



IBM

International Technical Support Centers

**IBM 3174 REMOTE
TOKEN-RING GATEWAY**

GG24-3366-00

IBM 3174 REMOTE TOKEN-RING GATEWAY

Document Number GG24-3366

February 13th, 1989

**International Technical Support Center
Raleigh, North Carolina**

FIRST EDITION (January 1989)

This edition applies to Feature #3025 and Configuration Support-S Release 4.0 of the IBM 3174 Subsystem Control Unit.

References in this publication to IBM products, programs, or services do not imply that IBM intends to make these available in all countries in which IBM operates. Any reference to an IBM program product in this document is not intended to state or imply that only IBM's program product may be used. Any functionally equivalent program may be used instead.

The information contained in this document has not been submitted to any formal IBM test and is distributed on an 'As Is' basis without any warranty either express or implied. The use of this information or the implementation of any of these techniques is a customer responsibility and depends on the customer's ability to evaluate and integrate them into the customer's operational environment. While each item may have been reviewed by IBM for accuracy in a specific situation, there is no guarantee that the same or similar results will be obtained elsewhere. Customers attempting to adapt these techniques to their own environments do so at their own risk.

Publications are not stocked at the address given below. Requests for IBM publications should be made to the IBM branch office serving your locality.

A form for reader's comments is provided at the back of this publication. If the form has been removed, comments may be addressed to IBM Corporation, International Technical Support Center, Dept 985H, Bldg. 657, P.O. Box 12195, Research Triangle Park, North Carolina 27709, U.S.A. IBM may use or distribute whatever information you supply in any way it believes appropriate without incurring any obligation to you.

(c) Copyright International Business Machines Corporation 1989

Acknowledgements

The author of this document is:

- Andrew Slim, IBM United Kingdom

The advisor of this project is:

- Penny Frisbie, Raleigh International Technical Support Center

Abstract

This document describes the implementation of a Token-Ring Gateway in remote models of the IBM 3174 Subsystem Control Unit and examines some of the performance and management considerations for the Gateway.

The information contained in this document is based on installation experience at the International Technical Support Center Raleigh.

This document has been written for Systems Engineers and technical members of customers' organizations involved in the installation and maintenance of the IBM 3174 Subsystem Control Unit and the IBM Token-Ring Network.

CSYS WS

(41 pages)

Preface

This document provides an introduction to the Token-Ring Gateway function on remote models of the IBM 3174 Subsystem Control Unit. It describes the main functions of the gateway, the implementation process and material relating to performance and management. The information is the result of a residency at the ITSC, Raleigh. It is intended that the document be considered a supplementary chapter to the ITSC Bulletin, IBM 3174 Subsystem Control Unit Installation Guide, GG24-3061.

A basic knowledge of both the 3174 Control Unit and the Token-Ring Network has been assumed.

ORGANIZATION OF THIS DOCUMENT

The document contains the following sections:

- **Introduction**
A description of the functions of the remote 3174 Token-Ring Gateway.
- **Implementation**
Planning information for installing the gateway, including host, 3174 and downstream device considerations.
- **Performance**
An outline of the factors influencing performance of the Gateway and the parameters that can be varied to improve performance.
- **Management**
An introduction to some of the management considerations for the remote 3174 Token-Ring Gateway, including details of the flows involved in establishing communications through the gateway.

And the following appendices:

- Appendix A - 3174 Customization Panels
- Appendix B - Sample NCP Source.

Table of Contents

1.0 The Remote 3174 Token-Ring Gateway	1
1.1 Introduction	1
1.1.1 The Gateway Function	1
1.1.2 Supported Devices	1
1.1.3 3174 Gateway Physical View	2
1.1.4 3174 Gateway Logical View	3
1.1.5 Remote 3174 Gateway Highlights	4
1.2 Implementing the 3174 Gateway	5
1.2.1 Hardware Installation	6
1.2.1.1 Adapter Installation	6
1.2.1.2 Storage Requirements	6
1.2.2 Microcode Customization	6
1.2.2.1 Question 100: 3174 Model Designation	6
1.2.2.2 Question 101: Host Attachment	6
1.2.2.3 Questions 104-105: SDLC Address Range	6
1.2.2.4 Question 121: Keyboard Language and I/O Interface Code	7
1.2.2.5 Question 900: Token-Ring Adapter Address	7
1.2.2.6 Question 905: Ring Error Monitor	7
1.2.2.7 Question 908: Link Subsystem Name	7
1.2.2.8 Question 940: Ring Address Assignment	8
1.2.2.9 Question 941: Ring Transmission Definition Questions	8
1.2.3 Host Software Planning	10
1.2.4 VTAM	10
1.2.5 NetView	10
1.2.6 ACF/NCP	10
1.2.6.1 LINE Macro	11
1.2.6.2 SERVICE Macro	11
1.2.6.3 PU Macro	11
1.3 DSPU Planning Considerations	12
1.3.1 The IBM LAN Support Program	12
1.3.2 IBM 3270 Emulation	13
1.4 Remote 3174 Gateway: Performance	15
1.4.1 SDLC Multipoint Lines	15
1.4.1.1 Service Order Table Polling	15
1.4.2 NCP Tuning Parameters	15
1.4.2.1 SERVLIM	15
1.4.2.2 SERVICE	15
1.4.2.3 PAUSE	16
1.4.2.4 PASSLIM	16
1.4.2.5 HDXSP	16
1.4.2.6 PACING	16
1.5 Remote Token-Ring Gateway : Management Considerations	17
1.5.1 3174 Problem Determination Facilities	17
1.5.2 Ring Error Monitor (REM)	22
1.5.3 Remote Token-Ring Gateway Data Flows	22
1.5.3.1 Problem Determination Tools	22
1.5.3.2 Activation of DSPUs	23
1.5.3.3 Session Termination Data Flows	25
1.5.4 Backup and Recovery	26

Appendix A. 3174 Customization Panels	29
Appendix B. NCP Source	33
Index	43

List of Illustrations

Figure 1.	Remote 3174 Token-Ring Gateway: Physical View	2
Figure 2.	Remote 3174 Token-Ring Gateway: Logical View	3
Figure 3.	Raleigh ITSC Configuration	5
Figure 4.	Default I-Frame and W-Field Values	8
Figure 5.	Maximum W-Field by Frame Size	9
Figure 6.	3270 Emulation: Communication Profile Tasks	13
Figure 7.	3270 Emulation Modem and Line Description	14
Figure 8.	3174 Event Log	17
Figure 9.	Token-Ring Test Menu	18
Figure 10.	Token-Ring Status	18
Figure 11.	Token-Ring Adapter Status Summary	19
Figure 12.	Link Status Summary	20
Figure 13.	Gateway Host Status Summary	21
Figure 14.	DSPU Activation Flows	23
Figure 15.	DSPU Deactivation Flows	25
Figure 16.	Dual 3174 Gateway Backup Scenario	26
Figure 17.	Model/Attachment Panel	29
Figure 18.	SDLC Panel	30
Figure 19.	Token-Ring Gateway Panel	30
Figure 20.	Ring Address Assignment Panel	31
Figure 21.	Ring Transmission Definition Panel	32

1.0 The Remote 3174 Token-Ring Gateway

1.1 Introduction

This chapter discusses use of the remote models of the 3174 (1R, 2R, 51R and 52R) as Token-Ring Gateways. This function requires the installation of the 3270 Token-Ring Gateway feature (#3025) and microcode of Configuration Support-S Release 2.0 or later. At least one increment of storage will also be required. Information is provided that should help readers to plan and install a remote Token-Ring Gateway, and understand the factors that affect performance and some of the management considerations.

1.1.1 The Gateway Function

While the IBM Token-Ring Network offers a solution to the problem of communication within a building, there is frequently a requirement to access a host at a remote site across a "wide-area network" based on IBM's System Network Architecture (SNA). The Token-Ring Network and SNA use different protocols at the 'link' level; it is the essential function of a Token-Ring Gateway to convert between SNA Synchronous Data Link Control (SDLC) formats and Token-Ring Medium Access Control (MAC) and Logical Link Control (LLC) formats. The conversion is transparent to higher-level protocols such as Logical Unit Type 6.2 and the 3270 data stream.

1.1.2 Supported Devices

The 3174 Token-Ring Gateway feature is designed to support up to 140 ring-attached devices. For convenience the term used to refer to Token-Ring attached devices is "downstream Physical Unit" (DSPU). In practice, the actual number of DSPUs supported will be dictated by performance considerations looked at later in this chapter. Any combination of the following Token-Ring attached devices is supported by the gateway:

- IBM 3174-03R and 53R
- IBM PC or PS/2 using 3270 Emulation 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 2.0 node)
- IBM PS/2 using IBM Operating System/2 Extended Edition Version 1.1
- IBM PC, PS/2 or 3270 PC using 3270 Workstation Program Version 1.1

1.1.3 3174 Gateway Physical View

The remote 3174 is attached to the host via a leased full-duplex or half-duplex SDLC line running data half-duplex. SDLC and X.21 switched connections or X.25 virtual circuits are NOT supported. The 3174 attaches to a 308X, 3090, 4341, 4361, 4381 or 9370 via a 3720, 3725 or 3745 Communications Controller. It can also attach to a 4361 Communication Adapter or a 9370 Telecommunications Subsystem Controller.

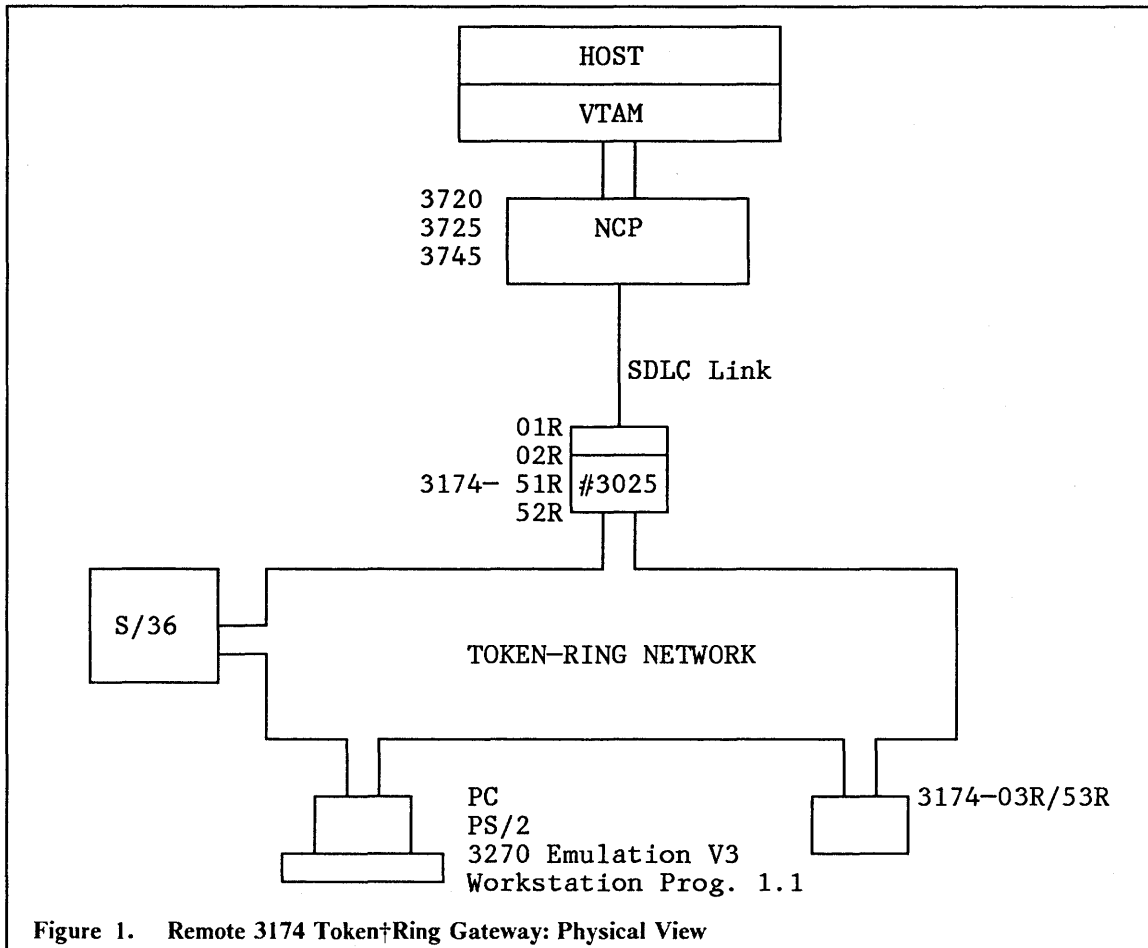


Figure 1. Remote 3174 Token-Ring Gateway: Physical View

1.1.4 3174 Gateway Logical View

VTAM and NCP view the Gateway 3174 and DSPUs as stations on a multipoint SDLC link. Outbound data is addressed to DSPUs using SDLC station addresses. The gateway references an address translation table to route the data on to the destination device. It also converts between SDLC and Token-Ring frame formats by stripping the SDLC link header and trailer and enclosing the remaining TH, RH and RU in MAC/LLC headers and trailers. The process is reversed for inbound data.

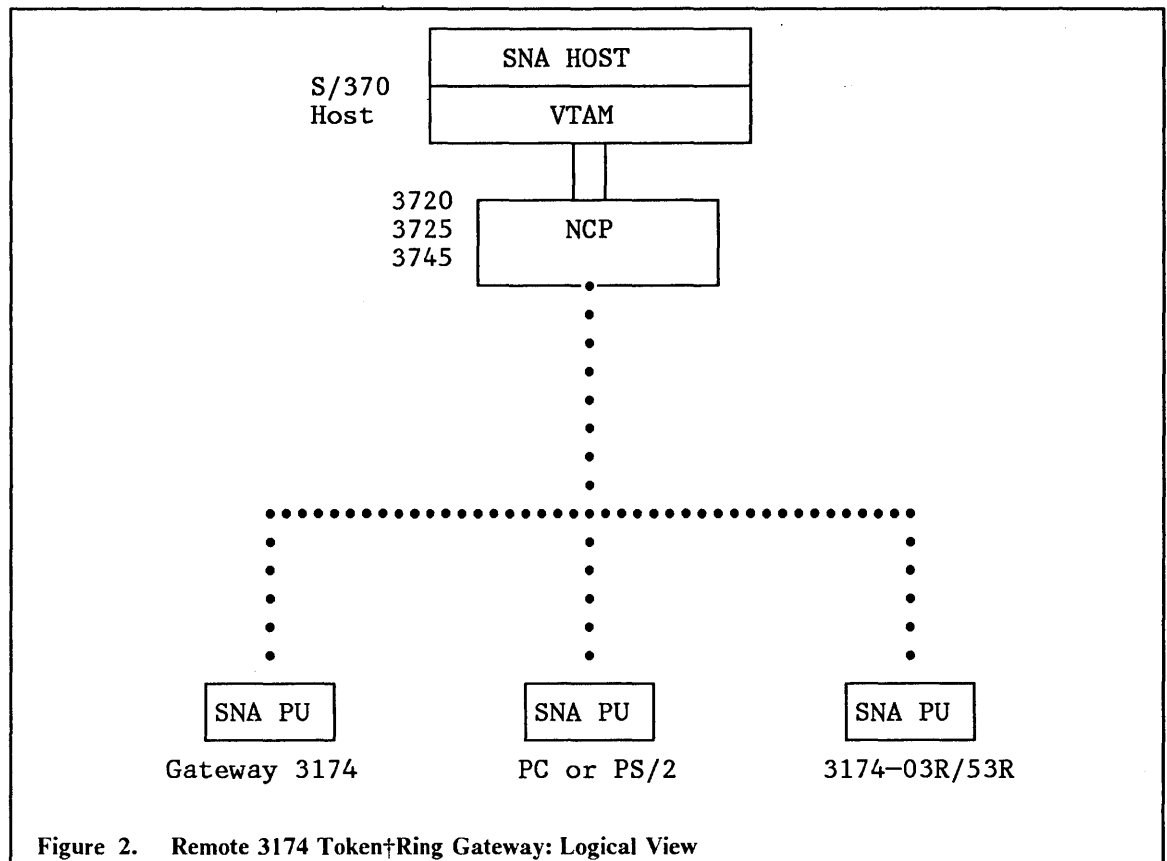


Figure 2. Remote 3174 Token-Ring Gateway: Logical View

1.1.5 Remote 3174 Gateway Highlights

This is a summary of the advantages and benefits of the 3174 Remote Gateway:

- **Dual Function: Gateway/Controller**

The gateway can be installed in a 3174 which is also used as a controller for attached terminals. Under heavy loads, 3174 capacity may become a critical factor.

- **High Attachment Speeds**

The 3174 can be attached to a communications link at up to 64000 bps. This compares favorably with PC-based gateways which have a maximum speed of either 9600 or 19200 bps depending on the model. The faster line speed and lower transmission delays may lead to improved response times for end-users.

- **Capacity**

The 3174 Gateway is designed to support up to 140 DSPUs although in practice the actual number supported may be far less. By comparison, PC-based gateways are limited in any event to five downstream devices (in the case of a DFT-attached PC) or 32 downstream devices (in the case of a PC attached via an SDLC adapter).

- **Ease of Installation**

The Remote 3174 Gateway requires no special software at the host apart from an NCP able to support a multipoint link. The gateway itself is an adapter installed by the customer in the 3174. Assuming the installer is familiar with 3174 customization the microcode is easily prepared.

- **Ring Error Monitor (REM) Facility**

This allows Token-Ring errors to flow through the 3174 Gateway to the NetView Hardware Monitor in the form of alerts.

1.2 Implementing the 3174 Gateway

Implementation of the remote 3174 Token-Ring Gateway comprises the following tasks:

1. Installation of the 3270 Gateway feature in the 3174
2. Creation of an NCP to support the line and downstream devices
3. Production of a customized control diskette to support the gateway
4. Customization of DSPUs.

The material presented here is based on the configuration at the International Technical Support Center in Raleigh as depicted in Figure 3.

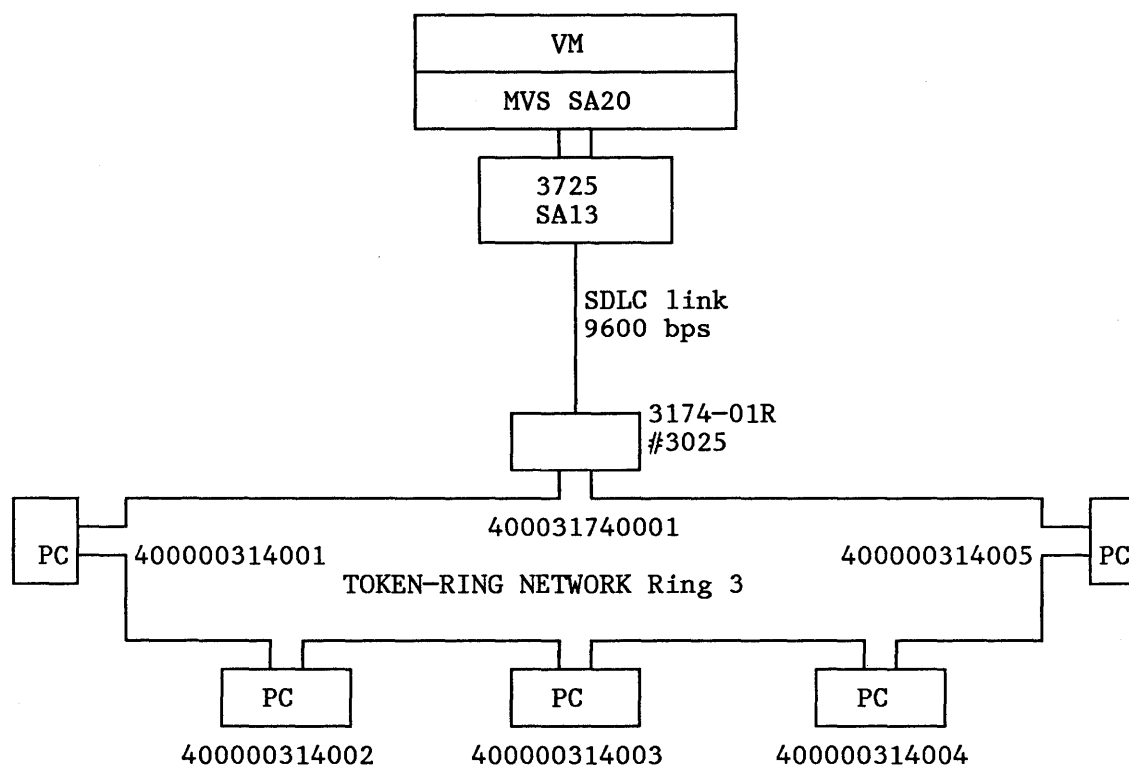


Figure 3. Raleigh ITSC Configuration

1.2.1 Hardware Installation

1.2.1.1 Adapter Installation

Feature #3025 is shipped in the form of an adapter card, a 2.4m (8ft) cable and microcode diskettes for Configuration Support-S Release 2 or later. You should carefully read the Customer Setup Instructions before installing the gateway.

The adapter card is fitted into a slot on the 3174 logic board and held in place by a simple thumbscrew mechanism. For the purposes of testing, the adapter was installed in position 11.

At one end of the cable is a "D" connector which is fitted to the 9-pin socket on the adapter card. At the other end is an IBM Cabling System connector which attaches to the IBM 8228 Multistation Access Unit.

1.2.1.2 Storage Requirements

AT LEAST ONE Storage Expansion feature (#1011 for 512KB, #1012 for 1.0MB, or #1014 for 2.0MB) is required. The amount of extra storage required is determined by the number of DSPUs defined in the 3174 Gateway customization. Should the number of PUs defined exceed the number supported by the installed storage, IML of the 3174 will not complete. Storage requirements are outlined in the following table:

up to 72 DSPUs	1 x #1011 (Minimum)	512K
up to 140 DSPUs	1 x #1012	1024K

1.2.2 Microcode Customization

Configuration Support-S microcode is shipped in the form of a Utility/Diagnostic diskette and a Control diskette. Configuration Support-S Release 4.0 contains all of the function of Configuration Support-A Release 4.0. There was NO Configuration Support-S Release 3.0.

Several new customization questions have been added for the remote Token-Ring Gateway. In addition, several of the Local Gateway questions have been updated for the remote telecommunications environment. These are described here, along with existing questions, with the responses that are specific to the 3174 Remote Gateway. IBM 3174 Subsystem Control Unit Customizing Guide, GA23-0214, is the appropriate source of planning information for the other questions. You should regard the material presented here as supplementary to the information contained in this publication.

See Appendix A for the customization example from the tests.

1.2.2.1 Question 100: 3174 Model Designation

Response must be 01R, 02R, 51R or 52R.

1.2.2.2 Question 101: Host Attachment

The only valid response is "2" (SDLC non-switched).

1.2.2.3 Questions 104-105: SDLC Address Range

Each DSPU functions logically as a PU on a multipoint line. NCP refers to them by a one-byte SDLC station address. These values tell the 3174 how many DSPUs it will be supporting in terms

of a lower and upper SDLC address. The lowest address (104) will be the address of the PU in the gateway 3174. The highest address (105) will be the highest SDLC station address for a DSPU. For instance, if the SDLC address of the Gateway is C1 and there are five DSPUs, the responses to 104 and 105 will be C1 and C6 respectively. It is possible to cater for future growth by declaring a number of "redundant" station addresses. Since the theoretical maximum capacity of the Gateway is 140 DSPUs, values with a difference of greater than 140 (X'8C') will be rejected.

1.2.2.4 Question 121: Keyboard Language and I/O Interface Code

A two-digit code representing the keyboard language and the I/O interface code will be used in this cluster.

The 3174 Customizing Guide contains a table to help you select the two-digit code.

1.2.2.5 Question 900: Token-Ring Adapter Address

The six-byte locally-administered address of the Token-Ring Adapter in the 3174 is entered in this question.

The format is:

4000 annn nnnn

where:

'4000' is the fixed part of the address

'a' must not be greater than X'7'(X'8' being a functional address)

'n' can be 0-F hexadecimal

The user-specified portion will be determined by the addressing conventions in force in the installation.

1.2.2.6 Question 905: Ring Error Monitor

This indicates whether the Token-Ring adapter in the 3174 will function as a Ring Error Monitor for the Ring to which it is attached. Alerts relating to the Token-Ring are sent up to NetView. The default response is "1" (the REM function will be included).

1.2.2.7 Question 908: Link Subsystem Name

A six-character customer-defined name that identifies which subsystem an alert is from when it is sent to the host. The default is 'IBMLAN' but it will be more meaningful to network operators in installations with multiple gateways if a unique identifier is assigned to each one.

1.2.2.8 Question 940: Ring Address Assignment

This panel establishes the address translation table used by the 3174 to map SDLC address to Token-Ring addresses.

SDLC addresses are provided automatically in column 1 based on the range of values indicated in Questions 104 and 105.

Token Ring addresses of DSPUs are entered in column 2. The adapter address of the Gateway is provided automatically from the response to Question 900 and is assigned to the lowest SDLC address.

Column 3 contains the Service Access Point (SAP) address for the DSPU. This is the "port" through which an application in the DSPU requests the services of the underlying communication protocols. A SAP ID must be a multiple of 4 in the range X'04' to X'EC'. The default value is X'04', the "standard" SAP ID defined by IBM to interface between SNA and Token-Ring protocols. This value is hard-coded on the panel for the gateway and cannot be altered. The required SAP address for devices running 3270 Emulation V3, APPC/PC and for 3174 models 3R or 53R is also X'04'. For Workstation Program 1.1 it is X'08'.

In situations where there is a requirement for a DSPU to support multiple SAP IDs (such as when migrating from 3270 Emulation to the Workstation Program) it is possible to code the Token-Ring address more than once with different SAP IDs.

Indicate in Column 4 whether the device is a workstation (response="0") or a 3174-3R/53R (response='1'). The response will also be "1" for a System/36.

1.2.2.9 Question 941: Ring Transmission Definition Questions

This panel is used to define certain ring transmission characteristics of attached devices.

The I-frame is the maximum number of bytes the DSPU expects to receive from the gateway including SNA headers. Default values are assigned based on the response entered in column 4 for Question 940.

The W-field represents the maximum acceptable window size; that is, the maximum number of frames the gateway transmits before waiting to receive an acknowledgement from the DSPU.

The values listed in Figure 4 are default values only. The maximum permissible window sizes depend on the I-frame size and are listed in Figure 5 on page 9

Downstream PU	Maximum I-Frame Size	Maximum Window Size
Workstation(T=0)	entry 0 (265 value)	2
Controller (T=1)	entry 3 (2042 value)	2

Figure 4. Default I+Frame and W+Field Values

I-Frame Size Entered (F)	Maximum Window Size
265	7
521	7
1033	4
2042	2

Figure 5. Maximum W+Field by Frame Size

Downstream 3174 considerations:The window size value for a 3174-3R or 53R should be planned at the same time as the response to Question 941. Question 941 on the Gateway corresponds to Question 318 on the downstream 3174 models 3R and 53R. Question 381 defines the number of frames the DSPU will receive before sending a response. A general recommendation is to set this to "1"; this ensures that each frame is acknowledged without adding greatly to Token-Ring congestion.

The transmit window size in Question 940 should be set higher than Question 381. This permits uninterrupted transmission by eliminating wait for acknowledgements and will keep buffer resources in the gateway from being depleted. If the path between the gateway and the DSPU includes bridges, there may be a case for making the difference between the two values greater than one to compensate for the delay introduced by copying data from one ring to another by the Token-Ring Bridge.

In any event, the transmit window size should NEVER be set less than the value in Question 381, since this causes a wait for acknowledgements and degrades performance.

1.2.3 Host Software Planning

This section discusses some of the host software planning considerations for the Token-Ring Gateway, concentrating on the NCP considerations.

1.2.4 VTAM

There are no specific VTAM considerations although you may need to generate a suitable logmode entry for file transfer. If a 3270 Emulation DSPU is to transfer files to and from TSO or CMS at the host it should access these applications using a logmode with the Query bit set ON in the PSERVIC macro.

These are the logmodes used by 3270 Emulation LUs in the tests:

```
M2SDLCQ MODEENT LOGMODE = M2SDLCQ,FMPROF = X'03',TSPROF = X'03',
PRIPROT = X'B1',SECPROT = X'90',COMPROT = X'3080',
RUSIZES = X'8587',PSERVIC = X'028000000000185000007E00'
```

```
M3287SCS MODEENT LOGMODE = M3287SCS,FMPROF = X'03',TSPROF = X'03',
PRIPROT = X'B1',SECPROT = X'90',COMPROT = X'3080',
RUSIZES = X'87C7',PSNDPAC = X'01',SRCVPAC = X'01',
SSNDPAC = X'00',PSERVIC = X'01000000E100000000000000'
```

The first sample is for a display LU. The second is for a printer LU in SNA Character String (SCS) mode. Notice that pacing has been requested from the host to the printer (PSNDPAC and SRCVPAC). This is to prevent data being transmitted to the printer faster than it can be processed.

A more complete description of host requirements for 3270 Emulation V3 is found in *PC 3270 Emulation Program V3 Application Programming Interface and Host Reference*, SC23-0960.

It is also possible to use the Dynamic Reconfiguration facility to add DSPUs without the need to regenerate an NCP. This will require the creation of appropriate Dynamic Reconfiguration Data Sets in VTAM as described in *VTAM Installation and Resource Definition*, SC23-0111.

1.2.5 NetView

No specific changes are required to NetView for the gateway although you will probably want to update CLISTs and online documentation to reflect the new resources. For instance, the Token-Ring introduces a new level of resource names and problem determination procedures may differ from those followed for coaxially-attached terminals.

1.2.6 ACF/NCP

An SDLC multipoint definition should be created in the NCP. Some of the important parameters are indicated in the extract below. A more complete extract from the NCP used in the tests is included in Appendix B. Parameters which influence performance are discussed in detail later in the chapter.

```
L13008 LINE ADDRESS = (08,HALF),
MAXPU = 10,
```

```
SERVICE MAXLIST = 10,ORDER = (P13008A,P13008B,P13008C,P13008D,P13008E,
P13008F)
```

```
P13008A PU ADDR = C1,
MAXDATA = 521,
PUDR = YES,
```

T13008A1 LU LOCADDR = 2,
MODETAB = AMODETAB,
DLOGMOD = M2SDLCQ,

P13008B PU ADDR = C2,
PUDR = YES,

T13008B1 LU LOCADDR = 2,
MODETAB = AMODETAB,
DLOGMOD = M2SDLCQ,

1.2.6.1 *LINE Macro*

- **ADDRESS:** MUST be (XXX,HALF) since the gateway supports half-duplex data transmission only.
- **MAXPU:** specifies the maximum number of PUs this line will support including the PU in the gateway. You should specify a value high enough to cater for current and anticipated requirements.

1.2.6.2 *SERVICE Macro*

- **MAXLIST:** this indicates the maximum number of entries that will be listed in the Service Order Table. You should define a high enough value to cater for anticipated growth.
- **SERVICE:** a list of the PUs supported by the Gateway 3174 (including the PU in the gateway itself). The list builds the Service Order Table which determines the sequence in which PUs receive outbound data or are polled for inbound data.

1.2.6.3 *PU Macro*

Two examples are shown here. The first is the PU for the Gateway itself. The second is a PC attached to the ring running 3270 Emulation V3.

- **ADDR:** this is the SDLC station address of the PU. The lowest address for this control unit equates to the response to Question 104 in the 3174 customization and will be the PU inside the Gateway 3174. The highest ADDR value should be less than or equal to the response to Question 105 in the 3174 customization. The responses to Question 940 determine to which Token-Ring address the ADDR value should be mapped.
- **MAXDATA:** note that the Gateway 3174 itself has a larger buffer than the PC. It is therefore possible to code MAXDATA as 521 bytes. The same value would be coded for a 3174-03R or 53R attached to the Token-Ring. Specify 265 for 3270 Emulation V3.
- **PUDR:** specifying "YES" permits the deletion of this PU from one line and its addition to another one using the VTAM Dynamic Reconfiguration facility. This may be the case if the backup strategy involves Dynamic Reconfiguration.

Planning for Dynamic Reconfiguration should also include the allocation of sufficient empty PU control blocks in the NCP and an indication of the maximum number of LUs that can be added to any of the PUs in the pool. This is done via the NUMBER and PU operands of the PUDRPOOL definition statement.

1.3 *DSPU Planning Considerations*

This section discusses planning considerations for the IBM LAN Support Program and IBM 3270 Emulation Version 3. The 3174-3R and 53R and Workstation Program 1.1 are not discussed. Planning considerations for allowing these models to use the 3174 Token-Ring Gateway are documented in Chapter 5.4 of *IBM 3174 Subsystem Control Unit Installation Guide*, GG24-3061.

1.3.1 The IBM LAN Support Program

The LAN Support Program provides the MAC and LLC level interfaces to allow 3270 Emulation to communicate with the 3174 Gateway. It also includes the NETBIOS interface which is needed if a workstation is to operate as a PU (gateway station) on behalf of another workstation (network station).

The LAN Support Program consists of a series of device drivers which are specified in CONFIG.SYS with additional parameters. The document DXMINFO.DOC supplied on the LAN Support Program diskette describes the device drivers in detail. Shown below is a sample extract from CONFIG.SYS showing how the device drivers have been tailored for a stand-alone station.

```
DEVICE = \DXMA0MOD.SYS
DEVICE = \DXMC0MOD.SYS 400000314001
DEVICE = \DXMT0MOD.SYS
```

Notes:

- DXMA0MOD.SYS: An interrupt arbitrator required in all installations.
- DXMC0MOD.SYS: The Token-Ring Network adapter support device driver used for IBM 3270 Emulation V3. A different device driver, DXMC1MOD.SYS, is used for IBM Workstation Program 1.1. Notice that this is the point where the local address of the adapter is coded.
- DXMT0MOD.SYS: The NETBIOS device driver.

1.3.2 IBM 3270 Emulation

The 3270 Emulation Program needs to be tailored for each DSPU. The key customization options are detailed below. For details of other customization parameters, consult the 3270 Emulation documentation supplied with the software. From the "3270 Task Selection" panel, select option b, "Communication Profile Tasks".

```

Chg Profile
                                     Ext 101          302
                                COMMUNICATION PROFILE TASKS

ID  ITEM                                YOUR          POSSIBLE
   ITEM                                CHOICE        CHOICES

a  Configuration                        1              1 = Standalone Station
                                     2 = Network Station
                                     3 = Gateway Station
                                     4 = Gateway with
                                     Network Station

b  Communication Attachment 3           3              1 = SDLC          2 = DFT
                                     3 = IBM Token-Ring Network

c  Alternate Tasks                      2              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 6. 3270 Emulation: Communication Profile Tasks

- (a). There are two choices for display stations providing PU communications with the host: stand-alone or gateway.

In the stand-alone configuration the DSPU contains a PU, a terminal LU and perhaps an additional printer LU.

In the gateway configuration the DSPU contains a PU supporting LUs in the same workstation and up to 32 other downstream devices. Communication between the gateway and network stations uses a NETBIOS session. The mapping of LU addresses to NETBIOS names is defined using option 8 from this menu.

- (b). Communication Attachment

Specify 3 for Token-Ring attachment.

You should then select option g to describe the modem and line configuration for both stand-alone and gateway PUs.

```

Chg Profile
                                Ext 101          302
                                MODEM AND LINE DESCRIPTION

ID  ITEM                        YOUR      POSSIBLE
   ITEM                        CHOICE    CHOICES

a  Physical Unit ID            E007
b  Network Facility            2          1 = Switched 2 = Dedicated
c  SDLC Station Address        04          3 = Switched Backup
d  Continuous Carrier          2          3 = Switched Backup
e  Half Speed                  2          1 = Yes          2 = No
f  NRZI Encoding               2          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          31740001    0 - 79999999

Type ID letter to choose ITEM; press ENTER:  _

```

Figure 7. 3270 Emulation Modem and Line Description

- (c). SDLC Station Address. Specify the SAP ID for the gateway. This will always be '04'.
- (h). End with REQDISCONT. This response determines how 3270 Emulation terminates its connection to the host when the 3270 task is ended. Specify 2 (NO). There is no need for the DSPU to send REQDISCONT to VTAM since the gateway sends it to VTAM on its behalf when it detects termination of the 3270 session.
- (i). Destination Address. The Token-Ring address of the gateway. Specify only the last eight characters: the first four, '4000', are appended internally.

1.4 Remote 3174 Gateway: Performance

This section discusses some of the performance characteristics of the remote Token-Ring Gateway. Tuning becomes more critical as more devices use the gateway and traffic volumes increase.

1.4.1 SDLC Multipoint Lines

The performance characteristics of the gateway are influenced by the SDLC multipoint polling mechanism. A useful reference on this subject is *Tuning and Problem Analysis for NCP SDLC Devices*, GG24-1629. A brief summary of the mechanism is provided here.

1.4.1.1 Service Order Table Polling

When PUs on the link are active, they receive data or are polled for input in the sequence in which they are listed in the Service Order Table. The time it takes to pass through the Service Order Table determines the rate at which DSPUs receive polls and therefore the performance they experience. Inactive PUs are not polled. Factors which affect the time it takes to pass through the table include the number of entries being polled (that is, the number of active devices), the line speed and the line propagation delay (the delay induced on transmission due to factors such as modem transit time and line length).

1.4.2 NCP Tuning Parameters

1.4.2.1 SERVLIM

"Contact" polling (the transmission of a SNRM, SNRME or DISC) is not subject to the data polling cycle. After the number of passes through the Service Order Table specified by SERVLIM, the NCP will perform one contact poll for a PU. On the next contact poll it will start looking for an outstanding SNRM, SNRME or DISC for the next entry in the Service Order Table. SERVLIM thus determines the ratio of activation/deactivation processing to normal data transfer. Setting the value high (its maximum is 254) means that relatively few attempts are made to contact a PU in order to activate it. While this may help performance for active users by reducing the time spent transmitting and waiting for responses to special polls, it has a negative impact on resource activation times. This effect may be more marked in the remote Token-Ring Gateway environment since two polls are required to establish connectivity between the NCP and each DSPU (see the session activation flow diagram later in the chapter).

In environments where 3270 Emulation is being started and terminated frequently and devices powered on and off, which is often the case with PC users, a high value should not be specified. The long wait for the VTAM 'USS10' message after requesting a host session may be considered unacceptable. During the tests we found that a SERVLIM value of 254 led to resource activation times of some minutes. We recommend setting SERVLIM to 4 as a good starting point for your installation.

1.4.2.2 SERVICE

By giving a DSPU multiple entries in the Service Order Table it will be polled more frequently. This is a good way of giving preferential treatment to particular devices. The order of the DSPUs in the table does not have any effect on performance.

It is also possible to reduce the number of entries in the Service Order Table where 3270 Emulation V3 is used by customizing gateway stations supporting several network stations rather than making each PC a stand-alone station. This could reduce the contribution of the polling delay to total response time. However, device path-lengths will increase due to the NETBIOS session between gateway and network stations. Furthermore, host access from Network stations is dependent on the availability of the Gateway PC.

1.4.2.3 PAUSE

The objective of the PAUSE operand on the LINE macro is to introduce a delay between passes through the Service Order Table so that the impact of excessive negative polling on communication controller CCU utilization is reduced. If the NCP goes through the table before the PAUSE time elapses, it will wait for the timer to elapse before proceeding with the next pass. It may be possible to reduce response times by setting PAUSE to 0 if there are few lines competing for CCU cycles. If there are many lines the increased polling which will ensue will reduce the cycles available for data processing rather than polling and may therefore be harmful to performance.

1.4.2.4 PASSLIM

The objective of the PASSLIM operand is to limit the amount of data transmitted to a PU in one pass through the Service Order Table so that it does not monopolize the link. In order to avoid a "staggered" screen-paint, it should not be set so low that only a small portion of the screen is sent on each pass through the Service Order Table. For example, it takes about 8 PIUs to paint a full 1920 character screen for a single workstation running 3270 Emulation Version 3 since data will be sent to the DSPU in 256 byte segments. If this is a stand-alone station with only one LU to support, 8 is a suitable value. If it is a PU with multiple LUs to support (for example, a 3174-3R/53R) setting PASSLIM high enough to allow each LU to receive a full screen on a pass through the table may adversely affect performance of other PUs. As a general rule in such circumstances, you should set PASSLIM less than or equal to MAXOUT.

1.4.2.5 HDXSP

If HDXSP (Half-Duplex Send Priority) is coded as "YES", outbound data is sent as soon as possible without waiting for the turn of the PU in the Service Order Table. This will improve performance for large numbers of PUs on a line with low traffic frequency.

1.4.2.6 PACING

This is used to control the flow of traffic on an LU-LU session. It is useful where the secondary LU is a printer or a display which will be doing large amounts of file transfer to and from the host. You may wish to examine the possibility of using inbound and outbound pacing to reduce excessive line utilizations when DSPUs are sending files to and from the host. Inbound pacing is agreed at BIND time and should therefore be specified in the logmode entry for the device (see Appendix F of *VTAM Programming*, SC23-0115). Outbound pacing can be defined in either the logmode entry or the NCP LU macro. If a non-zero value is coded in the logmode entry, the NCP value is overridden. If a zero entry is coded in the logmode entry, the NCP value is used.

Outbound pacing is particularly useful in preventing the transmission of more data to a device (such as a PC printer) than it can handle and may therefore reduce line utilization.


```

          _____Token-Ring Test Menu _____

Select Option; press ENTER

Option          Description

  1             Monitor Token-Ring status
  2             Display Token-Ring adapter status summary
  3             Reset Token-Ring Adapter status summary
  4             Display link status summary for all links
  5,n           Display link status summary for all link address n
  6             Reset link status counters for all links
  7,n           Reset link status counters for all link address n
  8             Display Gateway host status summary for all links

To go directly to other tests, enter: /Test,Option
Select ==>_
PF: 3=Quit          8=Fwd          12=Test Menu

```

Figure 9. Token-Ring Test Menu

This menu is invoked by selecting option 9 from the Test Menu.

```

          _____Token-Ring Status_____

4698 - Local Token-Ring Adapter open

4694 - The test has been active for 0000 minutes

To go directly to other tests, enter: /Test,Option
Select ==>_
PF: 3=Quit          12=Test Menu

```

Figure 10. Token-Ring Status

The Token-Ring Status panel indicates the status of the Token-Ring Adapter. The 4698 message indicates that the adapter is open. It will change to 4697 if the adapter closes for some reason (for example, if the cable is removed from the 8228).

```

              —Token-Ring Adapter Status Summary—
Adapter Address -          40003174000104          Adapter Status - Open
Customized links - 005                               Active Links - 003

                Counters                               Overflow
Line Errors          00000000                          0
Internal Errors      00000000                          0
Burst Errors         00000000                          0
ARI/FCI Errors       00000000                          0
Abort Delimiters     00000000                          0
Lost Frames          00000000                          0
Receive Congestion   00000000                          0
Frame Copied Errors  00000000                          0
Frequency Errors     00000000                          0
Token Errors         00000000                          0

To go directly to other tests, enter: /Test,Option
Select ==>_
PF: 3=Quit                               12=Test Menu

```

Figure 11. Token-Ring Adapter Status Summary

The Token-Ring Adapter Status Summary indicates the number of errors detected for the Token-Ring by category.

	Link Status Summary					
Link Address	40000031400204		40000031400404		40000031400504	
Primary/Secondary	01/00		01/00		01/00	
Trans I-frames	00000007 - 0		00000030 - 0		00000007 - 0	
Rec I-frames	00000005 - 0		00000022 - 0		00000005 - 0	
Transmit Errors	00000000 - 0		00000000 - 0		00000000 - 0	
Received Errors	00000000 - 0		00000000 - 0		00000000 - 0	
T1 Expired	00000000 - 0		00000000 - 0		00000000 - 0	
Com/Res Ind	01	01	01	01	01	01

To go directly to other tests, enter: /Test,Option
 Select ==>_
 PF: 3=Quit 12=Test Menu

Figure 12. Link Status Summary

The Link Status Summary shows traffic characteristics of each DSPU during this counting period, including the number of frames transmitted and received, the number of times the T1 or reply timer expired and the last command/response sent. The "Primary/Secondary" values indicate the Token-Ring primary and secondary states for the link station, where '01' for primary state identifies the link as being open.

```

-----Gateway Host Status Summary-----
Customized Links - 006                               Address Range - C1 - C6

Host      Link      Token-Ring      Host      Link      Token-Ring
Address   Status   Address         Address   Status   Address
C1        02      400031740001 04   C2        00      400000314001 04
C3        02      400000314002 04   C4        02      400000314003 04
C5        02      400000314004 04

To go directly to other tests, enter: /Test,Option
Select ==>_
PF: 3=Quit                               12=Test Menu

```

Figure 13. Gateway Host Status Summary

This panel was introduced in Configuration S Release 2.0 to show the number of links declared to the microcode at customization time and the status of each link.

<i>Field</i>	<i>Description</i>
Customized Links	The number of links declared in customization
Address Range	The host address range declared in customization
Host Address	The address assigned each link during customization
Link Status	The 2-digit status code representing the status of the link <ul style="list-style-type: none"> • For Model 1L: <ul style="list-style-type: none"> ▪ 00 = The Token-Ring attached physical unit is in disconnect mode ▪ 02 = The Token-Ring attached physical unit is connected • For Models 1R, 2R, 51R and 52R: <ul style="list-style-type: none"> ▪ 00 = SRNM required ▪ 01 = SRNM received ▪ 02 = Connected/active ▪ 03 = Poll timeout
Token-Ring Address	The station address assigned to each link during customization. This address is the six byte Token-Ring adapter address followed by the one byte service access point (SAP) address.

1.5.2 Ring Error Monitor (REM)

The 3270 Gateway Feature includes support for the Token-Ring Ring Error Monitor (REM) function. The support is enabled by specifying a response of '1' to Question 905 during customization.

REM performs integration and analysis of non-random error conditions on a real-time basis. In case of a failure of one of the stations in the ring, it derives information indicating the two consecutive adapters and the media between them most likely to be causing a failure. Other types of ring errors are also accumulated and reported to NetView when thresholds have been exceeded.

The information is presented to the host on the SSCP-PU session in the form of alerts, link events and PD statistics.

1.5.3 Remote Token-Ring Gateway Data Flows

The following diagrams depict the flow of network data through the 3174 Gateway as DSPUs are activated and deactivated. They are included to aid problem determination.

1.5.3.1 Problem Determination Tools

Data flows between the host and DSPUs can be analyzed using two trace tools which complement each other:

1. SNA Line Traces formatted using the Advanced Communication Function/ Trace Analysis Program (ACF/TAP).

These trace data between the host and the Gateway 3174.

2. The IBM Token-Ring Trace and Performance Program.

This traces data between the Gateway 3174 and the DSPU.

1.5.3.2 Activation of DSPUs

This diagram outlines the flow of data in a realistic situation where the DSPU and associated LUs are being activated (perhaps as part of a cascaded network initialization procedure) but the end-user has not yet requested a 3270 Emulation session.

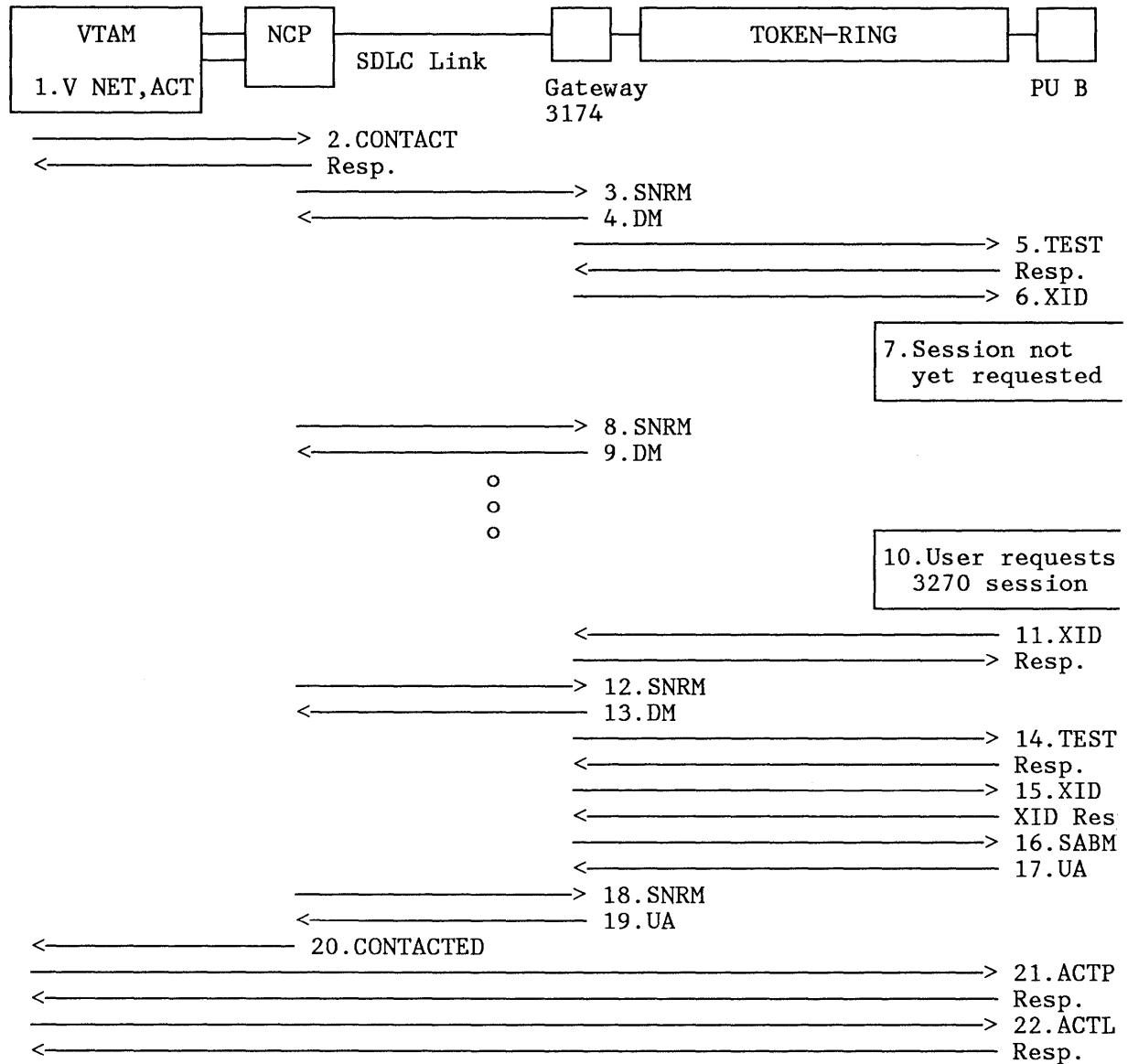


Figure 14. DSPU Activation Flows

1. The network operator issues a 'VARY NET' command to activate the DSPU or VTAM initializes resource activation when the NCP major node is activated.
2. VTAM sends a CONTACT request to the NCP.
3. The NCP queues a SNRM request, which is sent when it is the turn of this DSPU to receive a contact poll.

4. The gateway recognizes that it has no link to the DSPU so returns a DM to the NCP in order that it does not timeout waiting for a response and can continue with other processing pending establishment of the link to the DSPU.
5. The gateway 3174 sends a TEST request to the DSPU. This and the subsequent response constitute a basic test of the transmission path between the gateway and the DSPU.
6. The gateway sends an XID to the DSPU. No response is received because 3270 Emulation has not been started.
7. The DSPU will not continue link activation activity until a session is requested by the 3270 Emulation control program.
8. On subsequent passes through the polling cycle, the NCP will resend the pending SNRM to the gateway for the DSPU.
9. The gateway recognizes that there still is no link to the DSPU and returns a DM to the SNRM requests.
10. Sometime later the end user requests a 3270 session by selecting option "a" from the 3270 Task Selection menu.
11. An XID flows from the DSPU to the gateway. The gateway returns a response acknowledging the request.
12. Following the session request from the DSPU, the next SNRM received by the gateway restarts link activation procedure.
13. The gateway recognizes that there still is no link to the DSPU and returns a DM to the NCP.
14. The gateway 3174 sends a TEST request to the DSPU and receives a response.
15. The gateway sends an XID to the DSPU. This time an XID response is received from the DSPU.
16. The gateway sends a SABME, the Token-Ring link connection request command.
17. The DSPU acknowledges the SABME request with a UA (positive response). The link is now established, and both devices reset their send and receive counters.
18. On a subsequent pass through the polling cycle, the NCP will resend the pending SNRM to the gateway for the DSPU.
19. The gateway returns a UA to the NCP recognizing that there now exists a Token-Ring link from the gateway to the DSPU.
20. NCP informs VTAM that it has CONTACTED the DSPU.
21. An ACTPU request is eventually sent by VTAM to the DSPU.
22. Positive response to the ACTPU is followed by ACTLUs to the devices attached to the PU.

1.5.3.3 Session Termination Data Flows

This diagram outlines what happens when a user terminates the 3270 session either by ending the 3270 task or by powering off the workstation.

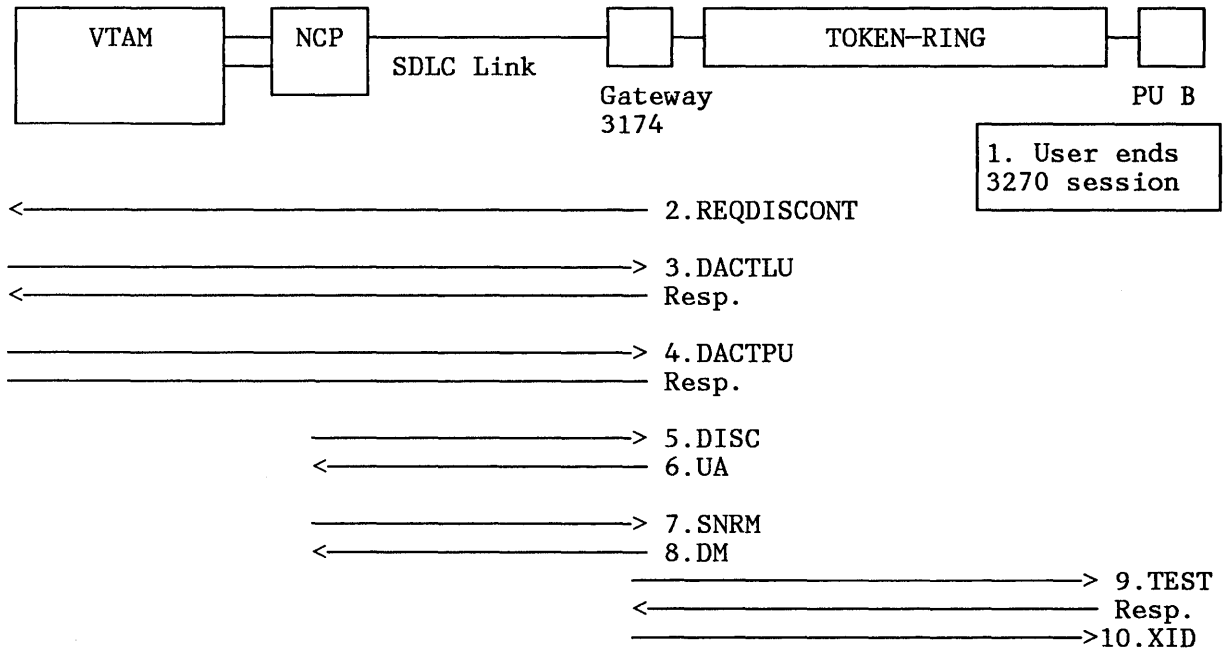


Figure 15. DSPU Deactivation Flows

1. The end user terminates the session by ending the 3270 task.
2. The gateway detects the loss of the downstream connection and builds a REQDISCONT RU for transmission to the host. This has byte 3 set to X'81' indicating the Contact Immediate option.
3. On receipt of the REQDISCONT, VTAM sends DACTLUs for devices attached to the PU. The gateway responds to these on behalf of the DSPU.
4. VTAM sends a DACTPU to deactivate the DSPU. Again, the gateway generates a response.
5. NCP sends a DISC request breaking the SDLC connection between the host and the DSPU.
6. The gateway returns a positive (UA) response to the DISC.
7. The NCP recommences polling of the DSPU as a result of the Contact Immediate option on the REQDISCONT.
8. The DSPU is now registered as PCTD2 by VTAM. The periodic arrival of the SNRM at the gateway causes it to reattempt connection with the DSPU in the manner described in the previous diagram.

1.5.4 Backup and Recovery

This section looks at an approach to backup based on a second 3174 Gateway.

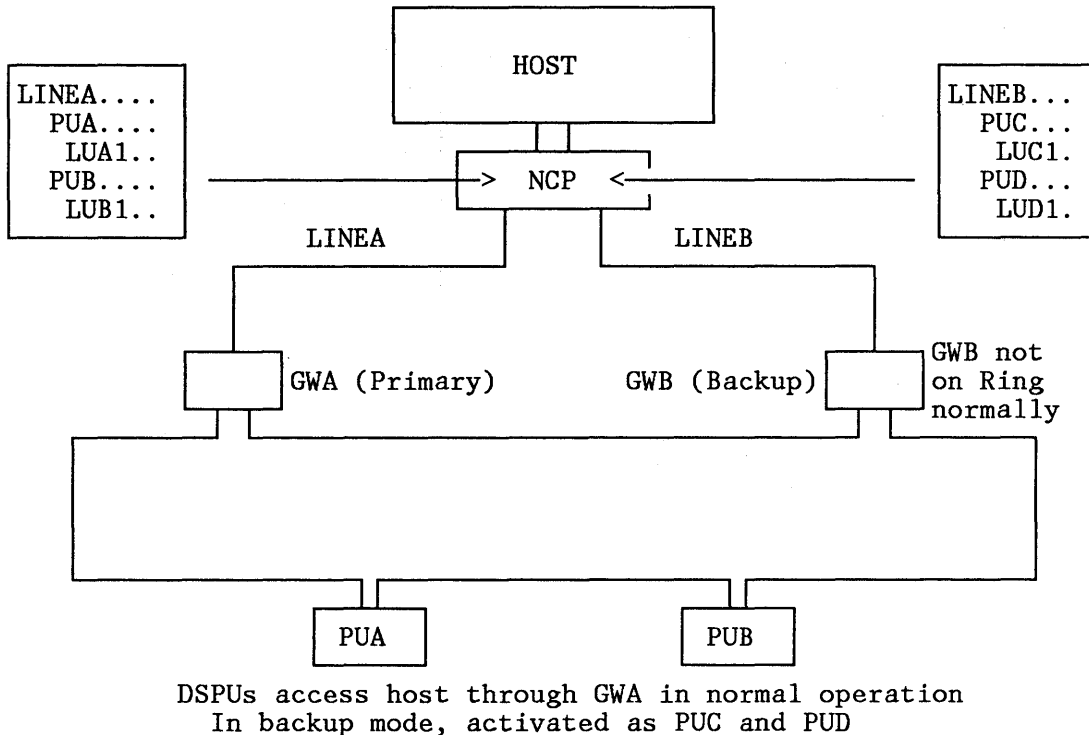


Figure 16. Dual 3174 Gateway Backup Scenario

The NCP definitions for both lines contain PU/LU macros which are able to support the DSPUs.

Each 3174 is customized to support DSPUs for normal and backup operation and has the same Token-Ring address so that the end user does not need to load a new copy of 3270 Emulation and 3174-3R/53R do not require a re-IML.

The scenario assumes that each DSPU is a stand-alone SNA PU.

The primary gateway 3174 should be IMLed and activated first so that it joins the ring.

Upon activation, the backup gateway 3174 will be able to support coaxially-attached terminals but will not be able to join the Token-Ring. The attempt to open the adapter will fail with a status code indicating the duplicate address.

If the primary gateway fails, it should be removed from the ring. The "redundant" PU definitions on LINEB are now activated; the backup Gateway 3174 will successfully open its adapter and the DSPUs will become active.

The DSPUs now have different SNA resource names. Dynamic Reconfiguration could be considered to avoid this problem. In order to achieve this you should carry out the following tasks:

1. Code a dynamic reconfiguration data set containing DELETE statements to remove PUA and PUB from LINEA and ADD statements to add them to LINEB.
2. Ensure the NCP has the appropriate definitions to support dynamic reconfiguration and that the DSPUs can be dynamically transferred from one line to another (PUDR = YES).
3. Ensure the appropriate NetView CLISTS and documentation are available to operators to make the change as smooth as possible. Remember that dynamic reconfigurations will be cancelled if the NCP fails.

For performance reasons it is recommended that the gateways be attached to separate SDLC links; they should not be multidropped from the same circuit.

Appendix A. 3174 Customization Panels

This Appendix illustrates the customization panels for the remote 3174 Gateway used in the tests. Note that the port address assignment and Response Time Monitor panels are not shown.

```

      _____ Model / Attach _____

099 - 3174 01R WITH TOKEN-RING GATEWAY ADDR 4000 3174 0001
101 - 01R
101 - 2

PF3=QUIT                                8=FWD
```

Figure 17. Model/Attachment Panel

SDLC				
104 - C1	105 - C6	108 - 952106	116 - 2	
121 - 01	125 - 01000000	127 - 5 2		
132 - 0 0 0 0	136 - 1 1 1 1	137 - 0 0 0 0	138 - 0	
141 - A	165 - 1	166 - A		
173 - 00000000	175 -			
213 - 1	215 - P138A	220 - 1		
310 - 0	313 - 1	317 - 0	340 - 0	365 - 0

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

Figure 18. SDLC Panel

Token-Ring Gateway		
900 - 4000 3174 0001	905 - 1	908 - IBMLAN

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

Figure 19. Token-Ring Gateway Panel

_____ 940 : Ring Address Assignment _____											
S@	Ring@			SAP@	T	S@	Ring@			SAP@	T
C1	4000	3174	0001	04							
C2	4000	0031	4001	04	0	C3	4000	0031	4002	04	0
C4	4000	0031	4003	04	0	C5	4000	0031	4004	04	0
C6	4000	0031	4005	04	0						

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

Figure 20. Ring Address Assignment Panel

_____941 : Ring Transmission Definition_____													
S@	Ring@			SAP@	F	W	S@	Ring@			SAP@	F	W
C1	4000	3174	0001	04									
C2	4000	0031	4001	04	0	2	C3	4000	0031	4002	04	0	2
C4	4000	0031	4003	04	0	2	C5	4000	0031	4004	04	0	2
C6	4000	0031	4005	04	0	2							

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

Figure 21. Ring Transmission Definition Panel

Appendix B. NCP Source

This Appendix shows the definitions for line L13008 and associated downstream devices used in the test environment. P13008B is capable of supporting multiple LUs across a NETBIOS session. The other DSPUs are Standalone configurations running 3270 Emulation V3 each with an attached printer able to operate as a host printer LU.

```

***** 00012000
*   NEWNAME = RADNCP3           *   *   UNITSZ = 152           *   * 00020000
*****  N *   MAXBFRU = 34       *   * 00030000
*   *   P *   MAXSUBA = 63       *   * 00040000
* ACF/NCP V4R2 FOR 3725        *   A *   SUBAREA = 13          *   * 00050000
*   (03/11/88)                 *   *   *                   *   * 00060000
***** 00070000
***** 01511000
*   OPTIONS DEFINITION STATEMENT *   * 01512000
***** 01520000
NCPOPT  OPTIONS NEWDEFN=YES     *   * 01520100
***** 01521000
*   PCCU'S    MACRO SPECIFICATIONS *   * 01530000
***** 01540000
*
      PRINT NOGEN
VTAMV303 PCCU  CUADDR=6FF,      V/M IS F9F           X01570000
                AUTODMP=YES,    ONLY ONE AUTODMP-HOST IF TWINTAIL X01580000
                AUTOIPL=NO,     ONLY ONE AUTOIPL-HOST IF TWINTAIL X01590000
                AUTOSYN=YES,    USE THE ALREADY LOADED NCP IF OK X01600000
                BACKUP=YES,     RESOURCE TAKEOVER PERMITTED X01610000
                CHANCON=COND,   CONDITIONAL CONTACT REQ. TO NCP SENTX01620000
                DUMPDS=NCPDUMP, DUMP DATASET X01630000
                MDUMPDS=NCPDMOSS, MOSS DUMP DATASET X01640000
                CDUMPDS=NCPDCSP, SCANNER DUMP DATASET X01650000
                MAXDATA=5000,   X01660000
                OWNER=MO3,      X01680000
                VFYLM=YES,     VERIFY LMOD WHEN LOADING X01690000
                SUBAREA=03,    HOSTSA VTAM VER 3 MVS X01700000
                RNAME=(P24036) X01670000
*
VTAMV311 PCCU  CUADDR=6FF,      V/M IS F9F           X01570000
                AUTODMP=YES,    ONLY ONE AUTODMP-HOST IF TWINTAIL X01580000
                AUTOIPL=NO,     ONLY ONE AUTOIPL-HOST IF TWINTAIL X01590000
                AUTOSYN=YES,    USE THE ALREADY LOADED NCP IF OK X01600000
                BACKUP=YES,     RESOURCE TAKEOVER PERMITTED X01610000
                CHANCON=COND,   CONDITIONAL CONTACT REQ. TO NCP SENTX01620000
                DUMPDS=NCPDUMP, DUMP DATASET X01630000
                MDUMPDS=NCPDMOSS, MOSS DUMP DATASET X01640000
                CDUMPDS=NCPDCSP, SCANNER DUMP DATASET X01650000
                MAXDATA=5000,   X01660000
                RNAME=(P24036), X01670000
                OWNER=M11,      X01680000
                VFYLM=YES,     VERIFY LMOD WHEN LOADING X01690000
                SUBAREA=11,    HOSTSA VTAM VER 3 MVS X01700000
*
VTAMV319 PCCU  CUADDR=BFF,      V/M IS F90           X01710000
                AUTODMP=YES,    ONLY ONE AUTODMP-HOST IF TWINTAIL X01720000
                AUTOIPL=NO,     ONLY ONE AUTOIPL-HOST IF TWINTAIL X01730000
                AUTOSYN=YES,    USE THE ALREADY LOADED NCP IF OK X01740000
                BACKUP=YES,     RESOURCE TAKEOVER PERMITTED X01750000
                CHANCON=COND,   CONDITIONAL CONTACT REQ. TO NCP SENTX01760000
                DUMPDS=NCPDUMP, DUMP DATASET X01770000
                MDUMPDS=NCPDMOSS, MOSS DUMP DATASET X01780000
                CDUMPDS=NCPDCSP, SCANNER DUMP DATASET X01790000

```

	MAXDATA=5000,	X01800000
	RNAME=(P24036),	X01810000
	OWNER=M19,	X01820000
	VFYLM=YES,	X01830000
	SUBAREA=19	01840000
VTAMV320 PCCU	CUADDR=B90,	X01570000
	AUTODMP=YES,	X01580000
	AUTOIPL=NO,	X01590000
	AUTOSYN=YES,	X01600000
	BACKUP=YES,	X01610000
	CHANCON=COND,	X01620000
	DUMPDS=NCPDUMP,	X01630000
	MDUMPDS=NCPDMOSS,	X01640000
	CDUMPDS=NCPDCSP,	X01650000
	MAXDATA=5000,	X01660000
	OWNER=M20,	X01680000
	VFYLM=YES,	X01690000
	SUBAREA=20	01700000
VTAMV325 PCCU	CUADDR=6FF,	X01570000
	AUTODMP=YES,	X01580000
	AUTOIPL=NO,	X01590000
	AUTOSYN=YES,	X01600000
	BACKUP=YES,	X01610000
	CHANCON=COND,	X01620000
	DUMPDS=NCPDUMP,	X01630000
	MDUMPDS=NCPDMOSS,	X01640000
	CDUMPDS=NCPDCSP,	X01650000
	MAXDATA=5000,	X01660000
	OWNER=M25,	X01680000
	VFYLM=YES,	X01690000
	SUBAREA=25	01700000
VTAMV329 PCCU	CUADDR=99F,	HW X01850000
	AUTODMP=YES,	X01860000
	AUTOIPL=NO,	X01870000
	AUTOSYN=YES,	X01880000
	BACKUP=YES,	X01890000
	CHANCON=COND,	X01900000
	DUMPDS=NCPDUMP,	X01910000
	MDUMPDS=NCPDMOSS,	X01920000
	CDUMPDS=NCPDCSP,	X01930000
	MAXDATA=5000,	X01940000
	RNAME=(P24036),	X01950000
	OWNER=M29,	X01960000
	VFYLM=YES,	X01970000
	SUBAREA=29	01980000
VTAMV233 PCCU	CUADDR=0BF,	X01990000
	AUTODMP=YES,	X02000000
	AUTOIPL=YES,	X02010000
	AUTOSYN=YES,	X02020000
	BACKUP=YES,	X02030000
	CHANCON=COND,	X02040000
	MAXDATA=5000,	X02050000
	RNAME=(P24036),	X02060000
	OWNER=M33,	X02070000
	VFYLM=YES,	X02080000
	SUBAREA=33	02090000
VTAMV349 PCCU	CUADDR=BFF,	X02100000
	AUTODMP=YES,	X02110000
	AUTOIPL=NO,	X02120000
	AUTOSYN=YES,	X02130000
	BACKUP=YES,	X02140000
	CHANCON=COND,	X02150000
	DUMPDS=NCPDUMP,	X02160000
	MDUMPDS=NCPDMOSS,	X02170000
	CDUMPDS=NCPDCSP,	X02180000
	MAXDATA=5000,	X02190000
	RNAME=(P24036),	X02200000
	OWNER=M49,	X02210000
	VFYLM=YES,	X02220000
	SUBAREA=49	02230000
	VERIFY LMOD WHEN LOADING	X02380000
	HOSTSA VM/VTAM VER 3.1.1	02390000
*		02400000
*	BUILD MACRO SPECIFICATIONS	* 02400000

```

***** 02410000
NCPBUILD BUILD BFRS=(128), NCP BUFFER SIZE,EP FREE BUFFER X02420000
                BRANCH=500, BRANCH TRACE ENTRIES V3X02430000
                CA=(TYPE5-TPS,TYPE5), CHANNEL ADAPTER TYPE V3X02440000
                CATRACE=(YES,100), CHANNEL ADAPTER TRACE V3X02450000
                CWALL=26, MIN. BUFFERS BEFORE SLOWDOWN X02500000
                DELAY=(0.2,0.2), CA ATT.-DELAY FOR V3 BUILD X02510000
                DSABLTO=6.5, X02520000
                ENABLTO=6.5, IBM 386X REQUIRE 6.5 AS MINIMUM X02530000
                LOADLIB=NCPLOAD, LIB FOR LOAD MODULE X02540000
                LOCALTO=1.5, * NTRI ACK.TIMER FOR LOCAL TOKEN RING X02541000
                QUALIFY=NCP43725, QUALIFIER FOR STAGE 2 DECK NAMES X02550000
                LTRACE=4, SIT FOR 4 LINES X02560000
                MAXSSCP=8, 8 SSCP'S CAN ACTIVATE THIS NCP X02570000
                MAXSUBA=63, ALLOW FOR UP TO 63 SUBAREAS X02580000
                MODEL=3725, X02600000
                MXRLINE=2,
                MXVLINE=25, * NTRI LOGICAL (NTRI LINES + AUTOGEN) X02600200
                TRANSFR=40, X02601000
                NCPCA=(ACTIVE,ACTIVE), V3X02610000
                NEWNAME=RADNCP3, X02620000
                NPA=(YES,DR), X02630000
                NUMHSAS=6, 6 HOSTS MAY COMMUNICATE CONCURRENTLY X02640000
                PUNAME=RADNCP3, X
                REMOTTO=1.5, * NTRI ACK.TIMER FOR REMOTE TOKEN RING X02641000
                SUBAREA=13, SUBAREA ADDRESS = 13 X02660000
                TIMEOUT=(120,120), ANS BEGINS AFTER, FOR V3 IN BUILD X02670000
                TRACE=(YES,64), 64 ADDRESS-TRACE ENTRIES X02680000
                TYPGEN=NCP, NCP ONLY X02690000
                TYPSYS=OS, OS GENERATION X02700000
                VERSION=V4R2, NDF VERSION INDICATOR X02710000
                RESOEXT=64, ALLOW 64 NAU'S TO BE REUSED 02650000
* ***** 02730000
* SYSCNTRL MACRO SPECIFICATIONS * 02740000
***** 02750000
NCPSYSC SYSCNTRL OPTIONS=(BHSASSC,ENDCALL,MODE,RCNTRL,RCOND,RECMD,RIMM,X02760000
                NAKLIM,SESSION,SSPAUSE,XMTLMT,STORDSP,DLRID,RDEVQ) 02770000
***** 02780000
* HOST MACRO SPECIFICATIONS * 02790000
***** 02800000
M03 HOST INBFRS=10, NCP BUFFERS ALLOCATION X02810000
                MAXBFRU=34, UP TO 34 VTAM BUFFERS SHIPPED X02820000
                UNITSZ=152, VTAM IO BUFFERS SIZE X02830000
                BFRPAD=0, BUFFER PAD X02840000
                SUBAREA=(03) CHANNEL ATTACHED HOSTSA V3 02850000
M11 HOST INBFRS=10, NCP BUFFERS ALLOCATION X02810000
                MAXBFRU=34, UP TO 34 VTAM BUFFERS SHIPPED X02820000
                UNITSZ=152, VTAM IO BUFFERS SIZE X02830000
                BFRPAD=0, BUFFER PAD X02840000
                SUBAREA=(11) CHANNEL ATTACHED HOSTSA V3R1.1 02850000
M19 HOST INBFRS=10, NCP BUFFERS ALLOCATION X02860000
                MAXBFRU=34, UP TO 34 VTAM BUFFERS SHIPPED X02870000
                UNITSZ=152, VTAM IO BUFFERS SIZE X02880000
                BFRPAD=0, BUFFER PAD (MANDATORY FOR ACF) X02890000
                SUBAREA=(19) CHANNEL ATTACHED HOSTSA REL 3 02900000
M20 HOST INBFRS=10, NCP BUFFERS ALLOCATION X02810000
                MAXBFRU=34, UP TO 34 VTAM BUFFERS SHIPPED X02820000
                UNITSZ=152, VTAM IO BUFFERS SIZE X02830000
                BFRPAD=0, BUFFER PAD X02840000
                SUBAREA=(20) CHANNEL ATTACHED HOSTSA V3 02850000
M25 HOST INBFRS=10, NCP BUFFERS ALLOCATION X02810000
                MAXBFRU=34, UP TO 34 VTAM BUFFERS SHIPPED X02820000
                UNITSZ=152, VTAM IO BUFFERS SIZE X02830000
                BFRPAD=0, BUFFER PAD X02840000
                SUBAREA=(25) CHANNEL ATTACHED HOSTSA V3 02850000
M29 HOST INBFRS=10, NCP BUFFERS ALLOCATION X02910000
                MAXBFRU=34, UP TO 34 VTAM BUFFERS SHIPPED X02920000
                UNITSZ=152, VTAM IO BUFFERS SIZE X02930000
                BFRPAD=0, BUFFER PAD (MANDATORY FOR ACF) X02940000
                SUBAREA=(29) CHANNEL ATTACHED HOSTSA REL 3 02950000
M33 HOST INBFRS=10, NCP BUFFERS ALLOCATION X03010000
                MAXBFRU=58, UP TO 58 VTAM BUFFERS SHIPPED X03020000
                UNITSZ=88, VTAM IO BUFFERS SIZE X03030000

```



```

STATMOD=YES,          REQUIRED FOR DOS/VSE          X03040000
BFRPAD=0,            BUFFER PAD (MANDATORY FOR ACF) X03050000
SUBAREA=(33)        CHANNEL ATTACHED HOSTSA REL 3 03060000
M49  HOST  INBFRS=10, NCP BUFFERS ALLOCATION DS X03070000
MAXBFRU=34,         UP TO 34 VTAM BUFFERS SHIPPED X03080000
UNITSZ=152,        VTAM IO BUFFERS SIZE X03090000
BFRPAD=0,          BUFFER PAD (MANDATORY FOR ACF) X03100000
SUBAREA=(49)       CHANNEL ATTACHED HOSTSA REL 3.1.1 03110000
***** 03120000
* DYNAMIC RECONFIGURATION POOL SPACE * 03130000
***** 03140000
* 03150000
DRPOOLPU PUDRPOOL NUMBER=20 03160000
MAXLU=64 03170000
* 03180000
DRPOOLLU LUDRPOOL NUMTYP1=10, RESERVE 10 LUS ON PU.T1 PUS X03190000
NUMTYP2=200 RESERVE 90 LUS ON PU.T2 PUS X03200000
***** 03211000
* PATH SPECIFICATIONS * 03220000
***** 03240000
* NCP13
PATH DESTSA=3, X
ERO=(11,1,5000,5000,5000,20000), X
ER3=(3,1,5000,5000,5000,20000), X
VR0=3, X
VRPWS00=(1,3),VRPWS01=(1,3),VRPWS02=(1,3), X
VR1=0, X
VRPWS10=(2,6),VRPWS11=(2,6),VRPWS12=(2,6), X
VR2=3, X
VRPWS20=(1,3),VRPWS21=(1,3),VRPWS22=(1,3)
PATH DESTSA=11, X
ERO=(11,1), X
ER1=(11,1), X
ER2=(3,1), X
VR0=0, X
VRPWS00=(1,3),VRPWS01=(1,3),VRPWS02=(1,3), X
VR1=2, X
VRPWS10=(2,6),VRPWS11=(2,6),VRPWS12=(2,6)
PATH DESTSA=19, X
ERO=(19,1,5000,5000,5000,20000), X
ER1=(19,1), X
ER2=(11,1), X
VR0=0, X
VRPWS00=(1,3),VRPWS01=(1,3),VRPWS02=(1,3), X
VR1=2, X
VRPWS10=(2,6),VRPWS11=(2,6),VRPWS12=(2,6)
PATH DESTSA=20, X
ERO=(20,1,5000,5000,5000,20000), X
ER2=(11,1), X
VR0=0, X
VRPWS00=(1,3),VRPWS01=(1,3),VRPWS02=(1,3), X
VR1=2, X
VRPWS10=(2,6),VRPWS11=(2,6),VRPWS12=(2,6)
PATH DESTSA=25, X
ERO=(26,8,5000,5000,5000,20000), X
ER1=(11,1), X
ER2=(20,1), X
ER3=(11,1), X
ER4=(26,8), X
VR0=1, X
VRPWS00=(3,9),VRPWS01=(3,9),VRPWS02=(3,9), X
VR1=3, X
VRPWS10=(4,12),VRPWS11=(4,12),VRPWS12=(4,12), X
VR2=0, X
VRPWS20=(2,6),VRPWS21=(2,6),VRPWS22=(2,6)
PATH DESTSA=28, X
ERO=(20,1), X
ER1=(20,1), X
ER2=(11,1), X
VR0=0, X
VRPWS00=(2,6),VRPWS01=(2,6),VRPWS02=(2,6), X
VR1=2, X
VRPWS10=(3,9),VRPWS11=(3,9),VRPWS12=(3,9)

```

**PATH DESTSA=22,
ER1=(22,8,5000,5000,5000,20000),
ER2=(22,8)**

**X
X**

```

***** 03813700
*      SDLCST STATEMENTS FOR CONFIGURABLE LINK STATIONS      * 03813800
*      (STATEMENT MUST PRECEDE GROUP STATEMENTS)             * 03813900
***** 03814000
SDL13PRI SDLCST MODE=PRI,                                     *03820000
          GROUP=G13XPRI,          GROUP FOR PRIMARY LINKS    *03830000
          RETRIES=(7,3,5),        *03840000
          MAXOUT=7,               *03860000
          PASSLIM=254             *03870000
*                                     *03880000
SDL13SEC SDLCST MODE=SEC,                                     *03890000
          GROUP=G13XSEC,          GROUP FOR SECONDARY LINKS  *03900000
          RETRIES=(7),           *03910000
          MAXOUT=7,              *03920000
          PASSLIM=254            *03930000
*                                     *03940000
***** 05290000
*      VIRTUAL GROUP FOR NPA                                   * 05300000
***** 05310000
G13NPA  GROUP LNCTL=SDLC,VIRTUAL=YES,NPARSC=YES             NPA 05320000
L13NPA  LINE ISTATUS=ACTIVE,OWNER=M20                       *05330000
P13NPA  PU                                                  *05340000
T13NPA  LU MAXCOLL=400                                       NPA 05360000
*                                     *05370000
***** 36831000
*      GROUP MACRO SPECIFICATIONS FOR SDLC LINES              * 36832000
***** 36833000
G13S1   GROUP LNCTL=SDLC,          SYNCHRONOUS DATA LINK    X36834000
          DUPLEX=FULL,            REQUEST TO SEND ALWAYS UP  X36835000
          NRZI=YES,               X36836000
          REPLYTO=1,              1 SECOND FOR SDLC         X36837000
          RETRIES=(7,4,5),        7 RETRIES PER SECOND FOR 5 TIMES X36838000
          TYPE=NCP                 NCP ONLY                  36839000
***** 36839100
*      SDLC 3174 - REMOTE T-R GATEWAY LINE 8                  * 36839200
***** 36840500
L13008  LINE ADDRESS=(08, half),                               *
          ATTACH=MODEM,                                                *
          HDXSP=YES,                                                    *
          ANS=CONTINUE,                                                 *
          CLOCKNG=EXT,                                                  *
          DUPLEX=(FULL),                                                *
          ETRATIO=30,                                                   *
          ISTATUS=ACTIVE,                                               *
          LPDATS=LPDA2,                                                 *
          MAXPU=10,                                                     *
          NPACOLL=YES,                                                  *
          PAUSE=0,                                                       *
          SERV LIM=4,              USE DEFAULT IF MANY DSPUS          *
          SPEED=9600,                                                    *
          SRT=(,64),                                                     *
          OWNER=M20
***** 36902800
*      SERVICE MACRO SPECIFICATION FOR SDLC (LINE 008)        * 36902900
***** 36903000
          SERVICE MAXLIST=10,                                           *
          ORDER=(P13008A,P13008B,P13008C,P13008D,P13008E,P13008F)

```

```

***** 36902800
*      PU / LU MACROS                      (LINE 008)      * 36902900
***** 36903000
P13008A  PU      ADDR=C1,                      *
          DISCNT=(NO),                          *
          MAXDATA=521,          3174 SUPPORTS UP TO 521    *
          ISTATUS=ACTIVE,                        *
          MAXOUT=7,                              *
          DATMODE=HALF,                          *
          PACING=0,                              *
          PASSLIM=8,                             *
          PUDR=YES,          MAXLU DELAULTS TO LUDRPOOL VALUE *
          PUTYPE=2,                              *
          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,                              *
          DATMODE=HALF,                          *
          PACING=0,                              *
          PASSLIM=8,                             *
          PUDR=YES,          MAXLU DELAULTS TO LUDRPOOL VALUE *
          PUTYPE=2,                              *
          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
T13008B3  LU  LOCADDR=4,MODETAB=AMODETAB,DLOGMOD=M2SDLCQ,ISTATUS=ACTIVE
T13008B4  LU  LOCADDR=5,MODETAB=AMODETAB,DLOGMOD=M2SDLCQ,ISTATUS=ACTIVE
*
P13008C  PU      ADDR=C3,          PC 3270 EMULATION GATEWAY      *
          DISCNT=(NO),                          *
          MAXDATA=265,          PC 3270 EMULATION SUPPORTS 265    *
          ISTATUS=ACTIVE,                        *
          MAXOUT=7,                              *
          DATMODE=HALF,                          *
          PACING=0,                              *
          PASSLIM=8,                             *
          PUDR=YES,          MAXLU DELAULTS TO LUDRPOOL VALUE *
          PUTYPE=2,                              *
          SSCPFM=USSSCS,                         *
          USSTAB=US327X,                         *
          VPACING=0
T13008C1  LU  LOCADDR=2,MODETAB=AMODETAB,DLOGMOD=M2SDLCQ,ISTATUS=ACTIVE
T13008C2  LU  LOCADDR=3,MODETAB=AMODETAB,DLOGMOD=M3287scs,istatus=active
*
P13008D  PU      ADDR=C4,          PC 3270 EMULATION STANDALONE    *
          DISCNT=(NO),                          *
          MAXDATA=265,          PC 3270 EMULATION SUPPORTS 265    *
          ISTATUS=ACTIVE,                        *
          MAXOUT=7,                              *
          DATMODE=HALF,                          *
          PACING=0,                              *
          PASSLIM=8,                             *
          PUDR=YES,          MAXLU DELAULTS TO LUDRPOOL VALUE *
          PUTYPE=2,                              *
          SSCPFM=USSSCS,                         *
          USSTAB=US327X,                         *
          VPACING=0
T13008D1  LU  LOCADDR=2,MODETAB=AMODETAB,DLOGMOD=M2SDLCQ,ISTATUS=ACTIVE
T13008D2  LU  LOCADDR=3,MODETAB=AMODETAB,DLOGMOD=M3287SCS,ISTATUS=ACTIVE
*
P13008E  PU      ADDR=C5,                      *
          DISCNT=(NO),                          *
          MAXDATA=265,                          *
          ISTATUS=ACTIVE,                        *

```

```
MAXOUT=7, *
DATMODE=HALF, *
PACING=0, *
PASSLIM=8, *
PUDR=YES, MAXLU DELAULTS TO LUDRPOOL VALUE *
PUTYPE=2, *
SSCPFM=USSCS, *
USSTAB=US327X, *
VPACING=0
T13008E1 LU LOCADDR=2,MODETAB=AMODETAB,DLOGMOD=M2SDLCQ,ISTATUS=ACTIVE
T13008E2 LU LOCADDR=3,MODETAB=AMODETAB,DLOGMOD=M3287scs,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 DELAULTS TO LUDRPOOL VALUE *
             DATMODE=HALF, *
             PUTYPE=2, *
             SSCPFM=USSSCS, *
             USSTAB=US327X, *
             VPACING=0
T13008F1 LU LOCADDR=2,MODETAB=AMODETAB,DLOGMOD=M2SDLCQ,ISTATUS=ACTIVE
T13008F2 LU LOCADDR=3,MODETAB=AMODETAB,DLOGMOD=M3287scs,ISTATUS=ACTIVE
GENEND
END

```


Index

A

ACF/NCP 10
ACF/TAP 22
Activation of DSPUs 23
Adapter Address 7
Adapter Installation 6
ADDRESS, LINE Macro 11
ADDR, PU Macro 11
Attachment Speeds 4

B

Backup 26
Backup and Recovery 26

C

Capacity 4
Communication Profile Tasks 13
CONFIG.SYS 12
Customization Panels, 3174 29

D

Data Flows 22
Data Flow, Session Termination 25
Deactivation of DSPU 25
Destination Address 14
Devices Supported 1
Downstream 3174 considerations 9
DSPU Activation 23
DSPU Deactivation 25
DSPU Planning Considerations 12

E

Event Log 17

F

Function, Dual 4
Function, Gateway/Controller 4

G

Gateway Function 1
Gateway Host Status Summary 21
Gateway Logical View 3
Gateway Physical View 2

H

Half-Duplex Send Priority 16
Hardware Installation 6
HDXSP 16
Highlights 4
Host Software 10

I

I-frame 8
Implementing the 3174 Gateway 5
Installation 4, 5
Installation, Adapter 6
Installation, Hardware 6

L

LAN Support Program 12
LINE Macro 11
Link Status Summary 20
Link Subsystem Name 7
Logical View 3
Logmode 10

M

Management Considerations 17
MAXDATA 11
Maximum window size 8
MAXLIST 11
MAXPU 11
Microcode Customization 6

N

NCP 10, 15, 33
NCP Tuning Parameters 15
NetView 10

P

PACING 16
PASSLIM 16
PAUSE 16
Performance 15
Physical View 2
Problem Determination Facilities 17
Problem Determination Tools 22
PSERVIC 10
PSNDPAC 10
PU Macro 11
PUDR 11

Q

Question 100: 3174 Model Designation 6
Question 101: Host Attachment 6
Question 121: Keyboard Language and I/O
Interface Code 7
Question 381 9
Question 900: Token-Ring Adapter
Address 7
Question 905: Ring Error Monitor 7
Question 908: Link Subsystem Name 7
Question 940 9
Question 940: Ring Address Assignment 8
Question 941 9
Question 941: Ring Transmission
Definition 8
Questions 104-105: SDLC Address Range 6

R

Recovery 26
REM 4, 22
Remote 3174 Gateway Highlights 4
Ring Address Assignment 8
Ring Error Monitor 4, 7, 22
Ring Transmission Definition 8

S

SDLC Address Range 6
SERVICE 15
SERVICE Macro 11
Service Order Table 15, 16
Service Order Table Polling 15
SERVLIM 15
Session Termination Data Flows 25
Speeds 4
SRCVPAC 10
Storage Requirements 6
Supported Devices 1

T

Token-Ring Adapter Address 7
Token-Ring Adapter Status Summary 19
Token-Ring Status 19
Token-Ring Test Menu 18
Trace Analysis Program 22
Trace and Performance Program 22
Tuning 15
Tuning Parameters 15

V

VTAM 10

W

W-field 8
Window size 8

3

3270 Emulation 12, 13

**IBM 3174 REMOTE TOKEN-RING GATEWAY
GG24- 3366-00**

**READER'S
COMMENT
FORM**

You may use this form to communicate your comments about this publication, its organization, or subject matter, with the understanding that IBM may use or distribute whatever information you supply in any way it believes appropriate without incurring any obligation to you.

Your comments will be sent to the author's department for whatever review and action, if any, is deemed appropriate. Comments may be written in your own language; use of English is not required.

Note: Copies of IBM publications are not stocked at the location to which this form is addressed. Please direct any requests for copies of publications, or for assistance in using your IBM system, to your IBM representative or to the IBM branch office serving your locality.

Possible topics for comment are:

Clarity Accuracy Completeness Organization Coding Retrieval Legibility

If you wish a reply, give your name, company, mailing address, and date:

NOTE: Staples will cause problems with information that bearing information.
Please use pressure sensitive or other gummed tape to seal this form.

What is your occupation? _____

Reader's Comment Form

Cut or Fold Along Line

Fold and tape

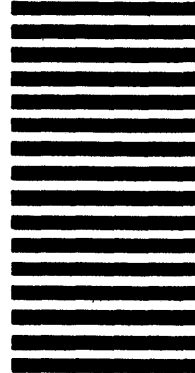
Please Do Not Staple

Fold and tape



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 40 ARMONK, N.Y.



POSTAGE WILL BE PAID BY ADDRESSEE:

IBM International Technical Support Center
Department 985A, Building 657
P.O. Box 12195
Research Triangle Park
Raleigh, North Carolina 27709
U.S.A.

Fold and tape

Please Do Not Staple

Fold and tape



GG24-3366-00

IBM 3174 REMOTE TOKEN-RING GATEWAY

GG24-3366-00

PRINTED IN THE U.S.A.

IBM[®]

GG24-3366-00

