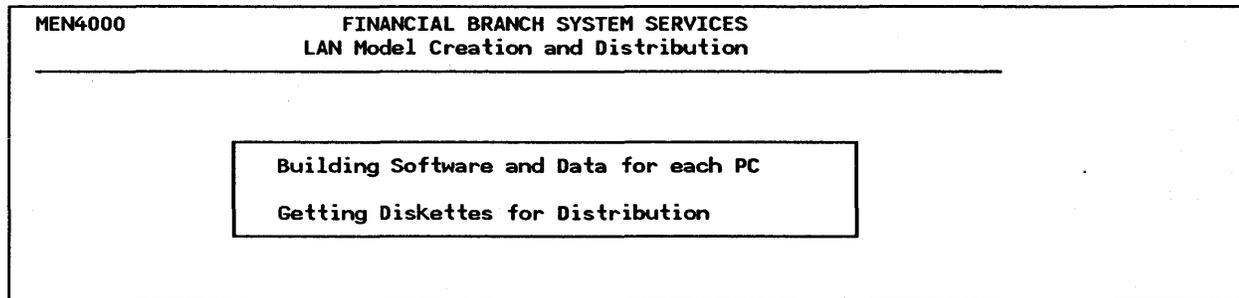


Figure 233. LAN Model, Creation and Distribution

#### Building Software and Data for each PC

The CUSBLM panel is displayed if you select this function. Select configuration by path and name and then press the Enter key.

The building process starts automatically indicating progress messages in the lower left corner of the screen.

If a shared file server is included in your configuration, the DBDBLM panel is displayed and you are prompted to enter the name and some parameters (number of additional buffers, number of additional sessions, creation of a statistical file) of the shared file server to be included.

**Note:** On most screens, appropriate default values are given and you can just press the Enter key. **Do not do so on the DBDBLM panel. Read before pressing Enter.** If the indicated shared file configuration does not belong to the currently generated configuration, use scrolling keys F7/F8 to search for the appropriate shared file server name before pressing Enter.

#### Getting Diskettes for Distribution

Use this function to generate a diskette for each PC in the LAN. As mentioned earlier you should have the diskettes already formatted prior to running this step.

**Note:** For limited testing on the "Customizing PC" there may be no need to create a diskette. This method is described in the next chapter.

#### Completion of the Generated Diskettes

There are program functions and utilities to be used for the integrity of files in a production system. They presuppose adequate programming and handling.

During the test phase files may be corrupted by an erroneous application in a way that they cannot be restored (for instance, different versions of a program to be tested write records in various formats - correct and incorrect - to the file). In that case, there must be an easy way to restore the original file.

To do that, we recommend you copy the target and index files to the diskette with the appropriate shared file server. To have an appropriate log file, too, the original file LOG.DAT should be copied to diskette with a different name (we always used LOGORIG.DAT). If you would strictly follow our

recommendations, the original log file on diskette would never be overwritten. But experience shows that in the hectic pace of a test environment somebody sometimes will issue the following command:

```
COPY C:LOG.DAT A:
```

and the original log file will be lost.

### **36.3.2.5 Model Testing**

With this step you can test a newly created system on the "Customizing PC" without using a diskette and you can test FBSS calls without having written any line of code.

It consists of the following functions:

- Configuration/WorkStation for Testing
- System verification program.

#### **Configuration/Workstation for Testing**

With this function you may switch FBSS between "customization" and "testing" mode. Customization mode is automatically entered if you invoke FBSS for the first time and is used to generate a FBSS system. All tasks described up to now were done in customization mode.

"Testing mode" is a feature to run the "System Verification Program" in the environment of one of the defined work stations.

**Note:** That is not the only possibility to start the 'System Verification Program'. It can also be started from a generated diskette.

The WKSCON panel is displayed when you invoke function "Configuration/Workstation for Testing" and you are prompted for the name of the configuration and the mode. If you select "Testing" you are prompted for the ID of the station to be tested on the next screen WKSWKS. Thereafter, you are prompted to leave FBSS and to re-IPL the machine.

During this IPL, the new environment is set. If the station to be tested includes a shared file server, the appropriate log file is copied into the root directory. As every log file has the name LOG.DAT, there is the risk that an existing log file may be overwritten if there are several configurations with various shared file server on your Customizing PC.

It is our experience, that you will inevitable end-up with several configurations and more than one shared file server on your Customizing PC during test activities. That will even occur, if your objective is a solely and clearly defined configuration. There will be at least one configuration with the servers concentrated on one station - for quick and easy tests on the Customizing PC - and another environment with the servers spread about stations - for test on the LAN test environment.

**Note:** Switching between "Customization" and "Testing" mode requires that you keep track of the mode currently set. There is no automatic change to a default mode after IPL. Even after an IPL you have to know in which mode FBSS is and which FBSS start procedure to invoke. Failing to do so brings a "Mode Error" message. To avoid confusion it's recommend you always switch back to "Customization" mode after a test in "Testing" mode has been completed.

Using "Testing" mode may be useful for a first and quick test in a simple environment. But it tends to led to confusion, especially, if you had to interrupt your work.

It is better to generate diskettes and set an environment to be tested by IPL'ing the appropriate diskette.

#### **System Verification Program**

The System Verification Program (SVP) is a very useful tool for the application programmer, especially when using FBSS for the first time. You can test each FBSS call without writing any line of code. As a result you'll get the return code as if the function would have been called by an application.

The application programmer may gain the following information from the SVP:

- The correct format of the parameter list to be provided with the CALL
- The correct sequence of FBSS-functions needed
- The return codes to be handled by the application.

The SVP is invoked by simply entering

FBSSSVP.

Of course, the environment to be tested must have been set in advance.

## ***36.4 Where To Go For More Information***

- GG24-3218 *Banking Branch Automation: A Planning Guide*.

## 37.0 4702 Finance Control Unit

### 37.1 Overview

The 4700 Finance Subsystem can be directly attached to the Token-Ring Network and communicate with other 4700 equipment in the Token-Ring LAN. Communication with PCs or PS/2 on the LAN can also be possible if the IBM 4700 Financial Branch System Integrator (4700 Integrator) is installed.

4700's line devices can be used with the 4702 Financial Branch Data sharing services to share data between several 4702's on the ring and to communicate at the branch level.

The 4702 Cluster Controller is the only equipment of the 4700 line that can be attached to the Token-Ring Network.

Basically the configuration is the following:

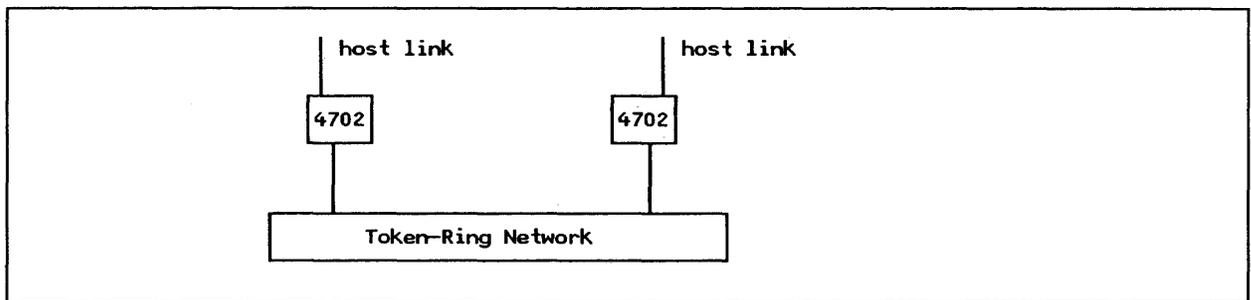


Figure 234. 4702 Token-Ring Configuration

#### 37.1.1 The 4702/Data Sharing Function

The IBM Financial Branch Data Sharing Services (4702/Data-Sharing) is a microcode feature (Feature Code 7003) for the 4702 Processor.

It provides horizontal growth to the banking branch by enabling multiple 4702s attached via the 4702 Token-Ring Network Adapter to the Token-Ring Network to:

- Share EDAM files among 4702 Processors (Remote File Access)
- Support station-to-station communications among Applications in different controllers.

The logical disk drive and alias table functions allow application independence of disk configurations. EDAM extensions allow an application program to use Record Level Locking.

Release 8 of the 4700 Host Support Program (HSP) and system monitor are extended to support these new resource sharing facilities.

These facilities can be used to:

- Dedicate controllers to specific functions for better load balancing.

- Replicate applications in many controllers in a single branch while sharing data between controllers for processing capacity growth.

### 37.1.2 4702-to-4702 Communications

When two or more 4702s are attached to the same LAN, a workstation in one 4702 can exchange messages with workstations in the other 4702s.

The 4700 APB uses the same macros as the station to station communication interface with minor modifications.

For the station-to-station communication, the programming considerations have incorporated some changes either when writing to remote stations, or when receiving from them. For details, the reader should refer to the official 4700 publications.

In the 4700 CPGEN, specific activities must be performed so that the application can exchange messages with another 4702:

- A session must be defined between this 4702 and the other 4702,
- The workstation must be allowed to use this session.

The 4702-to-4702 session is specified through a REMSESS macro, while a new parameter in the STATION macro enables the workstation to use this session.

### 37.1.3 EDAM Server

The 4702 has a disk capacity up to 1.6 Gigabytes. When attached to a Token-Ring LAN, the 4702 can be used as a File Server for the other 4702s or PS/2s attached to the same LAN.

In addition to the virtual volume and remote program load functions, two new functions are now provided by the 4702

- Remote File Access

Remote file access means that a 4700 Application (APB) running in any 4702 attached to the same LAN to which the 4702 File Server is also attached, can access any type of EDAM file located on the server.

In addition, the same application can run, without any change, in the 4702 server.

- Virtual File

A virtual file is a standard PC file physically located in one of the 4702 disk drives. This file is accessed by the PC applications running on any PS/2 attached to the same LAN, using standard DOS File calls and using standard DOS Access rules.

In addition, a PC virtual file can also be accessed by a 4700 application running on any 4702 of the LAN.

Basically, the EDAM server is a microcode program which receives requests from the requestors (4702 and/or PS/2), executes the requests and then returns the reply.

The EDAM server function requires, in the server controller, a dedicated workstation for each local physical drive accessed by a remote requestor (4702 and/or PS/2). This workstation is defined through a new parameter (SERVER = (station,buffer)) of the FILES macro.

Each local physical drive is defined in the configuration through a FILES macro. When the physical drive contains files that are used also by remote requestors, then a server workstation is required for the drive.

- SERVER = specifies that the physical drive being defined will also handle requests coming from a remote requestor (4702 or PS/2). When this parameter is coded, the microcode module (ME5) that provides the EDAM file Server function is included in the configuration.

- "Station" specifies the ID of the workstation dedicated to this shared drive. This station cannot be used for any purpose other than its use for this shared drive.
- "Buffer" specifies the size of a data segment buffer used for I/O operations by the server workstation. The minimum size of this buffer is 2K. The maximum size is 64K.

In the server controller, at least one REMSESS macro must be coded for a shared physical disk drive which is also used by a remote requestor. In this REMSESS macro, the DRIVE = parameter specifies the ID of the physical drive, while the DEVTYPE = parameter must be EDAMS, to indicate it as an EDAM server session.

If the requestor is a 4702, then in the REMSESS macro the REMADDR = parameter specifies the Token-Ring adapter address of the remote 4702 that will access the drive. Therefore, if more than one 4702 are connected and allowed to access the drive, a REMSESS macro (with a different value in the REMADDR = parameter) must be coded for each remote 4702.

If the requestor is a PS/2, additional macros and parameters are required.

### 37.1.4 4702 CPGEN Definitions

The 4702 Host Support Program (HSP) Rel.8 includes three new macros (TOKRING, SAP, and LSPARM) that are used in the 4702 CPGEN to define the way the 4702 Processor is attached to the Token-Ring Network.

These macros identify the three entities which participate in Token-Ring communications:

1. The Token-Ring Network communications adapter, which is unique in a 4702 Processor.

Its parameters (such as ring addresses, size of receive buffers and number and size of transmit buffers) are defined by the TOKRING macro. Only one TOKRING macro is permitted.

2. The Token-Ring Service Access Point (SAP).

The SAP<sup>39</sup> is to some extent comparable to the SNA PU entity. There can be more than one SAP in a Token-Ring node. Each Service Access Point is defined by a SAP macro. Some of the Token-Ring communications parameters can be overridden at SAP level by a SAP macro.

In the 4702, up to four types of SAP can be defined, based on the functions the customer is going to use:

- The SNA primary (SNAP) SAP.

This SAP is required for all SNA sessions established between the 4702 and the PCs running the PC/ Integrator.

- The Token-Ring Session Manager (TRSM) SAP.

This SAP is required if the 4702 is a file server or file requestor for another Token-Ring-attached 4702.

- The Remote Program Load Server (RPLS) SAP.

- The Discovery (DISC) SAP.

The RPLS SAP and the DISC SAP are required if the remote program load function is used.

3. The Link Station.

---

<sup>39</sup> A Service Access Point provides the interface from the Logical Link Control (LLC) layer to the upper layers in the OSI Model. A layer can have more than one SAP associated with it. Thus, a node in a LAN can have several independent connections with SAP's concurrently. For more details, see *Local Area Networks: Concepts and Positioning*.

A link station is the occurrence of a communications session established between two Token-Ring SAPs. There can only be one link station per SAP pair between two Token-Ring nodes. A Token-Ring node must have at least one link station for each Token-Ring Network node it intends to communicate with. The characteristics, the remote address and SAP value of a link station are defined through the LSPARM macro.

Two different SAPs (for example, SNAP and TRSM) can both have link stations to another node.

When the 4702/Data Sharing function is defined in the 4700 CPGEN, a link station is defined and allocated for each 4702 logically connected to the 4702 being defined.

## **37.2 *Planning Checklist***

### **37.2.1 Hardware Requirements**

The 4702 Token-Ring Network Adapter (Feature Code 3105) allows the 4702 Processor to attach directly to the IBM Token-Ring Network.

The IBM Financial Branch Data Sharing Services (4702/Data-Sharing) Microcode Feature (Feature Code 7003) for the 4702 Processor.

Only one adapter per 4702 is allowed. All 4702 models support this adapter. It is also field-installable.

The 4702 microcode support for the 4702 Token-Ring Adapter card is provided by EC 325257.

The 4702 Token-Ring Network Adapter consists of the following hardware pieces:

- An Adapter card which plugs into slot 10 on the engine/memory board of the 4702,
- An I/O bracket which attaches to the slot number 26 in the rear of the 4702,
- An internal cable which attaches the card adapter to the I/O bracket,
- An external cable which connects the 4702, via the I/O bracket, to the Token-Ring Network.

### **37.2.2 Software Requirements**

- The 4702 Host Support Program (HSP) Rel.8.

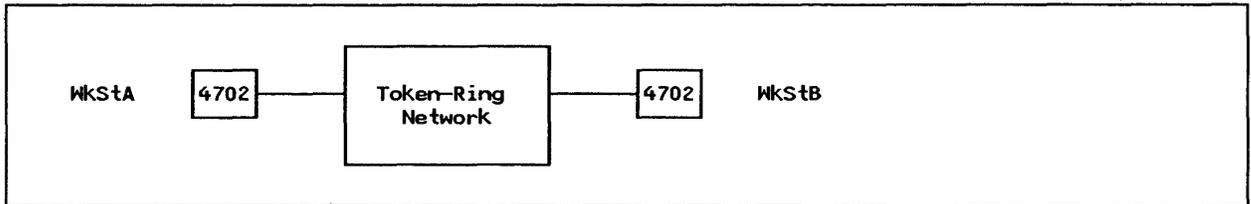
## **37.3 *Installation Steps***

- Have your customer engineer (CE) install the Token-Ring Network adapter feature.
- Install the required microcode.
- Code the CPGEN required definitions to incorporate the Token-Ring Network support into your 4702 Cluster Controller.
- Generate and transmit to the 4702 the new generated diskette.
- Connect the Token-Ring Network adapter to the Multistation Access Unit and test.

## 37.4 Coding Examples

In the following examples, only the Token-Ring Network related Macros and operands are going to be presented. If the reader needs to get detailed information about the CPGEN macros he should refer to the appropriate documents.

### 37.4.1 4702-to-4702 Communication for Station-Station Session



The CPGEN definitions for each 4702 Cluster Controller, should match each other. The CPGEN parameter definition relationship as well as some notes about them will be presented following the definitions.

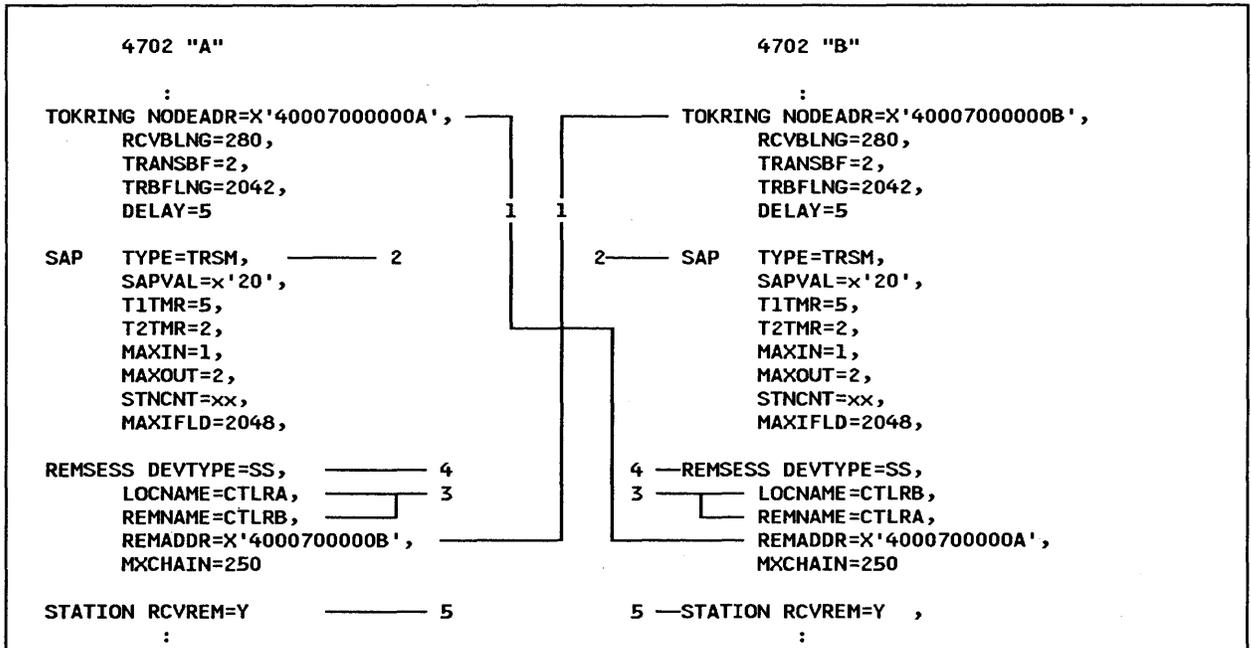


Figure 235. CPGEN Definitions For A 4702-4702 Configuration.

1. The locally administered address for the 4702 Token-Ring Network Adapter, defined in the TOKRING macro, should correspond to the value of the operand REMADDR in the macro REMSESS of the CPGEN for the other 4702 Cluster Controller.
2. The operand TYPE=TRSM defines the Token-Ring Network Session Manager SAP. This SAP is required if the 4702 is going to communicate with another 4702 on the LAN.
3. The LOCNAME and REMNAME operands of the REMSESS macro are used to identify the session partners. If REMNAME is specified, only requests coming from this session partner will be accepted. By specifying "\*", requests from any requestor name is accepted.

4. The DEVTYPE operand in the REMSESS macro, has to be defined as SS. SS stands for station-to-station session.
5. The operand RCVREM=Y enables the workstation defined in the STATION macro to send or receive station-to-station messages in a 4702-to-4702 Token-Ring Network session.

## 37.4.2 EDAM Server/Requester Scenario in 4702 Cluster Controllers

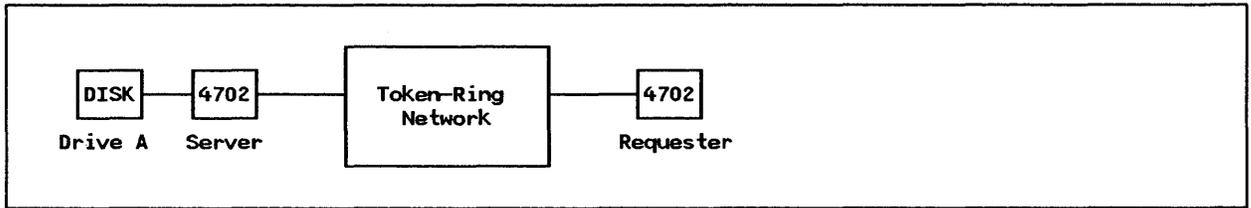


Figure 236. EDAM Server to EDAM Requester in a 4702-to-4702 session

The CPGEN definitions for each 4702 Cluster Controller, should be done with some considerations in mind. The CPGEN parameter definition relationship as well as some notes about them will be presented following the definitions.

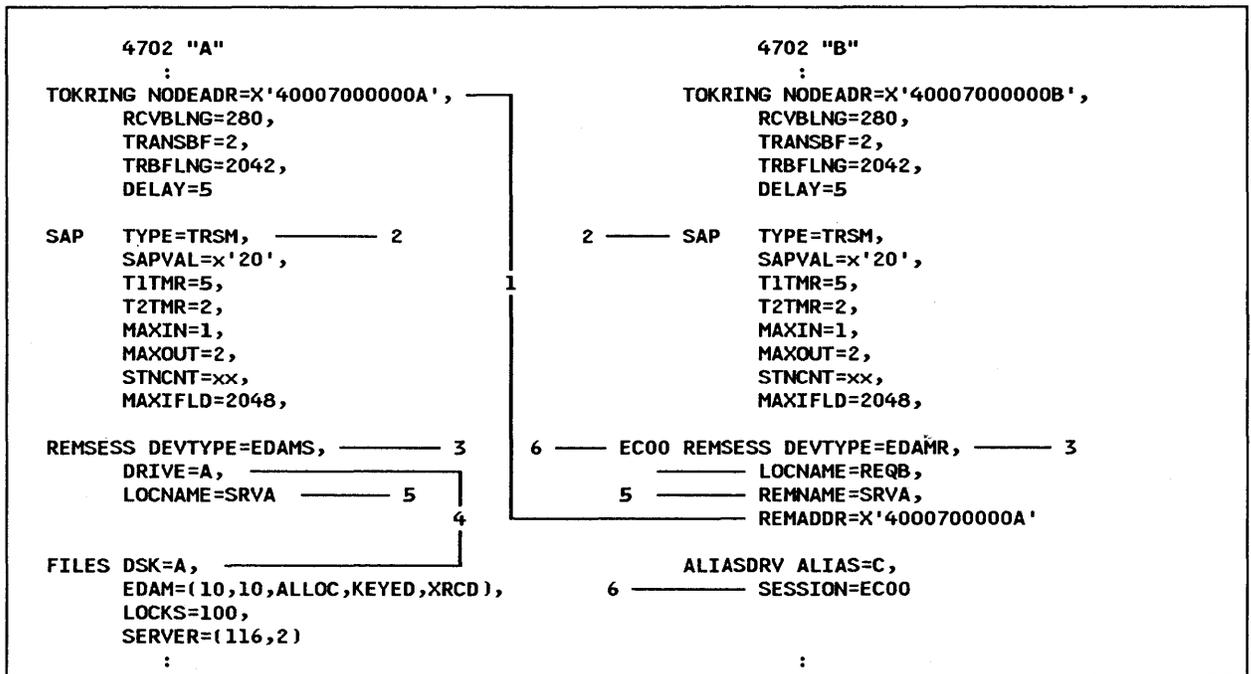


Figure 237. CPGEN Definitions For A 4702-4702 Configuration

1. The locally administered address for the 4702 Token-Ring Network Adapter, defined in the TOKRING macro for the Server 4702, should match the value of the operand REMADDR in the macro REMSESS of the CPGEN for the requester 4702 Cluster Controller.
2. The operand TYPE=TRSM defines the Token-Ring Network Session Manager SAP. This SAP is required if the 4702 is a file server or file requester for another 4702 attached to the Token-Ring LAN.
3. The DEVTYPE operand in the REMSESS macro has to be defined as EDAMS for the 4702 acting as Server and as EDAMR for the 4702 acting as requester.
4. The Disk Drive "A" in 4702 A will be used for remote file access. The drive is specified in the FILES macro in CPGEN for 4702 A and in the REMSESS macro for the station that will access it.

5. The Server name for 4702 "A" is specified in both CPGENs in the own CPGEN, is specified as LOCNAME and in the remote CPGEN as REMNAME and specifies the server name of disk drive A in 4702-A.
6. The ALIASDRV macro establishes a relationship between a drive name and a remote resource. The operand SESSION in the macro, should match the label name of the macro REMSESS that defines the remote server.

### ***37.5 Where To Go For More Information***

- *GC31-2071 IBM 4700 Finance Communication System. Volume 6*
- *GG24-3232 4700|Integrator and PC|Integrator: An Installation Guide.*

## ***PART C. Management of Token-Ring Networks***



## 38.0 NetView/PC

### 38.1 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.

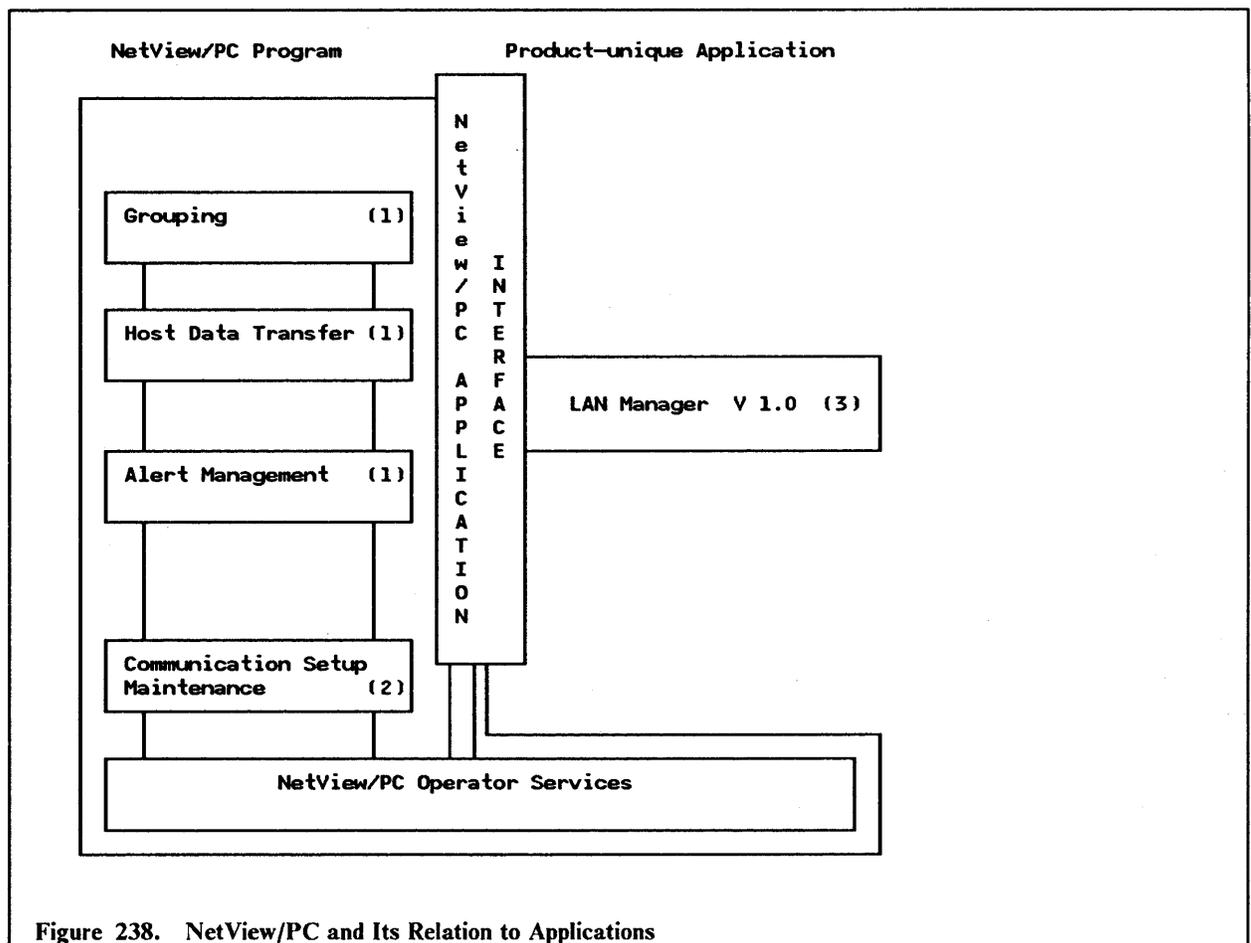


Figure 238. NetView/PC and Its Relation to Applications

Reference:

1. Figure 239 on page 391 through Figure 241 on page 392.
2. Figure 242 on page 393 through Figure 243 on page 395.
3. In the LAN Manager chapter, see the section "Installation (Under NetView/PC)" on page 409.

## 38.2 *Planning Checklist*

### 38.2.1 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 card, or an IBM Token-Ring PC Adapter/A card.
- 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).

### 38.2.2 Prerequisites - Software

- DOS 3.3 or higher.

**Note :** The Realtime Control Program DOS Support V1.02 or later is required for each NetView/PC workstation that communicates using the RTIC or RTIC Multiport Adapter.

- NetView/PC V1.1

**Note :** There are six 5.25" or three 3.5" system diskettes plus one diskette labeled "*Introduction to NetView/PC*" in this package.

- In order to manage multiple Token-Rings, you will also need the IBM LAN Manager Program Version 1.0.

### 38.3 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 PC Adapter, Adapter II or Adapter/A card is installed. (Instructions on how to do this are given on "PC Token-Ring Network Adapter Installation" on page 15 and "PS/2 Token-Ring Adapter/A Installation" on page 21.)
- 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; `.p. 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, is recommended to 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
                  APPLICATION SELECTION
                                     Panel 1 of 3
-----
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)

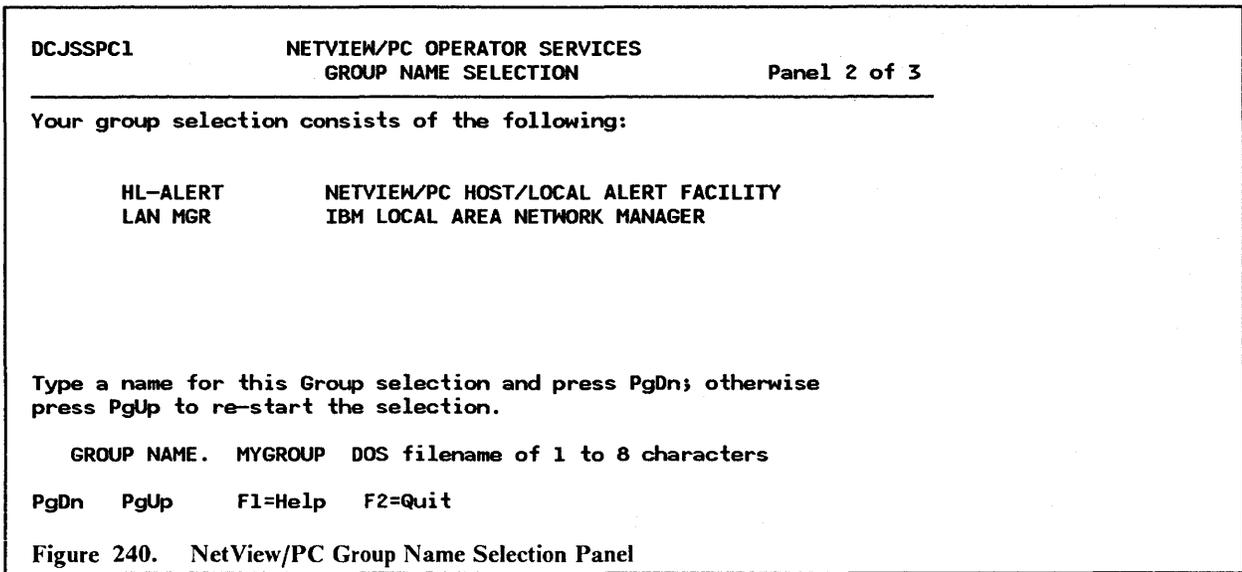
PgDn  F1=Help  F2=Quit  F5=Redisplay  F9=Select

Figure 239. NetView/PC Application Selection Panel

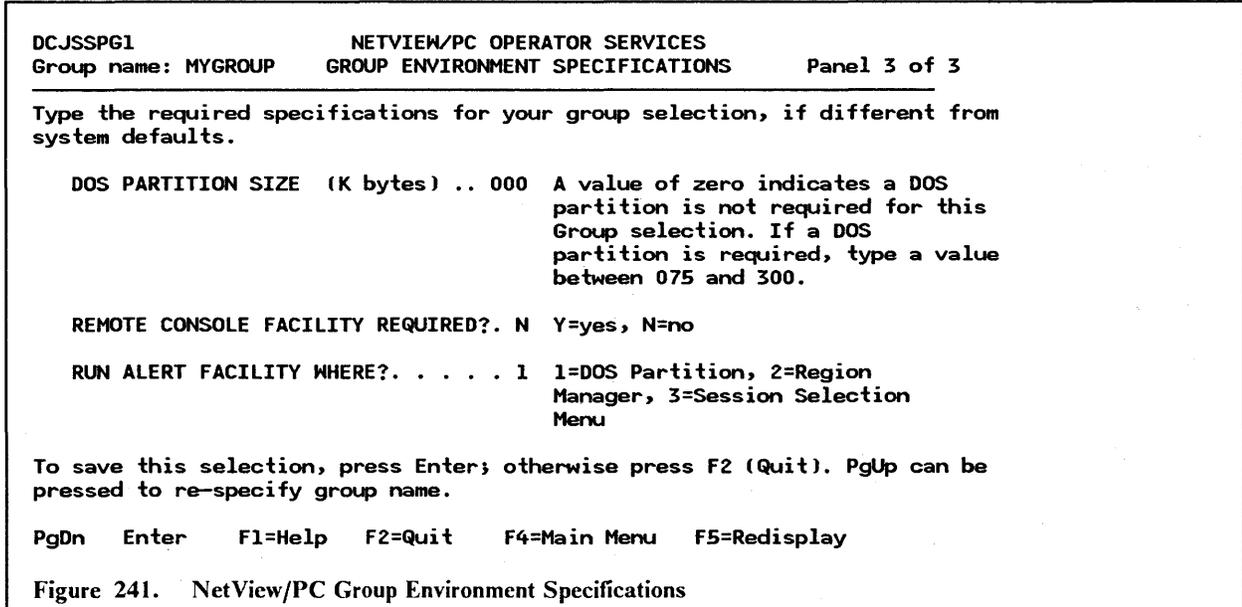
```

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.



After assigning the name "MYGROUP" to the group, press the PgDn key and this panel will be displayed.



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 242. 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

```

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
```

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
```

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 243. 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 won't be here. Quit the "System Record Maintenance" menu and return to the "Communication Set Maintenance" menu.

## **38.4 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.

## **38.5 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*.

## **38.6 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.



## 39.0 LAN Manager Version 1.0

### 39.1 Overview

The LAN Manager Program Version 1.0 is a Network Management program 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 Program.

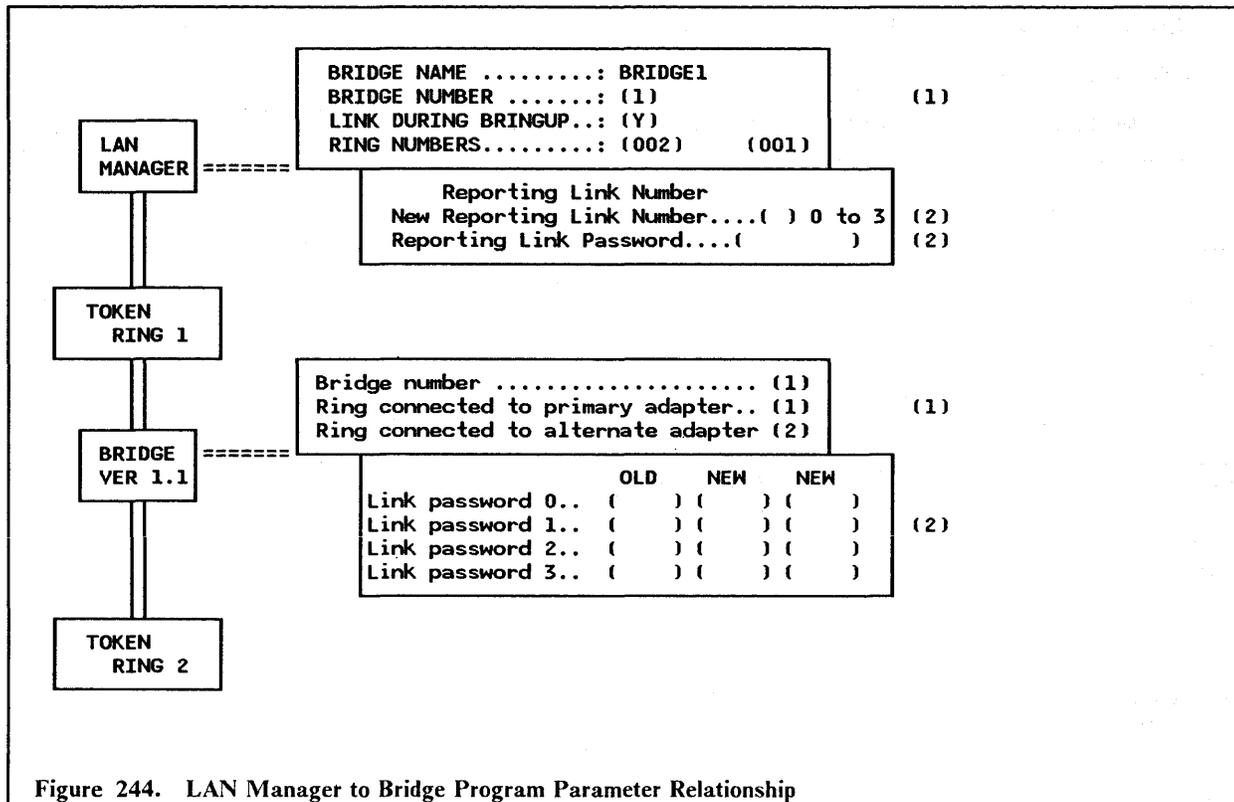
The LAN Manager Program V1.0 allows for the monitoring of network status, determining the source of problems on the network, and the maintaining of network records. On an IBM Token-Ring Network, the LAN Manager monitors the activities on the ring to which its adapter is attached, and on remote rings 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 is required for each network that you wish to monitor.

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:

<b>Normal</b>	The ring is operating normally.
<b>Soft Error</b>	The ring is experiencing intermittent errors but these are being handled by the re-transmission of data until it is passed correctly.
<b>Beaconing</b>	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.
<b>Adapter Closed</b>	The LAN Manager's IBM Token-Ring Network Adapter is not actively attached to the network.
<b>Wire Fault</b>	The LAN Manager has detected a problem between its attaching device and the access unit.
<b>Data Lost</b>	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:



## 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 V1.1" on page 179.
2. The Bridge Program can be controlled by one manager and it can be viewed for up to three managers. To accomplish that, the reporting link passwords in the LAN Manager have to match the link passwords of the Bridge Program.

## 39.2 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).

### 39.2.1 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 card, or an IBM Token-Ring Network Adapter/A card, plus the cable to attach it to the MAU in the network.

### 39.2.2 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).

## 39.3 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 15 and "PS/2 Token-Ring Adapter/A Installation" on page 21.

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, the IBM LAN Manager "Main Selection" menu will be presented.

```

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)

```

2. Select Option 3: "IBM Local Area Network Manager".  
The "IBM LAN Manager Main Menu" will be displayed.

```

DFIPCP10                IBM LAN MANAGER
Normal                  MAIN MENU
-----
Select one of these functions:

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.

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 Program to monitor the IBM Token-Ring Network will be discussed at this time. Refer to the *IBM LAN Manager User's Guide* for information on the options that are not presented here.

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 shown below.

```

DFIPSD10                                IBM LAN MANAGER
Normal                                  SYSTEM DEFINITION
-----
Select one of these functions:

ID FUNCTIONS                            DEFINITIONS
-----
 1 ADAPTER NUMBER                       Specify primary or alternate adapter.
 2 MANAGER PROFILE                       Display the manager's adapter data.
 3 SYMBOLIC NAMES                         Display, define, print symbolic names.
 4 SECURITY                               Change operator password.
 5 LOG OPTIONS                            Change logging of ring configuration changes.
 6 BRIDGES                                Display, add bridge definitions.
 7 REPORTING LINK                         Define bridge access level and password.
 8 LAN NAME                               Specify LAN name.
 9 TRACE OPTION                           Specify if tracing is allowed on the LAN.

Type the ID of the function and press Enter ==> (n)

F1=Help          F2=Quit          F4=Main menu

```

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, you will be presented with this display:

```

DFIPSD75                                IBM LAN MANAGER
Normal                                  ADAPTER NUMBER SPECIFICATION
-----
CURRENT ADAPTER NUMBER .....: 0
ADAPTER NUMBER FOR NEXT INITIALIZATION .....: 0

To change the adapter number for the next initialization or
reset of the LAN Manager, type the adapter number below and
press enter.

NEW ADAPTER NUMBER.....(0)  0 = Primary, 1 = Alternate

F1=Help          F2=Quit          F4=Main menu

```

The adapter number indicates whether the LAN Manager is to monitor the ring to which the primary or alternate Token-Ring 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:

ADAPTER ADDRESS/SYMBOLIC NAME.....: 10005A003787/LANMANAGER01

RING NUMBER.....: 001

NAUN ADDRESS/SYMBOLIC NAME.....: 400000314001/TIC1QSA13

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 this display.

To add a symbolic name, press F6 (Add).  
To find a symbolic name, press F7 (Find).  
To change a symbolic name, tab cursor to line and press F8 (Change).  
To delete a symbolic name, tab cursor to line and press F9 (Delete).

SYMBOLIC NAME	ADAPTER ADDR	COMMENTS
LANMANAGER01	10005A003787	LAN MANAGER

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 F1 to add a symbolic name, you will be presented with this display.

```

DFIPSN20                                IBM LAN MANAGER
Normal                                  ADD SYMBOLIC NAME
-----
Type the adapter address, the symbolic name, and the comments below.
Press the TAB Key to move between fields.
To add the symbolic name, press ENTER.
To clear the data entry fields, press F5 (Redisplay).

ADAPTER ADDRESS..... (           )      12 hexadecimal digits
SYMBOLIC NAME..... (           )      1 to 16 characters
COMMENTS..... (           )           0 to 40 characters

F1=Help      F2=Quit      F4=Main Menu      F5=Redisplay

```

The adapter address and symbolic name are defined on this screen. It is the same information that is displayed on the "IBM LAN Manager Profile" panel.

- Option 4 on the System Definition menu: "Security".

If you select this option, you will be presented with this display.

```

DFIPSE20                                IBM LAN MANAGER
Normal                                  CHANGE OPERATOR PASSWORD
-----
Type the OLD PASSWORD. Then press Enter.
(If assigning a password for the first time, then leave blank and press
Enter.)

OLD PASSWORD (           )           6 to 8 alphanumeric characters
NEW PASSWORD (           )
NEW PASSWORD (           )

F1=Help      F2=Quit

```

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: "Bridges".

If you selected this option, then the following display would be presented:

```

DFIPBD10                IBM LAN MANAGER
Normal                   BRIDGES
-----
Select one of these functions:

  ID  FUNCTION            DESCRIPTION
-----
  1  DEFINE              Add/delete/find/change Bridge Definitions
  2  REPORTERS           Display number of error reporters by ring

Type the ID of the function and press Enter ==> ( )

```

If you selected Option 1, then this display would be presented.

```

DFIPSN10                IBM LAN MANAGER                Page 1 of n
Normal                   BRIDGE DEFINITION
-----
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.

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).

<b>Bridge Name</b>	The name by which you want the bridge to be identified on the network (one to eight characters).
<b>Bridge Number</b>	One hexadecimal digit that identifies this bridge uniquely from all other bridges connecting the same two rings.
<b>Link During Bringup</b>	Y (Yes), if the LAN Manager is to establish a link with this bridge each time it is initialized or reset.
<b>Ring Number</b>	The three-digit numbers of the rings connected by this bridge. They must match the ring number specified in the bridge program configuration.
<b>Adapter</b>	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: "Reporting Link".  
If you selected this option, then this screen will be presented.

```

DFIPSD50                      IBM LAN MANAGER
Normal                          REPORTING LINK NUMBER
-----
CURRENT REPORTING LINK NUMBER.....: 0
REPORTING LINK NUMBER FOR NEXT INITIALIZATION OR RESET.....: 1

To change the reporting link number for next initialization or
reset of the LAN Manager, type the reporting link number and
password (if you wish to change it), then press Enter.

NEW REPORTING LINK NUMBER.....( )      Number 0 = Controlling Manager
                                         Number 1,2,3 = Observing Manager

REPORTING LINK PASSWORD.....( ) 6 to 8 alphanumeric characters

F1=Help      F2=Quit      F4=Main Menu

```

Figure 245. Bridge Link Number and Password.

- 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: "Trace Option".
- If you selected this option, then this screen will be presented.

```

DFIPSD90                      IBM LAN MANAGER
Normal                          TRACE OPTION
-----
Trace Option indicates whether or not tracing of frames is allowed on
the network. The current Trace Option is displayed below.

CURRENT TRACE OPTION .....: YES

To change the Trace Option, type in the new option and press Enter.

NEW TRACE OPTION ..... ( )      Y=Yes, N=No

F1=Help      F2=Quit      F4=Main Menu

```

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.

4. From the "IBM LAN Manager Main Menu", select option 7: "Bridge Functions".

The following screen will be presented.

DFIPBF10 Normal	IBM LAN MANAGER BRIDGE DEFINITION															
Please select one of these functions:																
<table border="1"><thead><tr><th>ID</th><th>FUNCTION</th><th>DESCRIPTION</th></tr></thead><tbody><tr><td>1</td><td>BRIDGE PROFILE</td><td>Display bridge status and parameters.</td></tr><tr><td>2</td><td>LINK BRIDGE</td><td>Establish reporting link with bridge.</td></tr><tr><td>3</td><td>UNLINK BRIDGE</td><td>Terminate reporting link with bridge.</td></tr><tr><td>4</td><td>SINGLE-ROUTE BROADCAST</td><td>Set single-route broadcast in bridge.</td></tr></tbody></table>	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.	
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														

- |                               |  |
|-------------------------------|--|
| <b>Bridge Profile</b>         | 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. |
| <b>Link Bridge</b>            | Select this option to request the LAN Manager to establish communications with a specified bridge in order to get information from a remote ring.  |
| <b>Unlink Bridge</b>          | Select this option to request the LAN Manager to drop communication with a specified bridge.   |
| <b>Single-Route Broadcast</b> | 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.   |

## 39.4 Installation (Under NetView/PC)

The NetView/PC program 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 387. 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 the NetView/PC program, 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 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 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 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 the NetView/PC program 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 program 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.

## 39.5 User's Guide

The LAN Manager program is designed to be started and left to run continuously. **Starting the LAN Manager Version 1.0 Program Standalone**

If the LAN Manager Version 1.0 Program has been installed as a standalone application, you need to follow the following steps:

1. Boot up the PC in DOS (Version 3.3 or higher)
2. Open the adapter (Run TOKREUI.COM)
3. Change the directory to the LANMGR directory  
C> cd \LANMGR
4. Type the command "LANMGR"  
C\LANMGR> LANMGR
5. 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)
```

6. Select Option 3: "IBM Local Area Network Manager".  
"IBM LAN Manager Main Menu" will be displayed.

```

DFIPCP10                                IBM LAN MANAGER
Normal                                  MAIN MENU
-----
Select one of these functions:

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.

Type the ID of the function and press Enter ==>> (2)

F1 = Help      F2 = Quit

```

**Starting the LAN Manager Version 1.0 Program Under NetView/PC**

If the LAN Manager Version 1.0 Program 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) and open the adapter by running TOKREUI.COM.  
 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 will be displayed.

DFIPCP10  
Normal

IBM LAN MANAGER  
MAIN MENU

Select one of these functions:

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.

Type the ID of the function and press Enter ==>> (2)

F1 = Help      F2 = Quit

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 this screen will be presented:

```

DFIPRP10                IBM LAN MANAGER                DATE 05-19-88
Normal                  REQUEST EVENT LOG REPORT        TIME 11:37:00
-----
To view the entire event log, leave fields blank and press Enter.
For selected entries, type your choice and press Enter.
To delete the ENTIRE event log, press F9 (Delete).

  ITEM                CHOICE                DESCRIPTION
-----
START DATE. . .      ( - - )                Retrieve messages logged from the
END DATE. . .        ( - - )                START DATE to the END DATE.
START TIME. . .      ( : : )                Retrieve messages logged from the
END TIME. . .        ( : : )                START TIME to the END TIME.

SUMMARY ONLY.        (N)                   Change to Y (yes) to generate a
MESSAGE NUMBER        ( )                   report summary only.
ADAPTER . . .        ( )                   Retrieve this message number by
RING NUMBER . . .    ( )                   entering the last three digits
                                           Retrieve messages for this adapter
                                           address or symbolic name.
                                           Retrieve messages for this RING NU

F1=Help      F2=Quit                F4=Main Menu    F5=Redisplay
F9=Delete

```

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: ADAPTER00BRIDGE2 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.

## 39.6 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 is 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 program.

## 39.7 *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:

- GA27-3367 *IBM Token-Ring Network Introduction and Planning Guide*
- GA27-3748 *IBM Token-Ring 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*
- *IBM LAN Manager User's Guide.*

## 39.8 *Migration Issues*

If you are upgrading from the Network Manager Version 1.0 or 1.1, then the following will apply:

- Installing the LAN Manager does not affect the 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 (DFISYMNM.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 (DFISYMNM.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).



## **40.0 3270 Emulation LAN Manager Program**

### ***40.1 Overview***

The 3270 Emulation LAN Manager 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.

### ***40.2 Planning Checklist***

#### **40.2.1 Prerequisites - Hardware**

1. The 3270 Emulation LAN Manager 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 48K of memory which is required by the LAN Manager.

The 3270 Emulation LAN Manager Program will not work with a 3270 Emulation Program DFT Gateway.

2. The 3270 Emulation LAN Manager Program uses 48K of memory.
3. 3270 Emulation Program Gateway uses 248K of memory.
4. Appropriate LAN adapter.

#### **40.2.2 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.

## 40.3 Installation Steps

1. Copy the 3270 LAN Manager 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 141.
4. You may need to change your AUTOEXEC.BAT file if you wish to load everything automatically. To load the 3270 LAN Manager 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.

## 40.4 Where To Go For More Information

- *IBM PC 3270 Emulation Local Area Network Management Program User's Guide* which comes with the product.

## 41.0 Trace and Performance Program

### 41.1 Overview

The IBM Token-Ring 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.

### 41.2 Planning Checklist

#### 41.2.1 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.

## 41.3 Installation

The hardware installation of the Token-Ring Network Trace and Performance Adapter II or Adapter/A card is the same as for the PC Token-Ring Adapters and is covered in the chapters on "PC Token-Ring Network Adapter Installation" on page 15 and "PS/2 Token-Ring Adapter/A Installation" on page 21.

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.

## 41.4 User's Guide

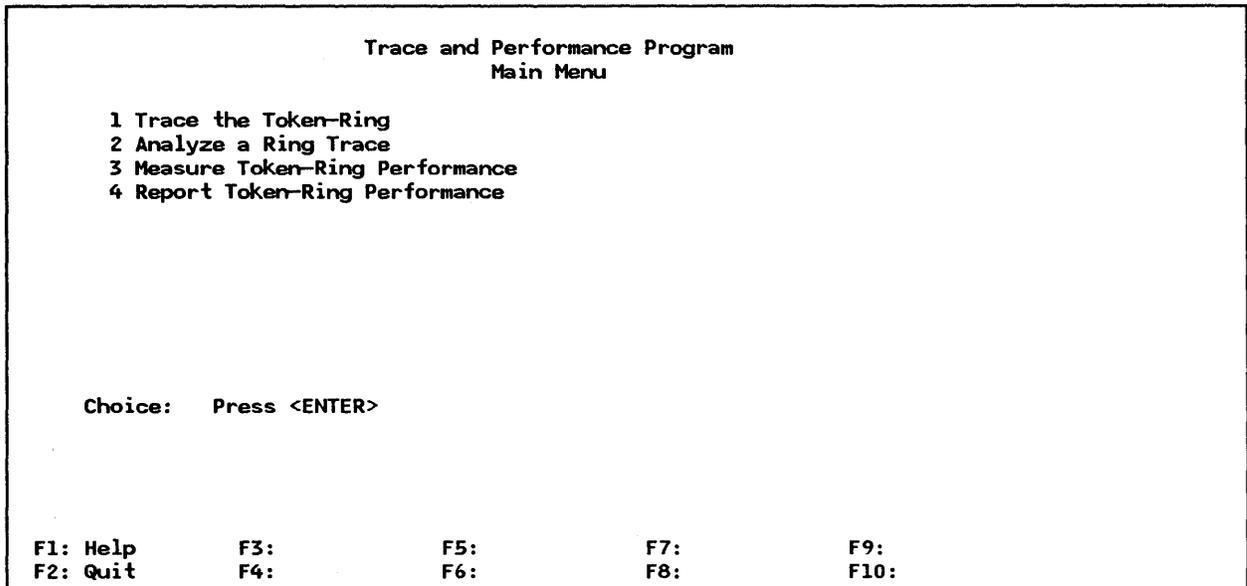
### 41.4.1 Starting the Trace and Performance Program

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.



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.

### 41.4.2 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:
    dougl

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 pre-defined 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 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 ten 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.TRO

                                RTAP
                                Built the File Index

File Name:
    DOUG.TRO

                                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.TRO

                          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 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 OC 400051130005 OC <RR> 92
2 400051130005 OC 10005A107E41 OC <RR> 5
3 400051130005 OC 10005A107E41 OC <I> 92 5 Req. FMD User data.
4 10005A107E41 OC 400051130005 OC <RR> 93
5 10005A107E41 OC 400051130005 OC <I> 5 93 Req. FMD User data.
6 400051130005 OC 10005A107E41 OC <RR> 6
7 400051130005 OC 10005A107E41 OC <I> 93 6 Req. FMD User data.
8 10005A107E41 OC 400051130005 OC <RR> 94
9 10005A107E41 OC 400051130005 OC <I> 6 94 Req. FMD User data.
10 400051130005 OC 10005A107E41 OC <RR> 7
11 400051130005 OC 10005A107E41 OC <I> 94 7 Req. FMD User data.
12 10005A107E41 OC 400051130005 OC <RR> 95
13 C000FFFFFFFF RS 400051130005 RS <Standby Monitor Present>
14 10005A107E41 OC 400051130005 OC <I> 7 95 Req. FMD User data.
15 400051130005 OC 10005A107E41 OC <RR> 8
16 400051130005 OC 10005A107E41 OC <I> 95 8 Req. FMD User data.
17 10005A107E41 OC 400051130005 OC <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.

### 41.4.3 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      1024      2048
Frame Size Distribution Intervals

    DELPERF                                Performance File Name

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) One of Destination OR One of Source (O)				
F1:	F3:	F5: Start	F7: Perf Parms	F9: Save Parms
F2: Quit	F4:	F6:	F8:	F10:

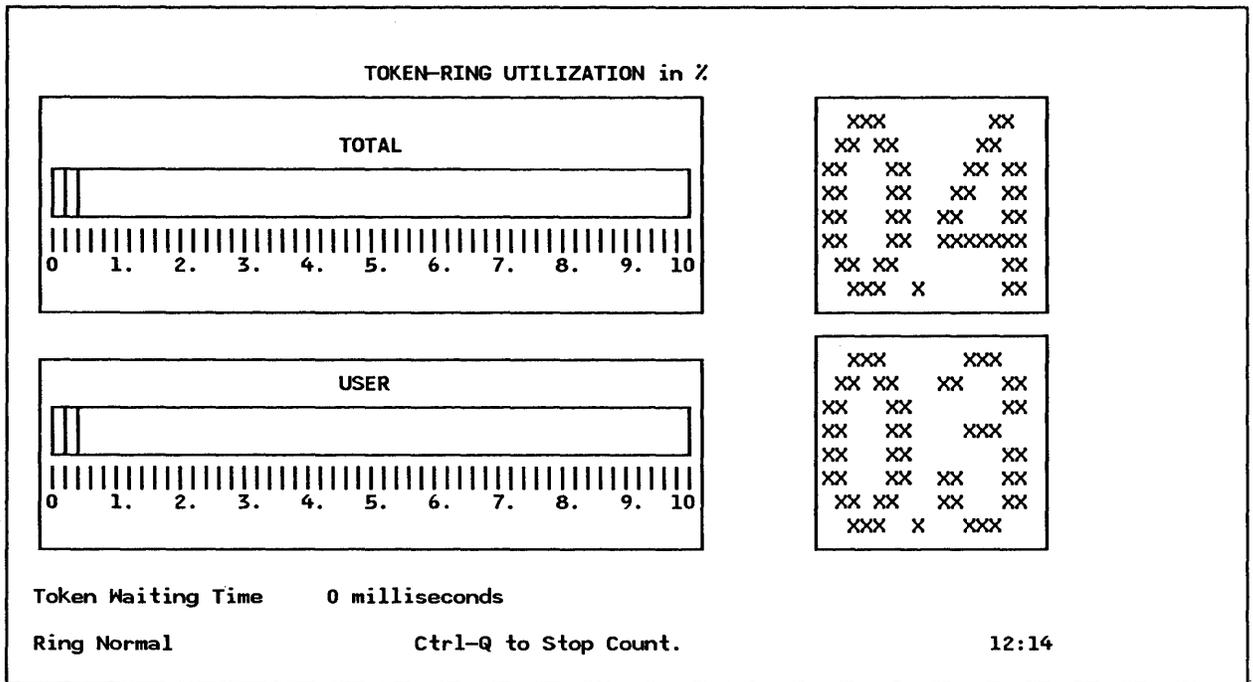
### 3. Performance Facility panel 3.

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.



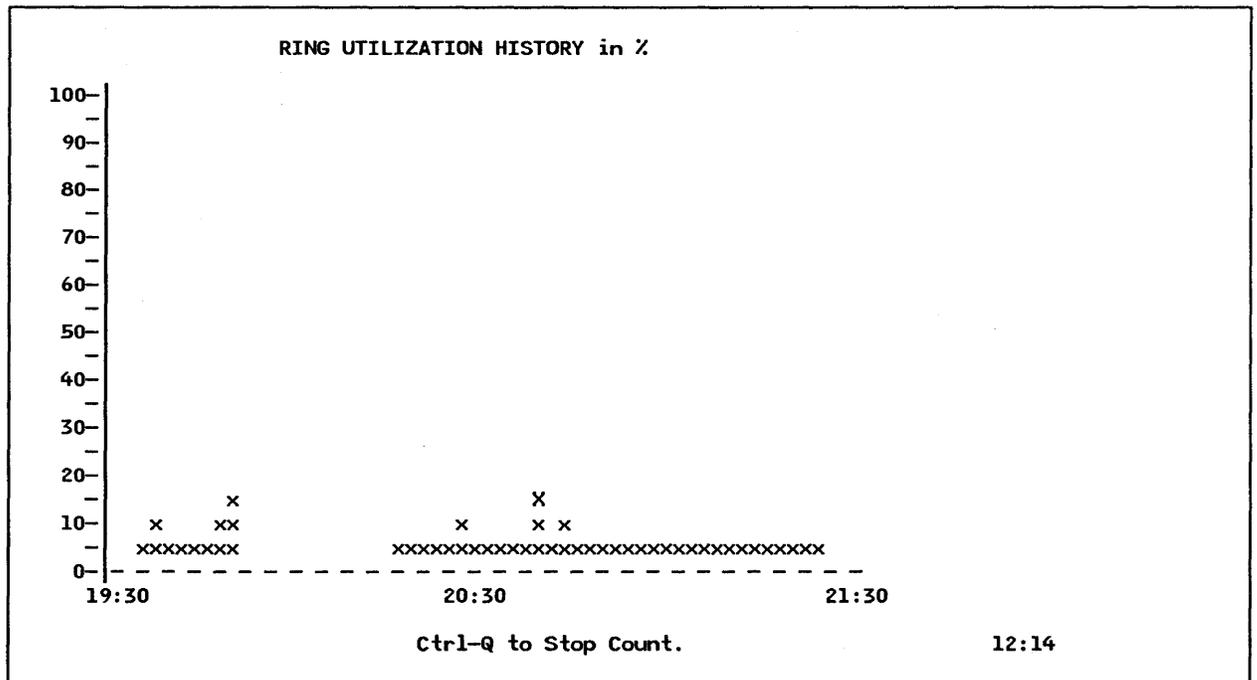
4. Performance Facility panel 4.

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 4mbps 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.CTO

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 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.

## 41.5 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 "EAJxxnnnE" 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*..

## ***41.6 Where To Go For More Information***

*IBM Token-Ring Network Trace and Performance Program User's Guide*.

## ***41.7 Migration Issues***

Information regarding new versions of this program will be included in the release update ship group.



## 42.0 Ring Error Monitor Function

### 42.1 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.

### 42.2 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 in conjunction with Bridge Program V1.1 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.

### 42.3 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 27.

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.



INSTALLATION GUIDELINES FOR IBM  
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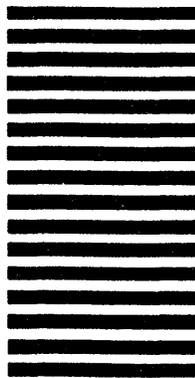
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