

Network Control Program  
Version 7 Release 8



# Migration Guide



Network Control Program  
Version 7 Release 8



# Migration Guide

**Note**

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

**First Edition (September 1999)**

This edition applies to:

- Advanced Communications Function/Network Control Program (ACF/NCP) Version 7 Release 8 (program number 5648-063)
- Advanced Communications Function/System Support Programs (ACF/SSP) Version 4 Release 8 for MVS (program number 5655-041)
- Advanced Communications Function/System Support Programs (ACF/SSP) Version 4 Release 8 for VM (program number 5654-009)
- Advanced Communications Function/System Support Programs (ACF/SSP) Version 4 Release 8 for VSE (program number 5686-064)
- Emulation Program for IBM Communication Controllers Release 14 (program number 5735-XXB)

and to all subsequent releases and modifications until otherwise indicated in new editions or technical newsletters. See "What Is New in This Book" for a summary of the changes made to this manual. Make sure you are using the correct edition for the level of the product.

Order publications through your IBM representative or the IBM branch office serving your locality. Publications are not stocked at the address given below.

IBM welcomes your comments. A form for reader's comments appears at the back of this publication. If the form has been removed, address your comments to:

Department CGF  
Design & Information Development  
IBM Corporation  
PO Box 12195  
Research Triangle Park, NC 27709  
USA

When you send information to IBM, you grant IBM a nonexclusive right to use or distribute the information in any way it believes appropriate without incurring any obligation to you.

© **Copyright International Business Machines Corporation 1999. All rights reserved.**

US Government Users Restricted Rights – Use, duplication or disclosure restricted by GSA ADP Schedule Contract with IBM Corp.

---

# Contents

<b>Notices</b> . . . . .	vii
Notice to Users of Online Versions of This Book . . . . .	viii
Trademarks . . . . .	viii
<b>About This Book</b> . . . . .	xi
Who Should Use This Book . . . . .	xi
How to Use This Book . . . . .	xi
How Numbers Are Written . . . . .	xii
What Is New in This Book . . . . .	xii
Where to Find More Information . . . . .	xii
Information for NCP Tasks . . . . .	xiii
<b>Chapter 1. Using the NCP and EP Migration Aid Functions</b> . . . . .	1-1
<b>Chapter 2. Host System and Hardware Updates</b> . . . . .	2-1
<b>Chapter 3. Migrating from an Unsupported Release</b> . . . . .	3-1
<b>Chapter 4. Migrating from NCP Version 7 Release 7</b> . . . . .	4-1
<b>Chapter 5. Migrating from NCP Version 7 Release 6</b> . . . . .	5-1
<b>Chapter 6. Migrating from NCP Version 7 Release 5</b> . . . . .	6-1
<b>Chapter 7. Migrating from NCP Version 7 Release 4</b> . . . . .	7-1
<b>Chapter 8. Migrating from NCP Version 7 Release 3</b> . . . . .	8-1
<b>Chapter 9. Migrating from NCP Version 7 Release 1</b> . . . . .	9-1
<b>Chapter 10. Migrating from NCP Version 6 Release 3</b> . . . . .	10-1
<b>Chapter 11. Migrating from NCP Version 6 Release 2</b> . . . . .	11-1
<b>Chapter 12. Migrating from NCP Version 5 Release 4</b> . . . . .	12-1
<b>Chapter 13. Migrating from NCP Version 4 Release 3.1</b> . . . . .	13-1
<b>Appendix A. Quick Reference of Keyword Changes</b> . . . . .	A-1
<b>Appendix B. Migration Aid Modifications</b> . . . . .	B-1
<b>Appendix C. Migration Aid Sample</b> . . . . .	C-1
<b>List of Abbreviations</b> . . . . .	X-1
<b>Glossary</b> . . . . .	X-3
<b>Bibliography</b> . . . . .	X-21

**Index** ..... X-25

---

## Figures

1-1.	Sample JCL for Invoking the Migration Aid in MVS	1-8
1-2.	Sample EXEC for Invoking the Migration Aid in VM	1-8
1-3.	Sample EXEC for Invoking the Migration Aid in VSE	1-9
1-4.	Sample OPTIONS Definition Statement for Invoking the Migration Aid	1-9
1-5.	Sample Summary Comment Block	1-11
1-6.	Sample Statement Comment Block	1-13
1-7.	Sample Modified BUILD Definition Statement	1-14
11-1.	LU-LU Connection through Two NCPs	11-10
11-2.	LU-LU Connection through One NCP	11-11
11-3.	Pre-APPN Configuration	11-11
C-1.	Sample Migration Aid Input Generation Definition	C-1
C-2.	Sample Migration Aid Output NEWDEFN File	C-5

---

## Tables

0-1.	Sources of Information by Task for NCP V7R8	xiii
1-1.	Using the Migration Aid with NCP and Related Products	1-2
4-1.	New Functions Added in V7R8	4-3
5-1.	New Functions Added in V7R8 and V7R7	5-4
6-1.	New Functions Added in V7R8, V7R7 and V7R6	6-5
7-1.	New Functions Added in V7R8, V7R7, V7R6, and V7R5	7-7
8-1.	New Functions Added in V7R8, V7R7, V7R6, V7R5, and V7R4	8-9
9-1.	New Functions Added in V7R8, V7R7, V7R6, V7R5, V7R4, and V7R3	9-12
10-1.	New Functions Added in V7R8, V7R7, V7R6, V7R5, V7R4, and V7R3	10-14
11-1.	New Functions Added in V7R8, V7R7, V7R6, V7R5, V7R4, and V7R3	11-17
12-1.	New Functions Added in V7R8, V7R7, V7R6, V7R5, V7R4, and V7R3	12-12
13-1.	New Functions Added in V7R8, V7R7, V7R6, V7R5, V7R4, and V7R3	13-12
A-1.	Changes to Definition Statements and Keywords by NCP Enhancement	A-1
B-1.	Statements and Keywords That May Be Modified by the Migration Aid	B-1
B-2.	Keywords the Migration Aid Deletes	B-6
B-3.	Keywords the Migration Aid Changes	B-9
B-4.	Keywords the Migration Aid Moves from the BUILD Definition Statement	B-13
B-5.	Keywords the Migration Aid Adds	B-14





---

## Notices

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 product, program, or service is not intended to state or imply that only IBM's product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any of IBM's intellectual property rights may be used instead of the IBM product, program, or service. Evaluation and verification of operation in conjunction with other products, except those expressly designated by IBM, are the user's responsibility.

IBM may have patents or pending patent applications covering subject matter in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to:

IBM Director of Licensing  
IBM Corporation  
North Castle Drive  
Armonk, NY 10504-1785  
U.S.A.

Licensees of this program who wish to have information about it for the purpose of enabling: (i) the exchange of information between independently created programs and other programs (including this one) and (ii) the mutual use of the information which has been exchanged, should contact:

Licensing  
IBM Corporation  
PO Box 12195  
3039 Cornwallis  
Research Triangle Park, NC 27709-2195  
U.S.A

Such information may be available, subject to appropriate terms and conditions, including in some cases, payment of a fee.

For license inquiries regarding double-byte (DBCS) information, contact the IBM Intellectual Property Department in your country or send inquiries, in writing, to:

IBM World Trade Asia Corporation  
Licensing  
2-31 Roppongi 3-chome, Minato-ku  
Tokyo 106, Japan

The licensed program described in this document and all licensed material available for it are provided by IBM under terms of the IBM Customer Agreement, IBM International Program License Agreement, or any equivalent agreement between us.

The following paragraph does not apply to the United Kingdom or any other country where such provisions are inconsistent with local law:

INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR

IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

---

## Notice to Users of Online Versions of This Book

For online versions of this book, you are authorized to:

- Copy, modify, and print the documentation contained on the media, for use within your enterprise, provided you reproduce the copyright notice, all warning statements, and other required statements on each copy or partial copy.
- Transfer the original unaltered copy of the documentation when you transfer the related IBM product (which may be either machines you own, or programs, if the program's license terms permit a transfer). You must, at the same time, destroy all other copies of the documentation.

You are responsible for payment of any taxes, including personal property taxes, resulting from this authorization.

THERE ARE NO WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

Some jurisdictions do not allow the exclusion of implied warranties, so the above exclusion may not apply to you.

Your failure to comply with the terms above terminates this authorization. Upon termination, you must destroy your machine-readable documentation.

---

## Trademarks

The following terms are trademarks of the IBM Corporation in the United States or other countries or both.

ACF/VTAM	IBM	OS/390
Advanced Peer-to-Peer Networking	Library Reader	PS/2
AIX	LPDA	S/370
AnyNet	MVS/SP	S/390
APPN	MVS/ESA	SecureWay
BookManager	MVS/XA	SystemView
eNetwork	NetFinity	System/370
ESCON	NetView	Virtual Machine/ Enterprise System
ESA/370	NTune	Architecture
ESA/390	NTuneMON	VM/ESA
Hardware Configuration Definition	NTuneNCP	VSE/ESA
	Nways	VTAM
	OS/2	

TME 10 is a trademark of Tivoli Systems, Inc.

Other company, product, and service names may be trademarks or service marks of others.



---

## About This Book

This book provides information to help you modify an Advanced Communications Function (ACF) for Network Control Program (NCP) generation definition to migrate from your current NCP release to NCP Version 7 Release 8 (V7R8).

---

## Who Should Use This Book

This book is for system analysts, system programmers, and system engineers who are responsible for the migration of NCP.

Before starting your NCP migration, you should be familiar with:

- Systems Network Architecture (SNA)<sup>1</sup>
- Hardware and software requirements for NCP<sup>2</sup>
- Your network configuration
- Your NCP generation definition

---

## How to Use This Book

This book addresses two general topics:

- How to use the NCP and EP migration aid to automatically migrate generation definitions to NCP V7R8 from earlier releases of NCP or to EP R14 standalone from earlier releases of EP.
- How to manually update the generation definition for an earlier release of NCP to generate NCP V7R8, and to add new functions available in the new release.

**Using the NCP and EP Migration Aids:** The NCP and EP migration aid is an NCP/EP definition facility (NDF) function that automates much of the migration task. The migration aid makes only those changes necessary to generate the new release of either NCP or EP; it does not add any optional functions. Read Chapter 1 to learn how to use the migration aid. Read Appendix B to see what modifications the migration aid makes to particular definition statements and keywords. Read Appendix C to see the input and output of a sample migration.

**Updating Your Generation Definition Manually:** Chapter 4 through Chapter 13 list the keywords you need to add or change to generate the new release of NCP. These chapters also list the keywords you will need to add or change to take advantage of the enhancements made to NCP since the release you are migrating from.<sup>3</sup> To identify the keywords you need to add or change, follow these steps:

1. If you are migrating to a different host operating system or communication controller model or to a type 7 channel adapter, read Chapter 2 to see which keywords you need to add or change for your new host system or hardware before you start your migration process. This information applies regardless of the NCP release you are migrating from.

---

<sup>1</sup> Refer to *Systems Network Architecture Technical Overview* for this information.

<sup>2</sup> Refer to *Planning for NetView, NCP, and VTAM* for this information.

<sup>3</sup> In this book, NCP enhancements introduced between NCP releases are considered to be new to the following release.

2. Use the table of contents to find the chapter for the NCP release you are migrating from. Read that chapter to see what keywords you are required to add or change to generate the new NCP release and what keywords you need to add or change to take advantage of NCP enhancements. For a brief summary of all the keyword changes since NCP V3, see Appendix A.

**Note:** If you are currently using an unsupported NCP release, read Chapter 3 to learn how to migrate to the latest release of NCP.

3. When you have identified the keywords you need to add or change, refer to *NCP, SSP, and EP Resource Definition Guide* for detailed information on their function, and refer to *NCP, SSP, and EP Resource Definition Reference* for detailed information on how to code them.

---

## How Numbers Are Written

This book shows numbers over 9999 in metric style, which means that a space is used instead of a comma to separate groups of three digits. For example, the number ten thousand five hundred fifty-two is written 10 552. However, keyword values, for example, SALIMIT=65535, do not use a blank.

---

## What Is New in This Book

This edition contains the following new NCP and SSP information, as well as editorial and technical changes.

NCP V7R8 offers the following enhancements:

- EP Line Takeover
- EP Shorten V25 BIS Dial Timer
- Logical Line Pool Sharing for TIC3 Connections
- Enhanced Hung TG Detection
- Facilitate Minimum-Sized Remote Load Module
- Ignoring Data from an Undefined 3270 BSC Device
- 3746 Model 900 TIC3 Connection Balancing
- 3746 Model 900 Frame Relay BAN Connection Balancing
- Enhanced Control of the Dynamic Working Window support for 3745 Token Ring
- Enhanced Control of Adaptive Session Pacing
- Specifying a Minimum Working Window for 3745 Frame Relay
- Triple DES Encryption for XRF Sessions

---

## Where to Find More Information

A good place to start any task regarding NCP, SSP, or EP is the *NCP V7R8, SSP V4R8, and EP R14 Library Directory*. This directory introduces the enhancements for the current release and shows where these enhancements are described in the NCP library. It gives you an overview of NCP, SSP, and EP and directs you to information on a variety of tasks related to these programs. If you use the online

book, *hypertext links*<sup>4</sup> will allow you to move directly from task and enhancement descriptions to the appropriate chapters of other books in the library.

## Information for NCP Tasks

The books in the NCP, SSP, and EP library are listed here according to task, along with closely related books and tools you may find helpful. See “Bibliography” on page X-21 for a brief summary of each book in the NCP, SSP, and EP library and listings of related publications.

Table 0-1. Sources of Information by Task for NCP V7R8

Order No.	Title	Hardcopy	Softcopy
<b>Planning</b>			
SC31-8063	<i>Planning for NetView, NCP, and VTAM</i>		■
SC31-8062	<i>Planning for Integrated Networks</i>		■
SC30-4025	<i>NCP V7R8, SSP V4R8, and EP R14 Library Directory</i>	■	■
SC30-3470	<i>NCP Version 7 and X.25 NPSI Version 3 Planning and Installation</i>	■	■
<b>Installation and Resource Definition</b>			
SC31-6221	<i>NCP, SSP, and EP Generation and Loading Guide</i>	■	■
SC30-4024	<i>NCP V7R8 Migration Guide</i>	■	■
SC31-6223	<i>NCP, SSP, and EP Resource Definition Guide</i>	■	■
SC31-6224	<i>NCP, SSP, and EP Resource Definition Reference</i>	■	■
<b>Customization</b>			
LY43-0031	<i>NCP and SSP Customization Guide</i>		■
LY43-0032	<i>NCP and SSP Customization Reference</i>	■	■
<b>Operation</b>			
SC31-6222	<i>NCP, SSP, and EP Messages and Codes</i>	■	■
<b>Diagnosis</b>			
LY43-0033	<i>NCP, SSP, and EP Diagnosis Guide</i>	■	■
LY43-0037	<i>NCP, SSP, and EP Trace Analysis Handbook</i>	■	■
LY43-0029	<i>NCP and EP Reference</i>	■	■
LY43-0030	<i>NCP and EP Reference Summary and Data Areas</i>	■	■
LY30-5610	<i>NCP Version 7 and X.25 NPSI Version 3 Diagnosis, Customization, and Tuning</i>	■	■
<b>Monitoring and Tuning</b>			
SC31-6266	<i>NTuneMON User's Guide</i>	■	■
LY43-0039	<i>NTuneNCP Feature Reference</i>	■	■

<sup>4</sup> A *hypertext link* is a pointer from a location in an online book to another location in the same book or another book. By selecting highlighted information, such as a message number, you can move quickly to related information and, if desired, back again.

## About This Book

Those publications available as softcopy books have cross-document search and hypertext links for speedy, online information retrieval. These softcopy books are grouped together on an electronic bookshelf as part of the *ACF/NCP, ACF/SSP, EP, NPSI, and NTuneMON Softcopy Collection Kit*, LK2T-0414, on compact disc read-only memory (CD-ROM).

You can view and search these softcopy books by using BookManager READ products or by using the IBM Library Reader product included on the CD-ROM. For more information on CD-ROMs and softcopy books, see the *IBM Online Libraries: Softcopy Collection Kit User's Guide*, the BookManager READ documentation, or the BookManager home page at:

**<http://booksrv2.raleigh.ibm.com>**

You can also access unlicensed softcopy NCP publications in Acrobat or BookManager formats from the NCP home page at:

**<http://www.networking.ibm.com/ncp>**



---

## Chapter 1. Using the NCP and EP Migration Aid Functions

General Description . . . . .	1-1
Introduction to the Migration Aid . . . . .	1-1
When to Use the Migration Aid . . . . .	1-2
Migration Aid Modifications . . . . .	1-3
Migration Aid Output . . . . .	1-5
How to Use the Migration Aid . . . . .	1-5
Step 1. Start with an Error-Free Generation Definition . . . . .	1-6
Step 2. Define a NEWDEFN File . . . . .	1-6
Step 3. Choose Parameters to Invoke the Migration Aid . . . . .	1-6
Step 4. Code Migration Aid Parameters . . . . .	1-8
Step 5. Submit an NDF Job to Run the Migration Aid . . . . .	1-9
Step 6. Examine the Generation Listing for Error Codes . . . . .	1-9
Step 7. Examine the NEWDEFN File for Modifications . . . . .	1-10
Step 8. Modify the NEWDEFN File . . . . .	1-15
Step 9. Submit an NDF Job to Generate Your NCP . . . . .	1-15
Step 10. Remove Migration Aid Comments (Optional) . . . . .	1-16

This chapter contains a general description of the NCP and EP migration aid functions and a step-by-step description of how to use them.

---

### General Description

This section presents the following topics:

- Introduction to the migration aid
- When to use the migration aid
- Migration aid modifications
- Migration aid output.

### Introduction to the Migration Aid

The migration aid is a function of the NCP/EP definition facility (NDF) that automates much of the NCP migration task. The migration aid is part of NDF; you do not need to obtain the migration aid separately from IBM. For more information on NDF, refer to *NCP, SSP, and EP Generation and Loading Guide*.

The input to the migration aid is a working NCP or EP generation definition. The migration aid modifies a working generation definition to define resources for NCP V7R8 or EP R14 standalone for an IBM 3745 Communication Controller. The output of the migration aid is a NEWDEFN file containing the modified generation definition and, optionally, an object module.

To migrate your generation definition, the migration aid:

- Deletes unnecessary definition statements and keywords
- Changes keywords
- Moves keywords to other definition statements
- Adds required definition statements and keywords
- Adds required functions
- Documents all changes.

## Using the NCP and EP Migration Aid Functions

When you have migrated your generation definition, you edit it, if necessary, to specify additional values and functions, and then submit it to NDF to define the resources for the target version and controller model.

For an example of the input to the migration aid and the output it generates, see Appendix C.

## When to Use the Migration Aid

This section describes the communication controller models, NCP versions, and NCP-related products with which you can use the migration aid. Table 1-1 summarizes the products and releases with which you can use the migration aid.

Table 1-1. Using the Migration Aid with NCP and Related Products

With this product...	You can migrate from...	To...
NCP	V2 or any later release	NCP V7R8
PEP or EP	NCP V2 or any later release Any EP release	NCP V7R8 EP R14
NRF	R3.3 or any later release	R9
NTO	R3 or any later release	R11
NPSI	V3 or any later release	V3R9

### NCP

You can use the migration aid with NCP to do the following:

- Migrate from NCP V2 or later release to NCP V7R8
- Migrate from an IBM 3705, 3720, or 3725 to an IBM 3745 Communication Controller.

The migration aid will allow you to do the following:

- Migrate to a new release of NCP but not change the model of the IBM 3745 controller
- Change the communication controller model on your current release of NCP but not migrate to a new release
- Remove obsolete keywords from the generation definition for your current model of communication controller and release of NCP.

### PEP and EP

You can use the migration aid to migrate a partitioned emulation program (PEP) or Emulation Program (EP) generation definition for an IBM 3705, 3720, 3725, or 3745 Communication Controller to a PEP generation definition for NCP V7R8 and EP R14 for an IBM 3745. You may also use the migration aid to migrate an existing EP standalone generation definition to an EP R14 standalone generation definition for an IBM 3745.

The input generation definition can be either of the following to create a PEP generation definition:

- A PEP generation definition for NCP V2 or any later release and for any associated EP release
- An EP generation definition for a standalone EP release

The input generation definition must be an EP standalone gen to create an EP R14 standalone generation definition.

### **NRF**

You can migrate a Network Routing Facility (NRF) generation definition for NRF R3.3 or a later release for an IBM 3720, 3725, or 3745 Communication Controller to NRF R9 for an IBM 3745. NRF keywords have not changed since NRF R3.3, so the migration aid makes no changes when you migrate from NRF R3.3 to a later release unless you also change controller model. You need to migrate manually from earlier NRF releases. To migrate an NRF generation definition manually, refer to *NRF Migration, Resource Definition, and Customization*.

### **NTO**

You can migrate a Network Terminal Option (NTO) generation definition for NTO R3 or a later release for an IBM 3720, 3725, or 3745 Communication Controller to NTO R11 for an IBM 3745. NTO keywords have not changed since NTO R3, so the migration aid makes no changes when you migrate from NTO R3 to a later release unless you also change controller model. You need to migrate manually from earlier NTO releases. To migrate an NTO generation definition manually, refer to *NTO Planning, Migration, and Resource Definition*.

### **NPSI**

You can migrate an X.25 NCP Packet Switching Interface (NPSI) generation definition for NPSI V3 or a later release to NPSI V3R9. You need to migrate manually from earlier NPSI releases. To migrate a NPSI generation definition manually, follow the directions in *X.25 NCP Packet Switching Interface Planning and Installation*.

### **User-Written Generation Applications**

If you have defined your own keywords using the NDF Standard Attachment Facility, you need to migrate them manually.

## **Migration Aid Modifications**

This section is a general description of the modifications the migration aid makes to an NCP or EP generation definition. See Appendix B for a more detailed description of these modifications.

**Deleted Definition Statements and Keywords:** The migration aid deletes definition statements and keywords that have become obsolete because their function has been discontinued or merged into other definition statements and keywords.

For example, before NCP V5R1, a direct-attached cable was represented by specifying CLOCKNG=EXT and ATTACH=DIRECT on the LINE definition statement. In the current release, this is represented by specifying CLOCKNG=DIRECT, so the migration aid deletes the ATTACH keyword.

See “Deletions” on page B-6 for more information about deleted keywords.

**Changed Keywords:** The migration aid changes the value specified for a keyword if it is not valid for the new release of NCP or EP.

If only one value is valid, the migration aid uses that value. If more than one value is valid, the migration aid changes the keyword value to a string of three question

## Using the NCP and EP Migration Aid Functions

marks (???). When the migration is complete, you will need to edit the NEWDEFN file to change all occurrences of ??? to valid values. For more information, see “Step 8. Modify the NEWDEFN File” on page 1-15.

For example, if you were migrating from an IBM 3720 (type 5 channel adapter), the migration aid would change the value of the CA keyword on the LINE definition statement from TYPE5 to TYPE6 or TYPE7, depending on the channel adapter being used.

See “Changes” on page B-9 for more information about changed keywords.

**Moved Keywords:** The migration aid moves keywords from one definition statement to another when appropriate.

For example, channel definitions may be specified on the BUILD definition statement for an IBM 3705 Communications Controller, but must be specified on the GROUP and LINE definition statements for an IBM 3745. Consequently, the migration aid moves channel link definitions from BUILD to GROUP and LINE when you are migrating from an IBM 3705.

See “Moves” on page B-13 for more information about moved keywords.

**Added Definition Statements and Keywords:** The migration aid adds definition statements and keywords required for NCP V7R8 or EP R14.

For an added keyword, when only one value is valid for NCP V7R8, the migration aid uses that value. When more than one value is valid, the migration aid uses the value ???. After the migration, you need to edit the NEWDEFN file to change all occurrences of ??? to valid values. For more information, see “Step 8. Modify the NEWDEFN File” on page 1-15.

For example, NETID on the BUILD definition statement is required for NCP V7R8, so the migration aid adds NETID=??? to BUILD if NETID is not specified in the input generation definition.

See “Additions” on page B-14 for more information about added keywords.

**Added Functions:** The migration aid adds any new functions required for NCP V7R8. For example, channel links are required for a locally attached IBM 3745 Communication Controller. The migration aid adds definitions for these channel links if they are not already defined in the input generation definition.

The purpose of the migration aid is to migrate existing functions in a form appropriate for NCP V7R8. The migration aid does not add optional functions available with NCP V7R8. After the migration, you can add new functions by editing the NEWDEFN file produced by the migration aid.

**Documented Modifications:** The migration aid documents modifications to the generation definition by placing comment blocks in the NEWDEFN file.

The migration aid inserts a comment block near the beginning of the NEWDEFN file to indicate the migration aid parameters used for the migration and to supply other information regarding the migration.

The migration aid inserts a comment block before each definition statement for which it modifies or issues informational messages. Changed or added keywords for which the migration aid specified the value ??? are listed under the CRITICAL tag in the comment block. See “Step 7. Examine the NEWDEFN File for Modifications” on page 1-10 for more information about migration aid comments.

You can direct NDF to remove the comment blocks inserted by the migration aid after you have completed your migration. See “Step 10. Remove Migration Aid Comments (Optional)” on page 1-16 for more information about removing migration aid comments.

### Migration Aid Output

The output from the migration aid consists of the following:

- A generation listing
- A NEWDEFN file
- An object module (if no errors occurred during the migration and your generation is not FASTRUN)

The generation listing contains messages issued by the migration aid. The migration aid issues an informational message (severity code 0) for each modification that requires no action by you. When the migration aid does not have enough information to select a value for a changed keyword, it issues a warning message (severity code 4) to alert you that you need to supply a value.

The NEWDEFN file contains the modified NCP generation definition. It consists of the following:

- Informational comment blocks
- Modified definition statement and keywords
- Unmodified definition statement and keywords

After the migration, you can edit the NEWDEFN file to specify keyword values that the migration aid was unable to supply, and to add new function. Then submit the updated NEWDEFN file to NDF to generate your NCP. For an example of the NEWDEFN file the migration aid generates, see “Output NEWDEFN File” on page C-5.

The migration aid produces an object module if no errors with severity code 4 or greater occurred during the migration and if your generation is not FASTRUN.

---

### How to Use the Migration Aid

This section contains a step-by-step description of how to use the migration aid. It describes the following steps:

1. Start with an error-free generation definition.
2. Define a NEWDEFN file.
3. Choose parameters to invoke the migration aid.
4. Code migration aid parameters.
5. Submit an NDF job to run the migration aid.
6. Examine the generation listing for error codes.
7. Examine the NEWDEFN file for modifications.
8. Modify the NEWDEFN file.
9. Submit an NDF job to generate your NCP.

10. Remove migration aid comments (optional).

### Step 1. Start with an Error-Free Generation Definition

Use an error-free NCP generation definition as input to the migration aid. If the input contains errors, the output will also contain errors.

### Step 2. Define a NEWDEFN File

The migration aid produces a modified generation definition in the NEWDEFN output file. You need to define a NEWDEFN file in the MVS or VSE JCL or VM EXEC for your NDF generation job. For more information about defining a NEWDEFN file, refer to *NCP, SSP, and EP Generation and Loading Guide*.

When you define your NEWDEFN file, remember that the migration aid inserts many informational comments. The output NEWDEFN file may be two to three times as large as the input generation definition, depending on the number of modifications required.

### Step 3. Choose Parameters to Invoke the Migration Aid

The following parameters invoke the migration aid and control various aspects of the migration. You can specify them in the MVS or VSE JCL or VM EXEC for your NDF generation job or as keywords on the OPTIONS definition statement. For more information on the migration aid parameters, refer to the OPTIONS definition statement in *NCP, SSP, and EP Resource Definition Reference*.

**Required Parameters:** Specify all three of the following migration aid parameters to invoke the migration aid. When you have finished using the migration aid, remove all migration aid parameters from your JCL, EXEC, or OPTIONS definition statement.

- **TMODEL** specifies the target communication controller model, that is, the model to which you are migrating. You can specify:
  - 3745-130
  - 3745-150
  - 3745-160
  - 3745-170
  - 3745-17A
  - 3745-210
  - 3745-21A
  - 3745-310
  - 3745-31A
  - 3745-410
  - 3745-41A
  - 3745-610
  - 3745-61A
- **TVERSION** specifies the target NCP version to which you are migrating. Specify TVERSION=V7R8 to migrate to NCP V7R8 without including 3746 Model 900 connectivity subsystem functions. Specify TVERSION=V7R8F to migrate to NCP V7R8 and include 3746 Model 900 functions. For EP stand-alone, specify TVERSION=V1R14 for migrating from earlier releases for EP standalone to R14.
- **TUSGTIER** specifies the usage tier for NCP V7R8 and the target controller model.

You can specify:

- 1
- 2
- 2.5
- 3, 3-S, 3-TD, 3-TS, or 3-TB
- 4
- 5

Your system engineer can determine the usage tier from the HONE Configurator hardware configuration output report (CF37xx Report) or installation sheets (CF37xx Installation Sheets).

**Note:** TUSGTIER is not required to migrate to EP standalone.

**Optional Parameters:** The following migration aid parameters control various aspects of the migration process. When you have finished using the migration aid, remove all migration aid parameters from your JCL, EXEC, or OPTIONS definition statement.

- **ADDRCONV** converts the ADDR keyword on frame-relay PU statements to the DLCI keyword in a format of your choice (decimal, hexadecimal, or dotted decimal). The DLCI keyword allows coding the full range of DLCIs (up to 991).
- **CHANNELS** causes 370 I/O channel attachments to be coded on the GROUP, LINE, and PU definition statements in the output NEWDEFN file. If you specify CHANNELS, specify CHANNELS=GROUP. The default is CHANNELS=GROUP.
- **DPU** specifies whether dynamic path update keywords are to be allowed to default, thereby adding dynamic path update capability to NCP. Allowing these keywords to default can cause a significant amount of storage to be allocated for dynamic path update even if you do not use it. You can specify DPU=YES or DPU=NO. The default is DPU=YES.
- **NERLIM** causes the migration aid to add the ERLIMIT keyword to all NETWORK definition statements in your generation definition and specifies the value for the ERLIMIT keyword. You can specify NERLIM=8 or NERLIM=16. If you do not specify NERLIM, the ERLIMIT keyword is not added. NERLIM is relevant only for generation definitions that include SNA network interconnection (SNI).
- **SAVEADDR** specifies whether hardware-specific addresses specified in the input generation definition are to be preserved in the output generation definition. You can specify SAVEADDR=YES or SAVEADDR=NO.

The default for SAVEADDR depends on the value of MODEL on the BUILD definition statement in the input generation definition and the TMODEL migration aid parameter. The default is SAVEADDR=YES when any of the following is true:

- The value of MODEL equals the value of TMODEL.
- MODEL=3745 and TMODEL specifies a 3745-x10 or 3745-x1A model.
- MODEL and TMODEL both specify a single-CCU 3745-x10 or 3745-x1A model.
- MODEL and TMODEL both specify a twin-CCU 3745-x10 or 3745-x1A model.

## Using the NCP and EP Migration Aid Functions

Otherwise, the default is SAVEADDR=NO.

- **TOCONV** replaces the LOCALTO and REMOTTO keywords on token-ring and frame-relay lines with the T1TIMER keyword.

### Step 4. Code Migration Aid Parameters

You can specify migration aid parameters in the MVS or VSE JCL or VM EXEC for your NDF generation job or as keywords on the OPTIONS definition statement.

An advantage of specifying migration aid parameters in the JCL or EXEC is that you do not need to change your NCP generation definition to use the migration aid. If you have more than one generation definition, you can use the same JCL or EXEC with only minor modifications for each generation definition.

If you specify a migration aid parameter both in the JCL or EXEC and on the OPTIONS definition statement, the OPTIONS definition statement overrides the JCL or EXEC.

**VM:** The VM generation EXECs (VMNCP, VMTAPE, VMFAST, and VMEP) have been modified for the migration aid. If you want to code the migration aid parameters in your VM generation EXEC, do not use previous versions of these EXECs. The updated versions are supplied with the migration aid.

If you want to migrate your generation definition without creating an object module, specify FASTRUN=ON as a keyword on the OPTIONS definition statement or as a parameter in the MVS or VSE JCL for your NDF generation job, or use the VMFAST VM generation EXEC.

**MVS JCL:** Figure 1-1 shows how to invoke the migration aid in the JCL for an NDF generation job in MVS, using the three required parameters (highlighted in the example) and FASTRUN.

```
//NDF      EXEC PGM=ICNRTNDF,REGION=6000K,PARM=('FASTRUN=ON',  
//          'TMODEL=3745-410',  
          'TUSGTIER=5', 'TVERSION=V7R8')
```

Figure 1-1. Sample JCL for Invoking the Migration Aid in MVS

**VM EXEC:** Figure 1-2 shows how to invoke the migration aid in a VM NDF generation EXEC, using the three required parameters (highlighted in the example). The VMFAST generation EXEC performs a FASTRUN generation.

```
VMFAST FN=GEN_FN,FT=GEN_FT,...,TMODEL=3745-410,  
TUSGTIER=5,TVERSION=V7R8
```

Figure 1-2. Sample EXEC for Invoking the Migration Aid in VM

**VSE JCL:** Figure 1-3 on page 1-9 shows how to invoke the migration aid in a VSE NDF generation job using the three required parameters (highlighted in the example).



```
// EXEC ICNDNDF,...,PARM='FASTRUN=ON,TMODEL=3745-410,
      TUSGTIER=5,TVERSION=V7R8'
```

Figure 1-3. Sample EXEC for Invoking the Migration Aid in VSE

**OPTIONS Definition Statement:** Figure 1-4 shows how to invoke the migration aid by specifying the three required parameters (highlighted in the example) and FASTRUN as keywords on the OPTIONS definition statement. You can use this method to invoke the migration aid in MVS or VM.

```
OPTIONS TMODEL=3745-410,TUSGTIER=5,
      TVERSION=V7R8,FASTRUN=ON
```

Figure 1-4. Sample OPTIONS Definition Statement for Invoking the Migration Aid

**Note:** The migration aid produces a NEWDEFN file regardless of whether you code the NEWDEFN keyword on the OPTIONS definition statement. If you code this keyword, remove it after the migration if you do not want NDF to continue to produce a NEWDEFN file during each run after you have completed your migration. For more information about the NEWDEFN keyword, refer to *NCP, SSP, and EP Resource Definition Reference*.

To turn off the migration aid once you have migrated your generation definition, simply remove the migration aid parameters from your JCL or EXEC. The migration aid automatically deletes these parameters from the OPTIONS definition statement if you code them there.

## Step 5. Submit an NDF Job to Run the Migration Aid

Before you submit your NDF job, verify the following:

- Is your input generation definition error free?
- Is the NEWDEFN file defined with a unique file name in the JCL or EXEC for your NDF generation job?
- Have you coded the three required migration aid parameters (TMODEL, TUSGTIER, and TVERSION)?
- Have you coded the optional parameters you need (CHANNELS, DPU, NERLIM, SAVEADDR, ADDRCONV and TOCONV)?

When you have verified these items, submit your NDF job.

## Step 6. Examine the Generation Listing for Error Codes

Check for error codes in the return code summary report in the migration aid generation listing.

Messages with severity code 0 contain additional information about the migration. Messages with severity code 4 indicate migration aid modifications that require action by you. The same information is included in the comment blocks in the NEWDEFN file produced by the migration aid; you may prefer to examine this information in the NEWDEFN file.

## Using the NCP and EP Migration Aid Functions

Messages with severity code 8 or greater indicate errors that the migration aid could not resolve. Resolve any such errors and resubmit your NDF job to run the migration aid again.

*NCP, SSP, and EP Messages and Codes* describes the messages that the migration aid issues.

### Step 7. Examine the NEWDEFN File for Modifications

In addition to the usual NDF generation output, the migration aid produces a new generation definition in the NEWDEFN file. The new generation definition can be used as input to NDF.

The migration aid adds the following to the NEWDEFN file:

- A summary comment block near the beginning of the file
- A statement comment block preceding each modified statement
- Inline modifications for added and changed keywords

To help you find the comment blocks inserted by the migration aid, each comment block begins with the tag :MIGINFO and ends with the tag :MIGEND.

#### Summary Comment Block

The migration aid inserts a summary comment block near the beginning of the NEWDEFN file. It lists the values used for the migration aid parameters and may also contain other informational comments about the migration. Check this summary comment block to verify that the migration aid parameters were coded as you intended, and read any informational comments. Figure 1-5 on page 1-11 shows a sample summary comment block.

```

*:MIGINFO*****
* MIGRATION AID SUMMARY
*
* THE MIGRATION AID WAS INVOKED WITH THESE PARAMETERS SPECIFIED OR
* DEFAULTED:
*   TVERSION=V7R8
*   TMODEL=3745-210
*   TUSGTIER=4
*   CHANNELS=GROUP
*       IF CHANNEL DEFINITIONS EXISTED IN THE SOURCE GENERATION
*       DEFINITION, THEY ARE NOW DEFINED ON THE GROUP AND LINE
*       STATEMENTS.
*   DPU=YES
*       TGBXTRA, PATHEXT, AND VRPOOL(2) DEFAULT TO A VALUE
*       GREATER THAN ZERO, MEANING THAT NCP STORAGE IS ALLOCATED
*       FOR THE DYNAMIC PATH UPDATE FUNCTION. SINCE DPU=YES,
*       THE MIGRATION AID ALLOWED UNSPECIFIED VALUES OF
*       TGBXTRA, PATHEXT, AND VRPOOL(2) TO TAKE THEIR NORMAL
*       DEFAULTS. THIS MEANS THAT STORAGE WILL BE ALLOCATED
*       FOR THE DPU FUNCTION, WHETHER YOU INTEND TO USE DPU
*       OR NOT.
*   NERLIM=16
*       NDF WILL ADD ERLIMIT=16 TO NETWORK STATEMENTS ON WHICH
*       ERLIMIT IS NOT SPECIFIED.
*   SAVEADDR=NO
*       THE VALUES SPECIFIED FOR ADDRESS, AUTO, DUALCOM,
*       DYNADMP, HICHAN, AND LOCHAN HAVE BEEN CHANGED TO
*       QUESTION MARKS.
*
* INFORMATIONAL
*   LSPRI DEFAULT
*       FOR LINES BENEATH GROUP STATEMENTS ON WHICH LEVEL2 IS NOT
*       SPECIFIED, THE LSPRI DEFAULT (LSPRI=PU) CAUSES THE PRIORITY
*       OF TRANSMISSIONS ACROSS THE PHYSICAL UNIT TO BE BASED ON THE
*       PRIORITY OF VIRTUAL ROUTES ASSOCIATED WITH THE SESSIONS.
*       SEE THE NCP RESOURCE DEFINITION REFERENCE FOR MORE DETAILS.
*   NTRI AND CHANNEL LINK POSITIONAL RESTRICTIONS
*       THE POSITIONAL RESTRICTIONS AFFECTING NTRI PHYSICAL LINES AND
*       CHANNEL LINKS HAVE BEEN EASED. SEE THE "ADDRESS" KEYWORD
*       DESCRIPTION IN THE NCP RESOURCE DEFINITION REFERENCE FOR MORE
*       DETAILS.
*   ALIGN2 PARAMETER
*       IF RUNNING UNDER MVS OR VM, VERIFY THAT THE "ALIGN2" PARAMETER
*       IS NOT SPECIFIED ON YOUR LINKAGE EDITOR INVOCATION. THIS ENSURES
*       ALIGNMENT OF THE NCP ON 4K PAGE BOUNDARIES.
*:MIGEND*****

```

*Figure 1-5. Sample Summary Comment Block*

### Statement Comment Blocks

The migration aid inserts a statement comment block before each definition statement it modifies or issues informational messages for. Each statement comment block contains the following sections, as appropriate for the definition statement.

- INFORMATIONAL gives you information about this definition statement for your migration.
- ADDITIONS lists the keywords the migration aid added.

## Using the NCP and EP Migration Aid Functions

- CHANGES lists the keywords the migration aid changed.
- DELETIONS lists the keywords the migration aid deleted.
- CRITICAL lists the changed and added keywords for which the migration aid specified the value ????. You need to edit the NEWDEFN file to specify a valid value for each such keyword.

Figure 1-6 on page 1-13 shows a sample statement comment block for the BUILD definition statement.

## Using the NCP and EP Migration Aid Functions

```
*:MIGINFO*****
* MIGRATION AID BUILD STATEMENT SUMMARY
*
* INFORMATIONAL
*   THE TYP SYS DEFAULT HAS CHANGED FROM "OS" TO THE OPERATING
*   SYSTEM ON WHICH YOU ARE RUNNING.
*
*   MAXSUBA MAY BE REMOVED IF ALL THE NODES IN YOUR NETWORK ARE
*   CAPABLE OF EXTENDED NETWORK ADDRESSING, BUT ONLY IF YOU REMOVE
*   IT FROM THE GENERATION DEFINITIONS OF ALL THE OTHER NODES IN YOUR
*   NETWORK.
*
*
* ADDITIONS
*   USGTIER=4 - VIA TUSGTIER
*
* CHANGES
*
*   VERSION=V7R8 - CHANGED FROM V3
*   - CHANGED VIA TVERSION
*   MODEL=3745-210 - CHANGED FROM 3725
*   - CHANGED VIA TMODEL
*   MEMSIZE=??? - CHANGED FROM 768
*
* DELETIONS
*   ABEND=YES
*   - NCP V7R8 DOES NOT NEED IT
*   ASMXREF=SHORT
*   - NCP V7R8 DOES NOT NEED IT
*   OBJLIB=OBJMaha
*   - NCP V7R8 DOES NOT NEED IT
*   UNIT=CIDISK
*   - NCP V7R8 DOES NOT NEED IT
*   CA=(TYPE5-TPS,TYPE5)
*   - DELETED VIA CHANNELS=GROUP
*   DELAY=(0.1,0.1)
*   - DELETED VIA CHANNELS=GROUP
*   NCPA=(ACTIVE,ACTIVE)
*   - DELETED VIA CHANNELS=GROUP
*   CANETID=CNMNET
*   - DELETED VIA CHANNELS=GROUP
*   TIMEOUT=(420.0,420.0)
*   - DELETED VIA CHANNELS=GROUP
*
* :CRITICAL
*   MEMSIZE=??? - CHANGED FROM 768
*
*:MIGEND*****
```

Figure 1-6. Sample Statement Comment Block

## Inline Modifications

The migration aid makes the following modifications to definition statements and keywords in your NEWDEFN file.

- **Deleted keywords** do not appear in the NEWDEFN file. Deleted keywords for each definition statement are listed under DELETIONS in the statement comment block for that definition statement.
- **Changed keywords** appear where they were coded in the input generation definition. In order to preserve comments in the input generation definition, the migration aid does not insert inline comments to indicate changed keywords. Changed keywords for each definition statement are listed under CHANGES in the statement comment block for that definition statement.
- **Moved keywords** for each definition statement are listed under ADDITIONS or CHANGES in the statement comment block for that definition statement.
- **Added keywords** are identified by the tag MIGA, which appears in columns 68–71 on each line containing an added keyword. Added keywords for each definition statement are listed under ADDITIONS in the statement comment block for that definition statement.

Figure 1-7 shows an example of inline changes to the BUILD definition statement.

```
BUILD      BUILD BFRS=128,                *
           CATRACE=YES,                  *
           CWALL=26,                     *
           DSABLTO=3.0,                  *
           HSBPOOL=50,                   *
           LOADLIB=NCPLIB,               *
           LTRACE=2,                     *
           MAXSSCP=2,                    *
           MAXSUBA=255,                  *
           MEMSIZE=???,                  *
           MODEL=3745-210,               *
           NETID=NET1,                   *
           NEWNAME=NCP0525,              *
           NUMHSAS=10,                   *
           QUALIFY=ACF3,                  *
           SLODOWN=12,                   *
           SUBAREA=27,                    *
           TRACE=(YES,100),               *
           TRANSFR=32,                    *
           TYPGEN=NCP,                    *
           VERSION=V7R8,                 *
           VRPOOL=60,                     *
           USGTIER=4                       *
                                           MIGA
           .
           .
GENEND     GENEND
```

Figure 1-7. Sample Modified BUILD Definition Statement

See Appendix B for a description of the definition statements and keywords that the migration aid deletes, changes, moves, or adds. See Appendix C for an example of a complete input generation definition and the resulting NEWDEFN file produced by the migration aid.

## Step 8. Modify the NEWDEFN File

If the migration aid did not specify the value ??? for any added or changed keywords and if there are no errors of severity 4 or greater, your generation definition is completely migrated. In this case, the migration aid produces an object module (unless your migration was FASTRUN). You do not need to modify the NEWDEFN file.

If the migration aid specified the value ??? for an added or changed keyword, you need to replace each occurrence of ??? with a value appropriate for your NCP configuration. The statement comment block for each definition statement lists the keywords you need to change under the :CRITICAL tag. In the example in Figure 1-6 on page 1-13, MEMSIZE=??? indicates that you need to change your MEMSIZE value since you are migrating to a different communication controller. Refer to *NCP, SSP, and EP Resource Definition Reference* for information on coding specific keywords.

If you want to add new functions or define other resources, edit the NEWDEFN file to make the appropriate changes. Refer to *NCP, SSP, and EP Resource Definition Guide* for information on NCP functions and resources.

## Step 9. Submit an NDF Job to Generate Your NCP

If you modified the NEWDEFN file or if your NDF job did not create an object module, you need to submit the NEWDEFN file to NDF to generate your NCP. Follow these steps:

1. Turn off the migration aid by removing the migration aid parameters from your NDF JCL or EXEC if you coded them there. The migration aid automatically removes the migration aid parameters if you code them on the OPTIONS definition statement.
2. If you want to remove the migration aid comment blocks from the NEWDEFN file, code REMOVCOM=YES on the OPTIONS definition statement or in your NDF JCL or EXEC. Do not remove the comments until you are sure that the NEWDEFN file is the way you want it. You may want to keep the comments or remove them later. See “Step 10. Remove Migration Aid Comments (Optional)” on page 1-16 for more information.
3. If you want NDF to produce a NEWDEFN file, code NEWDEFN=YES on the OPTIONS definition statement. If you code REMOVCOM=YES on the OPTIONS definition statement, NDF automatically produces a NEWDEFN file, so you do not have to code the NEWDEFN keyword in this case. Code the REUSE suboperand on the NEWDEFN keyword if you want to be able to resubmit the NEWDEFN file to NDF in the future. Refer to *NCP, SSP, and EP Resource Definition Reference* for a description of the NEWDEFN keyword.

### Existing NEWDEFN File

If you want to save the existing NEWDEFN file, rename it so the new one does not overwrite it.

4. Submit your NDF job.

### Step 10. Remove Migration Aid Comments (Optional)

If you do not want to keep the migration aid comments in your NEWDEFN file, you can direct NDF to remove them. To do this, code REMOVCOM=YES on the OPTIONS definition statement or in your NDF JCL or EXEC and resubmit your NDF job. When you code REMOVCOM=YES, NDF automatically produces a NEWDEFN file without the migration aid comments; you do not need to code the NEWDEFN keyword on the OPTIONS definition statement to produce a NEWDEFN file. Refer to *NCP, SSP, and EP Resource Definition Reference* for a description of the REMOVCOM keyword.

You can remove the migration aid comments during a FASTRUN NDF job. You can code FASTRUN either on the OPTIONS definition statement or in your NDF JCL or EXEC.



---

## Chapter 2. Host System and Hardware Updates

Defining Your Operating System . . . . .	2-1
Defining an IBM 3745 Communication Controller . . . . .	2-1
Defining a 3746 Model 900 Connectivity Subsystem . . . . .	2-3
Defining a Type 7 (Buffer-Chaining) Channel Adapter . . . . .	2-3

If you are migrating to a different host operating system or communication controller model or to a type 7 channel adapter, you need to change the definition statements and keywords that define them. This chapter describes these changes. If you are not migrating to a different host system or different hardware, you do not need to read this chapter.

You should identify the changes for your new host system or hardware before considering any NCP migration changes. After completing this chapter, read the chapter for the NCP release you are migrating from to learn how to migrate to NCP V7R8.

Under each topic in this chapter, definition statements are listed in the order in which they appear in a generation definition. You can code certain keywords on more than one definition statement. This book describes each keyword on the lowest-level definition statement on which it can be coded.

After you have identified the definition statements and keywords that you need to change, add, or delete, refer to *NCP, SSP, and EP Resource Definition Guide* for detailed information on their function, and refer to *NCP, SSP, and EP Resource Definition Reference* for detailed information on how to code them.

---

### Defining Your Operating System

#### **BUILD**

If you are migrating to a different host operating system, update the TYP SYS keyword to specify the new operating system, or delete the TYP SYS keyword to allow it to default to the operating system in which your generation is running.

---

### Defining an IBM 3745 Communication Controller

This section describes the keywords you need to change if you are migrating to any model in the IBM 3745 Communication Controller series from a non-3745 model. You may also need to change some of these keywords if you are migrating from one IBM 3745 model to another.

The IBM 3745 Communication Controller series comprises the following models:

- 3745-130
- 3745-150
- 3745-160
- 3745-170
- 3745-17A
- 3745-210
- 3745-21A
- 3745-310

## Host System and Hardware Updates

3745-31A  
3745-410  
3745-41A  
3745-610  
3745-61A

**Attention:** The link-edit JCL for creating an NCP load module for the IBM 3745 Communication Controller *must not* contain the ALIGN2 parameter. If you code the ALIGN2 parameter, NCP will abend. For more information, refer to *NCP, SSP, and EP Generation and Loading Guide*.

If you are migrating from another communication controller to an IBM 3745 Communication Controller, change the CA keyword on the LINE definition statement to indicate the type of channel adapter in your communication controller.

**Note:** If you are migrating to an IBM 3745-x1A model attached to an MVS host, set the MVS missing-interrupt handler (MIH) timer to 12 minutes for all channels over which you will load an NCP load module larger than 4 megabytes (MB). A megabyte equals 1 048 576 bytes.

For the IBM 3745 Communication Controller, define all 370 I/O channel attachments as channel links on the GROUP and LINE definition statements. For more information, refer to “Chapter 6, 370 I/O Channel Attachments and Access Methods” in *NCP, SSP, and EP Resource Definition Guide*.

To define your IBM 3745 Communication Controller, make the following updates.

### BUILD

Update the MODEL keyword to specify your IBM 3745 Communication Controller model.

Code the USGTIER keyword to specify the number of line adapters, token-ring adapters, and channel adapters allowed on your controller.

Changed keywords:

BFRS  
CATRACE  
MEMSIZE  
TRACE

### GROUP

Code the COMPOWN keyword to specify whether the control blocks for lines in this group for IBM special products or user-written code have system services control point (SSCP) owners, are active, and are compatible for switchback, line-adapter disconnect, and fallback. (The IBM 3745-410, 3745-41A, 3745-610, or 3745-61A is required for switchback and fallback.)

Code the COMPSWP keyword to specify whether NCP honors port swap requests over a line group for IBM special products or user-written code.

Code the COMPTAD keyword to specify whether the control block structure of a line group for IBM special products or user-written code is compatible with NCP's control block structure for initialization, for updating the configuration data set, and for bus switching. (The IBM 3745-410, 3745-41A, 3745-610, or 3745-61A is required for bus switching.)

Code the X21NTWK keyword to specify whether this group attaches to an X.21 network.

The X21SW keyword is for VTAM only.

**LINE** Deleted keyword:  
 ATTACH

Changed keywords:  
 ADDRESS  
 AUTO  
 CLOCKNG  
 DUALCOM  
 HISPEED  
 LPDATS  
 RETRIES  
 SPEED

---

## Defining a 3746 Model 900 Connectivity Subsystem

The 3746 Model 900 connectivity subsystem is attached to the IBM 3745 and supports connections to the following resources:

- Enterprise Systems Connection (ESCON) links
- SDLC links
- Token-ring links.
- Frame-relay links.
- X.25 links.
- ISDN links.

**BUILD** Code the CSSTIER keyword to specify the usage tier for the optional NCP Feature for 3746 Model 900 support.

---

## Defining a Type 7 (Buffer-Chaining) Channel Adapter

The buffer-chaining channel adapter (BCCA), or type 7 channel adapter, supports buffer-chaining mode and device self-description. The type 7 channel adapter improves performance by reducing the number of NCP interrupts during data transfer and by reducing the time the channel is held while no data is being transferred.

You can migrate to the type 7 channel adapter in two steps:

1. Install the type 7 channel adapter and define it as a type 6 channel adapter in your generation definition. This causes it to function in compatibility (non-buffer-chaining) mode so you can make sure it is working correctly with your NCP.
2. Redefine the channel adapter as a type 7 channel adapter in your generation definition and regenerate your NCP. This causes the channel adapter to function in buffer-chaining mode.

## Host System and Hardware Updates

To define the type 7 channel adapter, make the following updates.

### LINE

Changed keywords:

CA  
DYNADMP  
HICHAN  
INBFRS  
LOCHAN  
NCPA

### PU

Code the MAXBFRU keyword to specify the maximum number of buffer units allocated by the access method to receive data from NCP.

---

## Chapter 3. Migrating from an Unsupported Release

Migration from the following unsupported NCP releases is not documented in this book:

- NCP V2
- NCP V3
- NCP V4 Subset
- NCP V4R1
- NCP V4R2
- NCP V4R3
- NCP V5R1
- NCP V5R2
- NCP V5R2.1
- NCP V5R3
- NCP V5R3.1
- NCP V6R1
- NCP V7R2

However, the migration aid can be used to migrate a generation definition for an unsupported release of NCP to NCP V7R8.

If you are currently using an unsupported release of NCP, other than V6R1 or V7R2, use the following process to add functions introduced between your release and V7R8:

1. Use the *NCP Migration Guide for Version 5 Release 4*, form number SC31-6204, to update the NCP generation definition you are currently using to the V5R4 level. You can order this book from IBM.
2. Use Chapter 12, "Migrating from NCP Version 5 Release 4" in this book to migrate from the V5R4 NCP generation definition to the V7R8 level.

Migration procedures from NCP V6R1 and NCP V7R1 are the only two exceptions:

If you are currently using NCP V6R1:

1. Use the *NCP Migration Guide for Version 7 Release 1*, form number SC31-6219, to update the NCP generation definition you are currently using to the V7R1 level. You can order this book from IBM.
2. Use Chapter 9, "Migrating from NCP Version 7 Release 1" in this book to migrate from the V7R1 NCP generation to the V7R8 level.

If you are currently using NCP V7R2:

1. Use the *NCP Migration Guide for Version 7 Release 6*, form number SC30-3833, to update the NCP generation definition you are currently using to the V7R6 level. You can order this book from IBM.
2. Use Chapter 5, "Migrating from NCP Version 7 Release 6" in this book to migrate from the V7R6 NCP generation definition to the V7R8 level.



---

## Chapter 4. Migrating from NCP Version 7 Release 7

Changed Defaults	4-1
Deleted Keywords	4-1
Changes to Controller Storage Requirements	4-2
Control Blocks	4-2
General Program Code Storage	4-2
NCP Initialization	4-2
Dynamically Created Control Blocks	4-2
General Updates	4-3
Program Generation Characteristics	4-3
NCP Migration Aid	4-4

This chapter contains information needed for updating the generation definition to migrate to V7R8 and to include new functions added since V7R7.

**Migrating to a New Host System or Hardware:** If you are migrating to a different host operating system or communication controller model or to a type 7 channel adapter, read Chapter 2 to see which keywords you need to change for your new host system or hardware before you begin migrating to NCP V7R8.

**Using the NCP Migration Aid:** The NCP migration aid is an NDF function that simplifies the migration task by automatically making most of the changes required to migrate to NCP V7R8. You should consider using the migration aid before using the information in this chapter. For more information on using the migration aid, see Chapter 1.

Under each topic in this chapter, definition statements are listed in the order in which they appear in a generation definition. You can code certain keywords on more than one definition statement. This book describes each keyword on the lowest-level definition statement on which it can be coded.

After you have identified the definition statements and keywords that you need to change, add, or delete, see the *NCP, SSP, and EP Resource Definition Guide* for more information on their functions, and see the *NCP, SSP, and EP Resource Definition Reference* for information on how to code them.

---

### Changed Defaults

The default for the following keyword has changed.

PU           MODULO

---

### Deleted Keywords

None

### Changes to Controller Storage Requirements

This section contains information needed for calculating new storage requirements for NCP V7R8. The storage sizes in this section are approximate. Your actual storage requirements depend on your configuration. For a more accurate estimate of the storage your NCP will require, use the HONE CF3745 Configurator storage model. For more information, see the *IBM 3745 Communication Controller Configuration Program* book.

### Control Blocks

When migrating from NCP V7R7 to NCP V7R8, plan for the following storage requirement increases:

- 8 bytes per 3746 Model 900 frame-relay physical line
- 4 bytes per 3746 Model 900 token ring physical line
- 4 bytes per 3746 Model 900 token ring logical station
- 24 bytes per 3745 frame-relay physical line
- 24 bytes per 3745 token ring physical line
- 32 bytes for XRF LU sessions using Triple-DES encryption (via BACKUP keyword)

### General Program Code Storage

There is no significant general growth in code due to new function added in NCP V7R8.

### NCP Initialization

Generation listings include a message (ICN076I) indicating how much storage NCP needs for initialization, beyond the storage that the load module displaces. Add this number to the size of the load module, obtained from the linkage editor output, to determine whether there is enough controller storage available for the buffer pool. For more information, see the *NCP, SSP, and EP Generation and Loading Guide*.

Beginning with SSP V4R8, another way to determine if there is enough controller storage available for the buffer pool is to add the ICNSIZE (MVS and VM) or IFUSIZE (VSE) job step after the linkage editor step. It will give you an estimate of how many NCP buffers will be created for your particular NCP. See the *NCP, SSP, and EP Generation and Loading Guide* and “Generation Steps” on page 67 for related VM information, “Generation Steps” on page 5 for related MVS information, or “Generation Steps” on page 169 for related VSE information.

### Dynamically Created Control Blocks

If you include the NCP function for dynamically created control blocks (DYNPOOL on the BUILD definition statement), NCP may use buffer storage to create additional control blocks as needed. This increases the amount of storage used for control blocks beyond the figures given in this section, and reduces the amount of available buffer storage. For more information on dynamically created control blocks, see the *NCP, SSP, and EP Resource Definition Guide*.



---

## General Updates

Make the following general updates:

- BUILD** Update the VERSION keyword to generate NCP V7R8 or NCP V7R8F.
- The new ADPLIMIT keyword enables you to limit the maximum window size that NCP permits on an adaptively paced session.
- A new suboperand of the BACKUP keyword specifies the number of LU sessions that support XRF with triple-DES encryption.
- The new MINILOAD keyword facilitates the generating of a minimum-size remote load module.
- The new TGTIMER keyword provides enhanced hung-TG detection.
- CLUSTER** There are new suboperands for the FEATURE keyword to allow NCP to ignore data from an undefined 3270 BSC device.
- DLCI** You can now define the BALANCE keyword on 3746 Model 900 Frame-Relay DLCI statements.
- GROUP** You can now code the PHYPORT keyword on 3746 Model 900 Token-Ring logical peripheral GROUP statements to associate the logicals with one or more physicals.
- The V25DIAL keyword enables you to set the V.25 dial timer, formerly a fixed 2-minute timer, for EP lines.
- LINE** You can now define the BALANCE keyword for 3746 Model 900 TIC3 Connection Balancing.
- By coding the second and third suboperands of the DYNWIND keyword (*dw* and *dwc*), you can now control the amount by which the working window is decreased when frame loss or congestion occurs for 3745 Token-Ring resources.
- The *mww* suboperand is added to the DYNWIND keyword to provide a minimum user-specified working window value for frame relay.
- The FEATURE keyword has been changed to provide LRC8 error checking for EP BSC USASCII lines running in transparent mode.
- MAXPU, which previously allowed a maximum of 16 ESCON stations, now allows a maximum of 32 ESCON stations.
- TAKEOVER, the new keyword on the LINE statement, enables you to force take-over of an EP line from another host.
- PU** The MODULO keyword default has changed.

---

## Program Generation Characteristics

Table 4-1 shows the locations in the *NCP, SSP, and EP Resource Definition Guide* where you will find descriptions of the functions added in V7R8:

*Table 4-1 (Page 1 of 2). New Functions Added in V7R8*

<b>New Information</b>	<b>Location</b>
EP Line Takeover	"Line Characteristics" on page 21-12
EP Shorten V25 BIS Dial Timer	"Timeouts" on page 20-7

## Migrating from NCP Version 7 Release 7

Table 4-1 (Page 2 of 2). New Functions Added in V7R8

<b>New Information</b>	<b>Location</b>
Logical Line Pool Sharing for TIC3 Connections	"Unassigned Logical Line Pools" on page 6-23
Enhanced Hung TG Detection	"Monitoring Transmission Group Performance" on page 23-18
Facilitate Minimum-Sized Remote Load Module	"Defining the NCP Environment" on page 2-5
Ignore Data from Undefined 3270 BSC Device	the new function of the FEATURE keyword on page 5-28
3746 Model 900 TIC3 Connection Balancing	the description of the BALANCE keyword on page 6-8
3746 Model 900 Frame Relay BAN Connection Balancing	BALANCE keyword on the DLCI statement on page 16-14
Enhanced Control of the Dynamic Working Window for 3745 Token Ring	the description of the DYNWIND keyword on page 6-42
Enhanced Control of Adaptive Session Pacing	"Defining Session Pacing" on page 24-6
Specifying a Minimum Working Window for 3745 Frame Relay	the description of the DYNWIND keyword on page 16-15
LRC8 Error Checking for EP BSC USASCII	"Devices" on page 20-5

## NCP Migration Aid

If you are using the NCP migration aid, make the following updates:

### OPTIONS

Update the TVERSION keyword to generate NCP V7R8 or V7R8F.

---

## Chapter 5. Migrating from NCP Version 7 Release 6

Changed Defaults	5-1
Deleted Keywords	5-1
Changes to Controller Storage Requirements	5-2
Control Blocks	5-2
General Program Code Storage	5-2
NCP Initialization	5-2
Dynamically Created Control Blocks	5-2
General Updates	5-3
Program Generation Characteristics	5-4
NCP Migration Aid	5-5

This chapter contains information needed for updating the generation definition to migrate to V7R8 and to include new functions added since V7R6.

**Migrating to a New Host System or Hardware:** If you are migrating to a different host operating system or communication controller model or to a type 7 channel adapter, read Chapter 2 to see which keywords you need to change for your new host system or hardware before you begin migrating to NCP V7R8.

**Using the NCP Migration Aid:** The NCP migration aid is an NDF function that simplifies the migration task by automatically making most of the changes required to migrate to NCP V7R8. You should consider using the migration aid before using the information in this chapter. For more information on using the migration aid, see Chapter 1.

Under each topic in this chapter, definition statements are listed in the order in which they appear in a generation definition. You can code certain keywords on more than one definition statement. This book describes each keyword on the lowest-level definition statement on which it can be coded.

After you have identified the definition statements and keywords that you need to change, add, or delete, see the *NCP, SSP, and EP Resource Definition Guide* for more information on their functions, and see the *NCP, SSP, and EP Resource Definition Reference* for information on how to code them.

---

### Changed Defaults

The default for the following keyword has changed.

PU	IPQLIM MODULO
----	------------------

---

### Deleted Keywords

None

---

### Changes to Controller Storage Requirements

This section contains information needed for calculating new storage requirements for NCP V7R8. The storage sizes in this section are approximate. Your actual storage requirements depend on your configuration. For a more accurate estimate of the storage your NCP will require, use the HONE CF3745 Configurator storage model. For more information, see the *IBM 3745 Communication Controller Configuration Program* book.

### Control Blocks

When migrating from NCP V7R6 to V7R8, plan for the following storage requirement increases:

- 20 bytes per 3746 Model 900 frame-relay physical line
- 4 bytes per 3746 Model 900 token ring physical line
- 4 bytes per 3746 Model 900 token ring logical station
- 52 bytes per 3745 frame-relay physical line
- 32 bytes per 3745 token ring physical line
- 32 bytes for XRF LU sessions using Triple-DES encryption (via BACKUP keyword)
- 20 bytes per NTRI frame handler logical line
- 4 bytes per ISDN physical line
- 6 bytes per 3746 Model 900 frame relay DLCI
- 8 bytes per 3745 frame relay DLCI

### General Program Code Storage

There is no significant general growth in code due to new function added in V7R7 and V7R8.

### NCP Initialization

Generation listings include a message (ICN0761) indicating how much storage NCP needs for initialization, beyond the storage that the load module displaces. Add this number to the size of the load module, obtained from the linkage editor output, to determine whether there is enough controller storage available for the buffer pool. For more information, see the *NCP, SSP, and EP Generation and Loading Guide*.

Beginning with SSP V4R8, another way to determine if there is enough controller storage available for the buffer pool is to add the ICNSIZE (MVS and VM) or IFUSIZE (VSE) job step after the linkage editor step. It will give you an estimate of how many NCP buffers will be created for your particular NCP. See the *NCP, SSP, and EP Generation and Loading Guide* and “Generation Steps” on page 67 for related VM information, “Generation Steps” on page 5 for related MVS information, or “Generation Steps” on page 169 for related VSE information.

### Dynamically Created Control Blocks

If you include the NCP function for dynamically created control blocks (DYNPOOL on the BUILD definition statement), NCP may use buffer storage to create additional control blocks as needed. This increases the amount of storage used for control blocks beyond the figures given in this section, and reduces the amount of available buffer storage. For more information on dynamically created control blocks, see the *NCP, SSP, and EP Resource Definition Guide*.

---

## General Updates

Make the following general updates:

**BUILD**

Update the VERSION keyword to generate NCP V7R8 or NCP V7R8F.

The new ADPLIMIT keyword enables you to limit the maximum window size that NCP permits on an adaptively paced session.

A new suboperand of the BACKUP keyword specifies the number of LU sessions that support XRF with triple-DES encryption.

The new MINILOAD keyword facilitates the generating of a minimum-size remote load module.

The new TGTIMER keyword provides enhanced hung-TG detection.

**CLUSTER**

There are new suboperands for the FEATURE keyword to allow NCP to ignore data from an undefined 3270 BSC device.

**DLCI**

The DLCI definition statement is added.

The ID keyword specifies the DLCI(s) to which the DLCI statement's keyword parameters apply.

The CIR keyword specifies the bandwidth management parameters to be used for a designated DLCI.

The BALANCE keyword specifies the balancing factor to be applied to the DLCI(s) indicated by the ID keyword.

**GROUP**

The DIAL keyword is changed to enable you to specify DIAL=YES for 3746 Model 900 frame-relay physical lines.

The FRELAY keyword is changed to provide the IP value for the second suboperand to indicate IP resources.

You can now code the PHYPORT keyword on 3746 Model 900 Token-Ring logical peripheral GROUP statements to associate the logicals with one or more physicals.

The V25DIAL keyword enables you to set the V.25 dial timer, formerly a fixed 2-minute timer, for EP lines.

**LINE**

You can now define the BALANCE keyword for 3746 Model 900 TIC3 Connection Balancing.

The CIR keyword is added to specify whether the Committed Information Rate (CIR) algorithms will be used for bandwidth management.

The CLLM keyword is added to specify whether Consolidated Link Layer Management (CLLM) will be used.

By coding the second and third suboperands of the DYNWIND keyword (*dw* and *dwc*), you can now control the amount by which the working window is decreased when frame loss or congestion occurs for 3745 Token-Ring resources.

The *mww* suboperand is added to the DYNWIND keyword to provide a minimum user-specified working window value for frame relay.

The FEATURE keyword has been changed to provide LRC8 error checking for EP USASCII lines running in transparent mode.

MAXPU, which previously allowed a maximum of 16 ESCON stations, now allows a maximum of 32 ESCON stations.

The MLTGPR1 keyword is changed so that it can be coded for switched PUs in the VTAM switched major node, with the appropriate level of VTAM.

TAKEOVER, a new keyword on the LINE statement, enables you to force takeover of an EP line from another host.

The TRANSBUF keyword is added to specify the maximum number of frames that will be queued for a TSS or HPTSS adapter awaiting transmission over a 3745 frame-relay physical line.

### PU

The IPQLIM keyword is changed so that its default value is 3 times the value of MAXFRAME on the LINE definition statement.

The MODULO keyword default has changed.

The PIUCHECK keyword is added to specify whether checksum validation is performed on PIUs sent and received by the subarea station.

The TGCONF keyword is changed so that it can be coded for switched PUs in the VTAM switched major node, with the appropriate level of VTAM.

The XMONLNK keyword is changed so that XMONLNK=YES and DIAL=YES are compatible when FRELAY=(PHYSICAL,SUBAREA) or FRELAY=(PHYSICAL,ANY).

---

## Program Generation Characteristics

Table 5-1 shows the locations in the *NCP, SSP, and EP Resource Definition Guide* where you will find descriptions of the functions added in V7R7 and V7R8.

*Table 5-1 (Page 1 of 2). New Functions Added in V7R8 and V7R7*

<b>New Information</b>	<b>Location</b>
EP Line Takeover	"Line Characteristics" on page 21-12
EP Shorten V25 BIS Dial Timer	"Timeouts" on page 20-7
Logical Line Pool Sharing for TIC3 Connections	"Unassigned Logical Line Pools" on page 6-23
Enhanced Hung TG Detection	"Monitoring Transmission Group Performance" on page 23-18
Facilitate Minimum-Sized Remote Load Module	"Defining the NCP Environment" on page 2-5
Ignore Data from Undefined 3270 BSC Device	the new function of the FEATURE keyword on page 5-28
3746 Model 900 TIC3 Connection Balancing	the description of the BALANCE keyword on page 6-8
3746 Model 900 Frame Relay BAN Connection Balancing	BALANCE keyword on the DLCI statement on page 16-14
Enhanced Control of the Dynamic Working Window for 3745 Token Ring	the description of the DYNWIND keyword on page 6-42
Enhanced Control of Adaptive Session Pacing	"Defining Session Pacing" on page 24-6
Specifying a Minimum Working Window for 3745 Frame Relay	the description of the DYNWIND keyword on page 16-15
LRC8 Error Checking for EP BSC USASCII	"Devices" on page 20-5
Specifying the number of frames queued for a TSS or HPTSS adapter	TRANSBUF keyword on the LINE definition statement on page 16-13

Table 5-1 (Page 2 of 2). New Functions Added in V7R8 and V7R7

New Information	Location
Committed information rate (CIR) on NCP controlled 3746 Model 900 frame-relay and ISDN lines	CIR keyword on the LINE definition statement on page 16-76 CIR keyword on the DLCI definition statement on page 16-13
Remote access to NCPRROUTE in the absence of SNALINK	Exception to P2PDEST/HOSTADDR Matching on page 15-7
Connection balancing of frame-relay boundary access node (BAN) connections over 3745 frame-relay DLCIs	BALANCE keyword on the DLCI statement on page 16-14
IP supports for switched frame-relay lines	"Defining Frame-Relay Attachments for IP" on page 15-44
3746 Model 900 switched frame-relay physical lines	Figure 16-45 on page 16-94
PIU checksum support	PIUCHECK keyword on the PU definition statement on page 24-9

## NCP Migration Aid

If you are using the NCP migration aid, make the following updates:

### OPTIONS

Update the TVERSION keyword to generate NCP V7R8 or V7R8F.





---

## Chapter 6. Migrating from NCP Version 7 Release 5

Changed Defaults	6-1
Deleted Keywords	6-1
Changes to Controller Storage Requirements	6-2
Control Blocks	6-2
General Program Code Storage	6-2
NCP Initialization	6-2
Dynamically Created Control Blocks	6-2
General Updates	6-3
Program Generation Characteristics	6-5
NCP Migration Aid	6-7

This chapter contains information needed for updating the generation definition to migrate to V7R8 and to include new functions added since V7R5.

**Migrating to a New Host System or Hardware:** If you are migrating to a different host operating system or communication controller model or to a type 7 channel adapter, read Chapter 2 to see which keywords you need to change for your new host system or hardware before you begin migrating to NCP V7R8.

**Using the NCP Migration Aid:** The NCP migration aid is an NDF function that simplifies the migration task by automatically making most of the changes required to migrate to NCP V7R8. You should consider using the migration aid before using the information in this chapter. For more information on using the migration aid, see Chapter 1.

Under each topic in this chapter, definition statements are listed in the order in which they appear in a generation definition. You can code certain keywords on more than one definition statement. This book describes each keyword on the lowest-level definition statement on which it can be coded.

After you have identified the definition statements and keywords that you need to change, add, or delete, see the *NCP, SSP, and EP Resource Definition Guide* for more information on their functions, and see the *NCP, SSP, and EP Resource Definition Reference* for information on how to code them.

---

### Changed Defaults

The default for the following keyword has changed.

PU	IPQLIM MODULO
----	------------------

---

### Deleted Keywords

None

---

### Changes to Controller Storage Requirements

This section contains information needed for calculating new storage requirements for NCP V7R8.

#### Control Blocks

When migrating from NCP V7R5 to NCP V7R8, plan for the following storage requirement increases:

- 24 bytes per 3746 Model 900 frame-relay physical line
- 4 bytes per 3746 Model 900 token ring physical line
- 4 bytes per 3746 Model 900 token ring logical station
- 56 bytes per 3745 frame-relay physical line
- 36 bytes per 3745 token ring physical line
- 32 bytes for XRF LU sessions using Triple-DES encryption (via BACKUP keyword)
- 20 bytes per NTRI frame handler logical line
- 8 bytes per ISDN physical line
- 8 bytes per IPOWNER
- 4 bytes per 3745 Frame Relay logical line
- 8 bytes per transmission group
- 36 bytes per SSCP owner
- 1024 bytes when 3745 token ring resources included

#### General Program Code Storage

There is no significant general growth in code due to new function added in NCP V7R6, V7R7 or V7R8.

#### NCP Initialization

Generation listings include a message (ICN076I) indicating how much storage NCP needs for initialization, beyond the storage that the load module displaces. Add this number to the size of the load module, obtained from the linkage editor output, to determine whether there is enough controller storage available for the buffer pool. For more information, see the *NCP, SSP, and EP Generation and Loading Guide*.

Beginning with SSP V4R8, another way to determine if there is enough controller storage available for the buffer pool is to add the ICNSIZE (MVS and VM) or IFUSIZE (VSE) job step after the linkage editor step. It will give you an estimate of how many NCP buffers will be created for your particular NCP. See the *NCP, SSP, and EP Generation and Loading Guide* and “Generation Steps” on page 67 for related VM information, “Generation Steps” on page 5 for related MVS information, “Generation Steps” on page 169 for related VSE information.

#### Dynamically Created Control Blocks

If you include the NCP function for dynamically created control blocks (DYNPOOL on the BUILD definition statement), NCP may use buffer storage to create additional control blocks as needed. This increases the amount of storage used for control blocks beyond the figures given in this section, and reduces the amount of available buffer storage. For more information on dynamically created control blocks, see the *NCP, SSP, and EP Resource Definition Guide*.

---

## General Updates

Make the following general updates:

**BUILD**

Update the VERSION keyword to generate NCP V7R8 or V7R8F.

The new ADPLIMIT keyword enables you to limit the maximum window size that NCP permits on an adaptively paced session.

A new suboperand of the BACKUP keyword specifies the number of LU sessions that support XRF with triple-DES encryption.

The new MINILOAD keyword facilitates the generating of a minimum-size remote load module.

The OWNERPL keyword has been added to enable you to specify the types of unassigned logical resources that will be managed in owner-based pools.

The QSZALERT keyword has been added to support monitoring for excessive NCP buffer usage by a single resource.

The new TGTIMER keyword provides enhanced hung-TG detection.

The USGTIER keyword has changed to support updates to the NCP usage tier definitions.

The VOSDEACT keyword has been added to specify whether VR (virtual route) deactivation will be initiated when a VR goes out-of-sequence.

The VSUBNETS keyword has been added to support variable subnetting via NDF and dynamic reconfiguration.

**CLUSTER**

There are new suboperands for the FEATURE keyword to allow NCP to ignore data from an undefined 3270 BSC device.

**DLCI**

The DLCI definition statement is added.

The ID keyword specifies the DLCI(s) to which the DLCI statement's keyword parameters apply.

The CIR keyword specifies the bandwidth management parameters to be used for a designated DLCI.

The BALANCE keyword specifies the balancing factor to be applied to the DLCI(s) indicated by the ID keyword.

**GROUP**

The DIAL keyword is changed to enable you to specify DIAL=YES for 3746 Model 900 frame-relay physical lines.

The FRELAY keyword is changed to provide the IP value for the second suboperand to indicate IP resources.

You can now code the PHYPORT keyword on 3746 Model 900 Token-Ring logical peripheral GROUP statements to associate the logicals with one or more physicals.

The V25DIAL keyword enables you to set the V.25 dial timer, formerly a fixed 2-minute timer, for EP lines.

**IPOWNER**

The INTFACE keyword has changed to enable you to define backup NCP-NCROUTE interfaces.

**IROUTE**

The SNETMASK keyword has been added to support variable subnetting via NDF and dynamic reconfiguration.

### LINE

The BALANCE keyword has been added to enable connection balancing for NTRI physical lines and the 3746 Model 900.

The CIR keyword is added to specify whether the Committed Information Rate (CIR) algorithms will be used for bandwidth management.

The CLLM keyword is added to specify whether Consolidated Link Layer Management (CLLM) will be used.

The CRATEDLY keyword has been added to specify the COMRATE delay threshold in seconds for the 3746 Model 900.

The DSCRDDLY keyword has been added to specify the discard delay threshold in seconds for the 3746 Model 900.

The DYNWIND keyword has changed to allow additional values for the *dw* and *dwc* suboperands for frame relay and ISDN lines.

By coding the second and third suboperands of the DYNWIND keyword (*dw* and *dwc*), you can now control the amount by which the working window is decreased when frame loss or congestion occurs for 3745 Token-Ring resources.

The *mww* suboperand is added to the DYNWIND keyword to provide a minimum user-specified working window value for frame relay.

The FEATURE keyword has been changed to provide LRC8 error checking for EP BSC USASCII lines running in transparent mode.

The FRRATES keyword has been added to enable setting the relative priorities for types of traffic (SNA, IP, and Frame Handler) supported by a 3745 frame-relay physical line.

The FRSPRI keyword has been added to specify the relative service priority for 3746 Model 900 attached frame-relay stations and ISDN logical stations.

The HLOQSTOP keyword has been added to specify the maximum size of the 3746 Model 900 physical line hardware queue.

The ISDNCALL, ISDNRPN, and ISDNRSA keywords have been added to support frame-relay dial backup over ISDN.

The MAXDLCI keyword has changed to enable you to limit the DLCI range supported by ISDN B-channels.

MAXPU, which previously allowed a maximum of 16 ESCON stations, now allows a maximum of 32 ESCON stations.

The MLTGPRI keyword is changed so that it can be coded for switched PUs in the VTAM switched major node, with the appropriate level of VTAM.

The QSIZE keyword has been added to specify the 3746 Model 900 software queue size threshold.

The QSIZEDE keyword has been added to specify the 3746 Model 900 software queue discard eligibility threshold

TAKEOVER, the new keyword on the LINE statement, enables you to force take-over of an EP line from another host.

The TRANSBUF keyword is added to specify the maximum number of frames that will be queued for a TSS or HPTSS adapter awaiting transmission over a 3745 frame-relay physical line.

**OPTIONS**

The TUSGTIER keyword has changed to support updates to the NCP usage tier definitions.

**PU**

The DYNWIND keyword has changed to allow additional values for the *dw* and *dwc* suboperands.

The FRSPRI keyword has been added to specify the relative service priority for 3746 Model 900 attached frame-relay stations and ISDN logical stations.

The IPQLIM keyword is changed so that its default value is 3 times the value of MAXFRAME on the LINE definition statement.

The LMI keyword has changed as part of the new support for switched frame-relay physical lines.

The MODULO keyword default has changed.

The PIUCHECK keyword is added to specify whether checksum validation is performed on PIUs sent and received by the subarea station.

The TGCONF keyword is changed so that it can be coded for switched PUs in the VTAM switched major node, with the appropriate level of VTAM.

The UNIQUE keyword has been added to specify whether a Token Ring's logical subarea station's destination MAC address is a unique locally administered address.

The XMONLNK keyword is changed so that XMONLNK=YES and DIAL=YES are compatible when FRELAY=(PHYSICAL,SUBAREA) or FRELAY=(PHYSICAL,ANY).

---

## Program Generation Characteristics

Table 6-1 shows the locations in the *NCP, SSP, and EP Resource Definition Guide* where you will find descriptions of the functions added in V7R8, V7R7 and V7R6:

*Table 6-1 (Page 1 of 3). New Functions Added in V7R8, V7R7 and V7R6*

<b>Function</b>	<b>Location</b>
EP Line Takeover	"Line Characteristics" on page 21-12
EP Shorten V25 BIS Dial Timer	"Timeouts" on page 20-7
Logical Line Pool Sharing for TIC3 Connections	"Unassigned Logical Line Pools" on page 6-23
Enhanced Hung TG Detection	"Monitoring Transmission Group Performance" on page 23-18
Facilitate Minimum-Sized Remote Load Module	"Defining the NCP Environment" on page 2-5
Ignore Data from Undefined 3270 BSC Device	the new function of the FEATURE keyword on page 5-28
3746 Model 900 TIC3 Connection Balancing	the description of the BALANCE keyword on page 6-8
3746 Model 900 Frame Relay BAN Connection Balancing	BALANCE keyword on the DLCI statement on page 16-14
Enhanced Control of the Dynamic Working Window for 3745 Token Ring	the description of the DYNWIND keyword on page 6-42
Enhanced Control of Adaptive Session Pacing	"Defining Session Pacing" on page 24-6

Table 6-1 (Page 2 of 3). New Functions Added in V7R8, V7R7 and V7R6

Function	Location
Specifying a Minimum Working Window for 3745 Frame Relay	the description of the DYNWIND keyword on page 16-15
LRC8 Error Checking for EP BSC USASCII	“Devices” on page 20-5
Specifying the number of frames queued for a TSS or HPTSS adapter	TRANSBUF keyword on the LINE definition statement on page 16-13
Committed information rate (CIR) on NCP controlled 3746 Model 900 frame-relay and ISDN lines	CIR keyword on the LINE definition statement on page 16-76 CIR keyword on the DLCI definition statement on page 16-13
Remote access to NCPROUTE in the absence of SNALINK	Exception to P2PDEST/HOSTADDR Matching on page 15-7
Connection balancing of frame-relay boundary access node (BAN) connections over 3745 frame-relay DLCIs	BALANCE keyword on the DLCI statement on page 16-14
IP supports for switched frame-relay lines	“Defining Frame-Relay Attachments for IP” on page 15-44
3746 Model 900 switched frame-relay physical lines	Figure 16-45 on page 16-94
PIU checksum support	PIUCHECK keyword on the PU definition statement on page 24-9
Defining an ISDN backup line for a frame-relay line	“Defining Automatic Frame-Relay Backup over an ISDN”
Defining backup NCP-NCPROUTE IP interfaces	“Backup IP Channel Interfaces”
Connection balancing for NTRI physical lines	the description of the BALANCE keyword on page 6-8
Limiting the DLCI range for an ISDN B-channel line	MAXDLCI on the LINE definition statement on page 7-7
New way that NCP determines link capacity and transmission time	SPEED keyword related to VTAM topology CAPACITY keyword on page 8-21
Allocating unassigned logical resources to owner-based pools	“Allocating Unassigned Logical Line Pools to Owners”
Defining an internal NCP to Model 900 point-to-point IP connection	“Defining an Internal NCP to Model 900 Point-to-Point IP Connection”
Defining ISDN subarea connectivity through a terminal adapter or a BAN device	“Defining ISDN Subarea Connectivity through a Terminal Adapter or BAN Device”
Defining relative priorities for the types (SNA, IP, and frame handler) of traffic supported by a 3745 frame-relay physical line	FRRATES on the LINE Definition Statement on page 16-11
New usage tier options	“Usage Tiers”
Defining variable subnetting for an IP route or an IP interface	“Defining Routes Explicitly”
Monitoring for excessive buffer usage by a peripheral resource	“Monitoring for Excessive Buffer Usage by a Peripheral Resource”
Specifying Token-Ring destination MAC address uniqueness	Reference to the UNIQUE keyword on page 6-31

Table 6-1 (Page 3 of 3). New Functions Added in V7R8, V7R7 and V7R6

Function	Location
Defining switched frame-relay 3745 physical lines	"Defining Switched Frame-Relay Physical Lines"
Controlling VR deactivation when a VR goes out-of-sequence	"Deactivating an Out-of-Sequence Virtual Route"

## NCP Migration Aid

If you are using the NCP migration aid, make the following updates:

### OPTIONS

Update the TVERSION keyword to generate NCP V7R8 or V7R8F.





---

## Chapter 7. Migrating from NCP Version 7 Release 4

Changed Defaults	7-1
Deleted Keywords	7-2
Changes to Controller Storage Requirements	7-2
NCP Initialization	7-2
Dynamically Created Control Blocks	7-2
General Program Code Storage	7-2
Control Blocks	7-2
Duplicate Token-Ring Interface Coupler (TIC) Addressing	7-3
Boundary Access Node (BAN) for 3746 Model 900 Frame Relay (FR)	
Subarea Links	7-3
3746 Model 900 Support	7-3
General Updates	7-4
Program Generation Characteristics	7-7
NCP Migration Aid	7-9

This chapter contains information needed for updating the generation definition to migrate to V7R8 and to include new functions added since V7R4.

**Migrating to a New Host System or Hardware:** If you are migrating to a different host operating system or communication controller model or to a type 7 channel adapter, read Chapter 2 to see which keywords you need to change for your new host system or hardware before you begin migrating to NCP V7R8.

**Using the NCP Migration Aid:** The NCP migration aid is an NDF function that simplifies the migration task by automatically making most of the changes required to migrate to NCP V7R8. You should consider using the migration aid before using the information in this chapter. For more information on using the migration aid, see Chapter 1.

Under each topic in this chapter, definition statements are listed in the order in which they appear in a generation definition. You can code certain keywords on more than one definition statement. This book describes each keyword on the lowest-level definition statement on which it can be coded.

After you have identified the definition statements and keywords that you need to change, add, or delete, see the *NCP, SSP, and EP Resource Definition Guide* for more information on their functions, and see the *NCP, SSP, and EP Resource Definition Reference* for information on how to code them.

---

### Changed Defaults

The default for the following keyword has changed.

PU

IPQLIM  
MODULO

---

## Deleted Keywords

None

---

## Changes to Controller Storage Requirements

This section describes the requirements for additional communication controller storage resulting from general changes and specific enhancements since NCP V7R4. The storage sizes in this section are approximate. Your actual storage requirements depend on your configuration. For a more accurate estimate of the storage your NCP will require, use the HONE CF3745 Configurator storage model. For more information, see the *IBM 3745 Communication Controller Configuration Program* book.

## NCP Initialization

Generation listings include a message (ICN0761) indicating how much storage NCP needs for initialization, beyond the storage that the load module displaces. Add this number to the size of the load module, obtained from the linkage editor output, to determine whether there is enough controller storage available for the buffer pool. For more information, see the *NCP, SSP, and EP Generation and Loading Guide*.

Beginning with SSP V4R8, another way to determine if there is enough controller storage available for the buffer pool is to add the ICNSIZE (MVS and VM) or IFUSIZE (VSE) job step after the linkage editor step. It will give you an estimate of how many NCP buffers will be created for your particular NCP. See the *NCP, SSP, and EP Generation and Loading Guide* and “Generation Steps” on page 67 for related VM information, “Generation Steps” on page 5 for related MVS information, or “Generation Steps” on page 169 for related VSE information.

## Dynamically Created Control Blocks

If you include the NCP function for dynamically created control blocks (DYNPOOL on the BUILD definition statement), NCP may use buffer storage to create additional control blocks as needed. This increases the amount of storage used for control blocks beyond the figures given in this section, and reduces the amount of available buffer storage. For more information on dynamically created control blocks, see the *NCP, SSP, and EP Resource Definition Guide*.

## General Program Code Storage

General program code storage increases by approximately 8 KB.

## Control Blocks

- Add 8 bytes per 3746 Model 900 frame-relay logical line.
- Add 12 bytes per 3746 Model 900 token-ring logical station.
- Add 234 bytes per 3746 Model 900 frame-relay physical line.
- Add 16 bytes per 3745 frame-relay logical line.
- Add 56 bytes per 3745 frame-relay physical line.
- Add 20 bytes per NTRI frame handler logical line.
- Add 4 bytes per 3746 Model 900 token ring physical line.
- Add 36 bytes per 3745 token ring physical line.
- Add 32 bytes for XRF LU sessions using Triple-DES encryption (via BACKUP keyword).

Add 8 bytes per IPOWNER.  
 Add 8 bytes per transmission group.  
 Add 36 bytes per SSCP owner.  
 Add 1024 bytes when 3745 token ring resources included.

## Duplicate Token-Ring Interface Coupler (TIC) Addressing

There is no storage impact for this function as there is no significant additional storage requirement above that required for token-ring.

## Boundary Access Node (BAN) for 3746 Model 900 Frame Relay (FR) Subarea Links

There is no storage impact for this function as there is no significant additional storage requirement above that required for frame relay.

## 3746 Model 900 Support

NCP requires additional storage for program code and control blocks when you include NCP support for 3746 Model 900 functions (ESCON links, SDLC lines, X.25, token-ring, frame-relay, or ISDN connections). This section describes how to estimate the additional storage required for your configuration.

**Program Code Storage:** Allocate the following approximate amounts of storage for the following conditions:

- To migrate from V7R4 to NCP V7R8F (3746 Model 900 feature) with ISDN.
  - Add 135 KB to your existing program code storage for the feature (base)
  - Add 10 KB for ISDN on the feature
  - Add 8 KB for frame relay on the feature
- To migrate from V7R4F to V7R8F with ISDN
  - Add 10 KB for ISDN on the model 900
  - Add 8 KB if you do not have frame relay on the 3746 Model 900

Some examples may help clarify how the net storage amounts are determined:

1. If you are adding ISDN resources and 3746 Model 900 for the first time, add the following:

- 135 KB for M900 base
- 10 KB for ISDN on the feature
- 8 KB for frame relay on the feature
- 8 KB for NCP migration (general program code storage increase)

For a total of 161 KB increase in code storage requirements.

2. If you already have the 3746 Model 900 feature installed, and you want to add ISDN to the 3746 Model 900, you will need to add:

- 10 KB for ISDN on the feature
- 8 KB for frame relay on the feature (if you do not have frame relay on the 3746 Model 900)
- 8 KB for NCP migration (general program code storage increase)

For a total of 26 KB increase in code storage requirements.

**Control Block Storage:** NCP requires additional control block storage when you define 3746 Model 900 resources. This section describes how to estimate the additional storage required for your configuration.

- If you are adding ISDN resources:
  - For each 3746 Model 900 ISDN B-channel, an additional 1432 bytes + (4 × *maxdlci*) where *maxdlci* is the largest DLCI supported by the line. The largest DLCI is the smaller of the following values:
    - 991
    - The value of the following expression:
$$((maxframe - lmi) / 5) + 15$$
where
      - maxframe* is the value of MAXFRAME on the LINE definition statement.
      - lmi* is 17 when LMI=CCITT on the LMI PU definition statement, and 18 when LMI=ANSI.
  - For each 3746 Model 900 ISDN logical line/PU,
    - An additional 1200 bytes if peripheral, **or**
    - An additional 1068 bytes if subarea.
  - For each 3746 Model 900 ISDN physical unit,
    - An additional 612 bytes if peripheral, **or**
    - An additional 480 bytes if subarea.

---

## General Updates

Make the following general updates:

### BUILD

Update the VERSION keyword to generate NCP V7R8 or V7R8F.

The new ADPLIMIT keyword enables you to limit the maximum window size that NCP permits on an adaptively paced session.

A new suboperand of the BACKUP keyword specifies the number of LU sessions that support XRF with triple-DES encryption.

The ISDNACC keyword has been added to specify whether the CSS is to include ISDN accounting information.

The new MINILOAD keyword facilitates the generating of a minimum-size remote load module.

The OWNERPL keyword has been added to enable you to specify the types of unassigned logical resources that will be managed in owner-based pools.

The QSZALERT keyword has been added to support monitoring for excessive NCP buffer usage by a single resource.

The new TGTIMER keyword provides enhanced hung-TG detection.

The USGTIER keyword has changed to support updates to the NCP usage tier definitions.

The VOSDEACT keyword has been added to specify whether VR (virtual route) deactivation will be initiated when a VR goes out-of-sequence.

	The VSUBNETS keyword has been added to support variable subnetting via NDF and dynamic reconfiguration.
<b>CLUSTER</b>	There are new suboperands for the FEATURE keyword to allow NCP to ignore data from an undefined 3270 BSC device.
<b>DLCI</b>	The DLCI definition statement is added.  The ID keyword specifies the DLCI(s) to which the DLCI statement's keyword parameters apply.  The CIR keyword specifies the bandwidth management parameters to be used for a designated DLCI.  The BALANCE keyword specifies the balancing factor to be applied to the DLCI(s) indicated by the ID keyword.
<b>GROUP</b>	The DIAL keyword is changed to enable you to specify DIAL=YES for 3746 Model 900 frame-relay physical lines.  The FRELAY keyword is changed to provide the IP value for the second suboperand to indicate IP resources.  The ISDN keyword has been added to specify that this GROUP defines an ISDN physical or logical line group.  You can now code the PHYPORT keyword on 3746 Model 900 Token-Ring logical peripheral GROUP statements to associate the logicals with one or more physicals.  The V25DIAL keyword enables you to set the V.25 dial timer, formerly a fixed 2-minute timer, for EP lines.
<b>IPOWNER</b>	The IPOWNER definition statement has been changed so that it is now optional.  The INTFACE keyword has changed to enable you to define backup NCP-NCPROUTE interfaces.
<b>IROUTE</b>	The SNETMASK keyword has been added to support variable subnetting via NDF and dynamic reconfiguration.
<b>LINE</b>	The ADDIFG keyword has been changed to provide you with more granularity when choosing the minimum number of flags to transmit between frames.  The BALANCE keyword has been added to enable connection balancing for NTRI physical lines and the 3746 Model 900.  The CIR keyword is added to specify whether the Committed Information Rate (CIR) algorithms will be used for bandwidth management.  The CLLM keyword is added to specify whether Consolidated Link Layer Management (CLLM) will be used.  The CRATEDLY keyword has been added to specify the COMRATE delay threshold in seconds for the 3746 Model 900  The DSCRDDLY keyword has been added to specify the discard delay threshold in seconds for the 3746 Model 900  The DYNWIND keyword has been changed to enable you to control delays that NCP uses when manipulating the working window for 3745 FRTE stations during congestion.  The DYNWIND keyword has changed to allow additional values for the <i>dw</i> and <i>dwc</i> suboperands for frame relay and ISDN lines.

## Migrating from NCP Version 7 Release 4

By coding the second and third suboperands of the DYNWIND keyword (*dw* and *dwc*), you can now control the amount by which the working window is decreased when frame loss or congestion occurs for 3745 Token-Ring resources.

The *mww* suboperand is added to the DYNWIND keyword to provide a minimum user-specified working window value for frame relay.

The FEATURE keyword has been changed to provide LRC8 error checking for EP BSC USASCII lines running in transparent mode.

The FRRATES keyword has been added to enable setting the relative priorities for types of traffic (SNA, IP, and Frame Handler) supported by a 3745 frame-relay physical line.

The FRSPRI keyword has been added to specify the relative service priority for 3746 Model 900 attached frame-relay stations and ISDN logical stations.

The HLOQSTOP keyword has been added to specify the maximum size of the 3746 Model 900 physical line hardware queue.

The ISDNLPN and ISDNLSA keywords have been added to support ISDN.

The ISDNCALL, ISDNRPN, and ISDNRSA keywords have been added to support frame-relay dial backup over ISDN.

The LOCADD keyword has been changed to enable you to specify the destination service access point (DSAP) and medium access control point (MAC) for 3746 Model 900 frame-relay logical connections to remote token-ring-capable type 4 physical units.

The MAXDLCI keyword has changed to enable you to limit the DLCI range supported by ISDN B-channels.

MAXPU, which previously allowed a maximum of 16 ESCON stations, now allows a maximum of 32 ESCON stations.

The MLTGPRI keyword is changed so that it can be coded for switched PUs in the VTAM switched major node, with the appropriate level of VTAM.

The QSIZE keyword has been added to specify the 3746 Model 900 software queue size threshold.

The QSIZEDE keyword has been added to specify the 3746 Model 900 software queue discard eligibility threshold

The RETRIES keyword has been changed to enable you to indicate a consecutive error threshold for 3745 frame-relay physical lines.

TAKEOVER, a new keyword on the LINE statement, enables you to force takeover of an EP line from another host.

The TRANSBUF keyword is added to specify the maximum number of frames that will be queued for a TSS or HPTSS adapter awaiting transmission over a 3745 frame-relay physical line.

### OPTIONS

The TUSGTIER keyword has changed to support updates to the NCP usage tier definitions.

### PU

The ADDR keyword has been changed to enable you to specify the destination service access point (DSAP) and medium access control point (MAC) for 3746 Model 900 frame-relay logical connections to remote token-ring-capable type 4 physical units.

The FRSPRI keyword has been added to specify the relative service priority for 3746 Model 900 attached frame-relay stations and ISDN logical stations.

The IPQLIM keyword is changed so that its default value is 3 times the value of MAXFRAME on the LINE definition statement.

The ISDNCFG and ISDNDSCT keywords have been added to support ISDN.

The LMI keyword has changed as part of the new support for switched frame-relay physical lines.

The MAXDATA keyword value for switched subarea PUs is obtained from VTAM and no longer from NCP. If you code the MAXDATA keyword for a switched subarea PU, you must code it on the PU definition statement in the VTAM switched major node because NCP no longer uses the MAXDATA value coded in the NCP generation definition.

The MODULO keyword default has changed.

The PIUCHECK keyword is added to specify whether checksum validation is performed on PIUs sent and received by the subarea station.

The RETRIES keyword has been changed to enable you to indicate a consecutive error threshold for 3745 frame-relay physical lines.

The SSAP keyword has been added to allow duplicate TIC addressing for token-ring logical subarea connections.

The TGCONF keyword is changed so that it can be coded for switched PUs in the VTAM switched major node, with the appropriate level of VTAM.

The TGCONF keyword has been changed to enable you to designate standby subarea stations for congestion relief in MLTGs.

The UNIQUE keyword has been added to specify whether a Token Ring's logical subarea station's destination MAC address is a unique locally administered address.

The XMONLNK keyword is changed so that XMONLNK=YES and DIAL=YES are compatible when FRELAY=(PHYSICAL,SUBAREA) or FRELAY=(PHYSICAL,ANY).

**SWMMT**

The MAXDATA keyword has been added to enable you to specify the maximum frame size.

---

## Program Generation Characteristics

Table 7-1 shows the locations in the *NCP, SSP, and EP Resource Definition Guide* where you will find descriptions of the functions added in V7R8, V7R7, V7R6, and V7R5:

*Table 7-1 (Page 1 of 3). New Functions Added in V7R8, V7R7, V7R6, and V7R5*

Function	Location
EP Line Takeover	"Line Characteristics" on page 21-12
EP Shorten V25 BIS Dial Timer	"Timeouts" on page 20-7
Logical Line Pool Sharing for TIC3 Connections	"Unassigned Logical Line Pools" on page 6-23
Enhanced Hung TG Detection	"Monitoring Transmission Group Performance" on page 23-18

Table 7-1 (Page 2 of 3). New Functions Added in V7R8, V7R7, V7R6, and V7R5

Function	Location
Facilitate Minimum-Sized Remote Load Module	"Defining the NCP Environment" on page 2-5
Ignore Data from Undefined 3270 BSC Device	the new function of the FEATURE keyword on page 5-28
3746 Model 900 TIC3 Connection Balancing	the description of the BALANCE keyword on page 6-8
3746 Model 900 Frame Relay BAN Connection Balancing	BALANCE keyword on the DLCI statement on page 16-14
Enhanced Control of the Dynamic Working Window for 3745 Token Ring	the description of the DYNWIND keyword on page 6-42
LRC8 Error Checking for EP BSC USASCII	"Devices" on page 20-5
Enhanced Control of Adaptive Session Pacing	"Defining Session Pacing" on page 24-6
Specifying a Minimum Working Window for 3745 Frame Relay	the description of the DYNWIND keyword on page 16-15
Specifying the number of frames queued for a TSS or HPTSS adapter	TRANSBUF keyword on the LINE definition statement on page 16-13
Committed information rate (CIR) on NCP controlled 3746 Model 900 frame-relay and ISDN lines	CIR keyword on the LINE definition statement on page 16-76 CIR keyword on the DLCI definition statement on page 16-13
Remote access to NCPROUTE in the absence of SNALINK	Exception to P2PDEST/HOSTADDR Matching on page 15-7
Connection balancing of frame-relay boundary access node (BAN) connections over 3745 frame-relay DLCIs	BALANCE keyword on the DLCI statement on page 16-14
IP subports for switched frame-relay lines	"Defining Frame-Relay Attachments for IP" on page 15-44
3746 Model 900 switched frame-relay physical lines	Figure 16-45 on page 16-94
PIU checksum support	PIUCHECK keyword on the PU definition statement on page 24-9
Defining an ISDN backup line for a frame-relay line	"Defining Automatic Frame-Relay Backup over an ISDN"
Defining backup NCP-NCPROUTE IP interfaces	"Backup IP Channel Interfaces"
Connection balancing for NTRI physical lines	the description of the BALANCE keyword on page 6-8
Limiting the DLCI range for an ISDN B-channel line	MAXDLCI on the LINE definition statement on page 7-7
New way that NCP determines link capacity and transmission time	SPEED keyword related to VTAM topology CAPACITY keyword on page 8-21
Allocating unassigned logical resources to owner-based pools	"Allocating Unassigned Logical Line Pools to Owners"
Defining an internal NCP to Model 900 point-to-point IP connection	"Defining an Internal NCP to Model 900 Point-to-Point IP Connection"



Table 7-1 (Page 3 of 3). New Functions Added in V7R8, V7R7, V7R6, and V7R5

Function	Location
Defining ISDN subarea connectivity through a terminal adapter or a BAN device	"Defining ISDN Subarea Connectivity through a Terminal Adapter or BAN Device"
Defining relative priorities for the types (SNA, IP, and frame handler) of traffic supported by a 3745 frame-relay physical line	FRRATES on the LINE Definition Statement on page 16-11
New usage tier options	"Usage Tiers"
Defining variable subnetting for an IP route or an IP interface	"Defining Routes Explicitly"
Monitoring for excessive buffer usage by a peripheral resource	"Monitoring for Excessive Buffer Usage by a Peripheral Resource"
Specifying Token-Ring destination MAC address uniqueness	Reference to the UNIQUE keyword on page 6-31
Defining switched frame-relay 3745 physical lines	"Defining Switched Frame-Relay Physical Lines"
Controlling VR deactivation when a VR goes out-of-sequence	"Deactivating an Out-of-Sequence Virtual Route"
Integrated Services Digital Network (ISDN) Primary Rate Adapter	Chapter 7, "Integrated Services Digital Network (ISDN) Resources"
Duplicate TIC Addressing for Token-Ring	"Duplicate TIC Addressing"
Hot Standby for Multiple Link Transmission Groups (MLTGs)	"Multilink Transmission Groups"
Boundary Access Node (BAN) for Frame-Relay (FR) Subarea Links	"Boundary Access Node (BAN) for Frame-Relay Subarea Links"
Frame Relay Inoperative 'Error Count' Management Upgrades	"Defining Frame-Relay Physical Lines"
Enhanced Dynamic Windowing Algorithm for 3745 Frame Relay Logical Lines	"Defining Frame-Relay Physical Lines"
Port sharing for NCP and 3746-900	"Shared 3746 Model 900 Resources between an NCP and 3746 Model 900"
Added flexibility in coding the ADDIFG keyword	"Controlling Adapter Overrun Errors"

## NCP Migration Aid

If you are using the NCP migration aid, make the following updates:

### OPTIONS

Update the TVERSION keyword to generate NCP V7R8 or V7R8F.



---

## Chapter 8. Migrating from NCP Version 7 Release 3

Changed Defaults	8-1
Deleted Keywords	8-2
Changes to Controller Storage Requirements	8-2
General Program Code Storage	8-2
NCP Initialization	8-2
Dynamically Created Control Blocks	8-2
Control Blocks	8-2
Specifying an Owning TCP/IP Host	8-3
3746 Model 900 Support	8-3
General Updates	8-5
Program Generation Characteristics	8-9
NCP Migration Aid	8-11

This chapter contains information needed for updating the generation definition to migrate to V7R8 and to include new functions added since V7R3.

**Migrating to a New Host System or Hardware:** If you are migrating to a different host operating system or communication controller model or to a type 7 channel adapter, read Chapter 2 to see which keywords you need to change for your new host system or hardware before you begin migrating to NCP V7R8.

**Using the NCP Migration Aid:** The NCP migration aid is an NDF function that simplifies the migration task by automatically making most of the changes required to migrate to NCP V7R8. You should consider using the migration aid before using the information in this chapter. For more information on using the migration aid, see Chapter 1.

Under each topic in this chapter, definition statements are listed in the order in which they appear in a generation definition. You can code certain keywords on more than one definition statement. This book describes each keyword on the lowest-level definition statement on which it can be coded.

After you have identified the definition statements and keywords that you need to change, add, or delete, see the *NCP, SSP, and EP Resource Definition Guide* for more information on their functions, and see the *NCP, SSP, and EP Resource Definition Reference* for information on how to code them.

---

### Changed Defaults

The default for the following keyword has changed.

PU

IPQLIM  
MODULO

---

### Deleted Keywords

None

---

### Changes to Controller Storage Requirements

This section describes the requirements for additional communication controller storage resulting from general changes and specific enhancements since NCP V7R3. The storage sizes in this section are approximate. Your actual storage requirements depend on your configuration. For a more accurate estimate of the storage your NCP will require, use the HONE CF3745 Configurator storage model. For more information, see the *IBM 3745 Communication Controller Configuration Program* book.

### General Program Code Storage

General program code storage increases by approximately 17 KB.

### NCP Initialization

Generation listings include a message (ICN076I) indicating how much storage NCP needs for initialization, beyond the storage that the load module displaces. Add this number to the size of the load module, obtained from the linkage editor output, to determine whether there is enough controller storage available for the buffer pool. For more information, see the *NCP, SSP, and EP Generation and Loading Guide*.

Beginning with SSP V4R8, another way to determine if there is enough controller storage available for the buffer pool is to add the ICNSIZE (MVS and VM) or IFUSIZE (VSE) job step after the linkage editor step. It will give you an estimate of how many NCP buffers will be created for your particular NCP. See the *NCP, SSP, and EP Generation and Loading Guide* and “Generation Steps” on page 67 for related VM information, “Generation Steps” on page 5 for related MVS information, or “Generation Steps” on page 169 for related VSE information.

### Dynamically Created Control Blocks

If you include the NCP function for dynamically created control blocks (DYNPOOL on the BUILD definition statement), NCP may use buffer storage to create additional control blocks as needed. This increases the amount of storage used for control blocks beyond the figures given in this section, and reduces the amount of available buffer storage. For more information on dynamically created control blocks, see the *NCP, SSP, and EP Resource Definition Guide*.

### Control Blocks

- Add 36 bytes for each 3746 Model 900 frame-relay logical line.
- Add 40 bytes per 3746 Model 900 token-ring logical station.
- Add 234 bytes per 3746 Model 900 frame-relay physical line.
- Add 16 bytes per 3745 frame-relay logical line.
- Add 56 bytes per 3745 frame-relay physical line.
- Add 20 bytes per NTRI frame handler logical line.
- Add 4 bytes per 3746 Model 900 token ring physical line.
- Add 36 bytes per 3745 token ring physical line.
- Add 32 bytes for XRF LU sessions using Triple-DES encryption (via BACKUP keyword).

Add 8 bytes per IPOWNER.  
 Add 8 bytes per transmission group.  
 Add 36 bytes per SSCP owner.  
 Add 1024 bytes when 3745 token ring resources included.

## Specifying an Owing TCP/IP Host

There is no storage impact for this function because there is no significant additional storage requirement above that required for IP with NCPROUTE.

## 3746 Model 900 Support

NCP requires additional storage for program code and control blocks when you include NCP support for 3746 Model 900 functions (ESCON links, SDLC lines, X.25, token-ring, frame-relay, or ISDN connections). This section describes how to estimate the additional storage required for your configuration.

**Program Code Storage:** Allocate the following approximate amounts of storage for the following conditions:

- To migrate from V7R3 to V7R8F with ISDN
  - Add 135 KB to your existing program code storage for the feature (base).
  - Add 10 KB for ISDN on the feature
  - Add 8 KB for frame relay on the feature
- To migrate from V7R3F to V7R8F with ISDN
  - Add 13 KB for feature migration on the model 900
  - Add 10 KB for ISDN on the feature
  - Add 8 KB if you do not have frame relay on the 3746 Model 900
- To include X.25 ODLC
  - Add 17 KB if neither frame relay nor token ring was previously included in your NCP generation definition.
  - Add 11 KB if frame relay, token ring, or both was previously included in your NCP generation definition.

Some examples may help clarify how the net storage amounts are determined:

1. If you are adding ISDN resources and 3746 Model 900 for the first time, add the following:

135 KB for 3746 Model 900 base  
 10 KB for ISDN on the feature  
 8 KB for frame relay on the feature  
 17 KB for NCP migration (general program code storage increase)

For a total of 170 KB increase in code storage requirements.

2. If you already have the 3746 Model 900 feature installed, and you want to add ISDN to the 3746 Model 900, you will need:

10 KB for ISDN on the feature  
 8 KB for frame relay on the feature (if you do not have frame relay on the 3746 Model 900)  
 13 KB for feature migration (general program code storage increase)  
 17 KB for NCP migration (general program code storage increase)

For a total of 48 KB increase in code storage requirements.

**Control Block Storage:** NCP requires additional control block storage when you define 3746 Model 900 resources. This section describes how to estimate the additional storage required for your configuration.

- If you are defining new X.25 resources, add the following values:
  - (1328 bytes × the number of physical ODLC lines) + (4 bytes × the number of logical ODLC lines)
  - 1104 bytes × the number of peripheral logical lines/PUs
  - 976 bytes × the number of subarea logical lines/PUs
- If you convert existing NCP V7R3 ODLC X.25 resources, or existing inboard X.25 resources, you will now use NCP control blocks instead of NPSI control blocks. The net change is:
  - 296 bytes less for each peripheral logical line/PU
  - 424 bytes less for each subarea logical line/PU
- If you are defining new frame-relay frame-handler internal frame switching support:
  - For each 3746 Model 900 frame-relay full duplex physical line, add an additional 1432 bytes + (4 × *maxdlci*) where *maxdlci* is the largest DLCI supported by the line. The largest DLCI is the smaller of the following values:
    - 991
    - The value of the following expression:
$$((maxframe - lmi) / 5) + 15$$
where  
*maxframe* is the value of MAXFRAME on the LINE definition statement.  
*lmi* is 17 when LMI=CCITT on the LMI PU definition statement and 18 when LMI=ANSI.
  - For each 3746 Model 900 frame-relay physical unit, add an additional 480 bytes.
- There is no change in storage requirements if you are converting from existing frame-relay ODLC support to the new frame-relay frame-handler internal frame switching support.
- If you are adding ISDN resources:
  - For each 3746 Model 900 ISDN B-channel, an additional 1432 bytes + (4 × *maxdlci*) where *maxdlci* is the largest DLCI supported by the line. The largest DLCI is the smaller of the following values:
    - 991
    - The value of the following expression:
$$((maxframe - lmi) / 5) + 15$$
where  
*maxframe* is the value of MAXFRAME on the LINE definition statement.  
*lmi* is 17 when LMI=CCITT on the LMI PU definition statement, and 18 when LMI=ANSI.

- For each 3746 Model 900 ISDN logical line/PU,
  - An additional 1200 bytes if peripheral, **or**
  - An additional 1068 bytes if subarea.
- For each 3746 Model 900 ISDN physical unit,
  - An additional 612 bytes if peripheral, **or**
  - An additional 480 bytes if subarea.

---

## General Updates

Make the following general updates:

### BUILD

Update the VERSION keyword to generate NCP V7R8 or V7R8F.

The new ADPLIMIT keyword enables you to limit the maximum window size that NCP permits on an adaptively paced session.

A new suboperand of the BACKUP keyword specifies the number of LU sessions that support XRF with triple-DES encryption.

The CSSTIER keyword has been changed to add a new operand for users who have the network node hardware feature (5022) installed on their 3746 Model 900.

The HPRSNAP keyword has been added to specify whether the snap trace function is to be enabled for APPN HPR resources.

The ISDNACC keyword has been added to specify whether the CSS is to include ISDN accounting information.

The new MINILOAD keyword facilitates the generating of a minimum-size remote load module.

The NTUNECOL keyword has been changed to make optional the collection of statistics for NCP token-ring interconnections and for 3745 frame relay physical stations and logical lines.

The new TGTIMER keyword provides enhanced hung-TG detection.

The OWNERPL keyword has been added to enable you to specify the types of unassigned logical resources that will be managed in owner-based pools.

The QSZALERT keyword has been added to support monitoring for excessive NCP buffer usage by a single resource.

The RGENLEVL keyword has been added to specify that NDF is to replace the GENLEVEL keyword value with the default date and time of the NCP generation.

The USGTIER keyword has changed to support updates to the NCP usage tier definitions.

The VOSDEACT keyword has been added to specify whether VR (virtual route) deactivation will be initiated when a VR goes out-of-sequence.

The VSUBNETS keyword has been added to support variable subnetting via NDF and dynamic reconfiguration.

### CLUSTER

There are new suboperands for the FEATURE keyword to allow NCP to ignore data from an undefined 3270 BSC device.

## Migrating from NCP Version 7 Release 3

<b>DLCI</b>	<p>The DLCI definition statement is added.</p> <p>The ID keyword specifies the DLCI(s) to which the DLCI statement's keyword parameters apply.</p> <p>The CIR keyword specifies the bandwidth management parameters to be used for a designated DLCI.</p> <p>The BALANCE keyword specifies the balancing factor to be applied to the DLCI(s) indicated by the ID keyword.</p>
<b>FRSESET</b>	<p>The SUBPORTS keyword has been changed to allow internal frame switching between a 3746 Model 900 and NCP running on a 3745.</p>
<b>GROUP</b>	<p>The DIAL keyword is changed to enable you to specify DIAL=YES for 3746 Model 900 frame-relay physical lines.</p> <p>The FRELAY keyword is changed to provide the IP value for the second suboperand to indicate IP resources.</p> <p>The ISDN keyword has been added to specify that this GROUP defines an ISDN physical or logical line group.</p> <p>You can now code the PHYPORT keyword on 3746 Model 900 Token-Ring logical peripheral GROUP statements to associate the logicals with one or more physicals.</p> <p>The V25DIAL keyword enables you to set the V.25 dial timer, formerly a fixed 2-minute timer, for EP lines.</p>
<b>IPOWNER</b>	<p>The IPOWNER definition statement is now optional.</p> <p>The IPOWNER definition statement has been changed to enable NCP to send NCPROUTE information directly over an IP channel.</p> <p>The INTFACE keyword has changed to enable you to define backup NCP-NCPROUTE interfaces.</p>
<b>IROUTE</b>	<p>The SNETMASK keyword has been added to support variable subnetting via NDF and dynamic reconfiguration.</p>
<b>LINE</b>	<p>The ADDIFG keyword has been changed to provide you with more granularity when choosing the minimum number of flags to transmit between frames.</p> <p>The BALANCE keyword has been added to enable connection balancing for NTRI physical lines and the 3746 Model 900.</p> <p>The CCLID keyword has been changed to pass the X.21 calling/called line ID (CCLID) to VTAM without the need for an additional product such as X.21 SH/MPS.</p> <p>The CIR keyword is added to specify whether the Committed Information Rate (CIR) algorithms will be used for bandwidth management.</p> <p>The CLLM keyword is added to specify whether Consolidated Link Layer Management (CLLM) will be used.</p> <p>The CRATEDLY keyword has been added to specify the COMRATE delay threshold in seconds for the 3746 Model 900.</p> <p>The DSCRDDLY keyword has been added to specify the discard delay threshold in seconds for the 3746 Model 900</p> <p>The DYNWIND keyword has been changed to enable you to control delays that NCP uses when manipulating the working window for 3745 FRTE stations during congestion.</p>



The DYNWIND keyword has changed to allow additional values for the *dw* and *dwc* suboperands for frame relay and ISDN lines.

By coding the second and third suboperands of the DYNWIND keyword (*dw* and *dwc*), you can now control the amount by which the working window is decreased when frame loss or congestion occurs for 3745 Token-Ring resources.

The *mww* suboperand is added to the DYNWIND keyword to provide a minimum user-specified working window value for frame relay.

The FEATURE keyword has been changed to provide LRC8 error checking for EP BSC USASCII lines running in transparent mode.

The FRRATES keyword has been added to enable setting the relative priorities for types of traffic (SNA, IP, and Frame Handler) supported by a 3745 frame-relay physical line.

The FRSPRI keyword has been added to specify the relative service priority for 3746 Model 900 attached frame-relay stations and ISDN logical stations.

The HLOQSTOP keyword has been added to specify the maximum size of the 3746 Model 900 physical line hardware queue.

The ISDNLPN and ISDNLSA keywords have been added to support ISDN.

The ISDNCALL, ISDNRPN, and ISDNRSA keywords have been added to support frame-relay dial backup over ISDN.

The LOCADD keyword has been changed to enable you to specify the destination service access point (DSAP) and medium access control point (MAC) for 3746 Model 900 frame-relay logical connections to remote token-ring-capable type 4 physical units.

The MAXDLCI keyword has changed to enable you to limit the DLCI range supported by ISDN B-channels.

MAXPU, which previously allowed a maximum of 16 ESCON stations, now allows a maximum of 32 ESCON stations.

The MLTGPRI keyword is changed so that it can be coded for switched PUs in the VTAM switched major node, with the appropriate level of VTAM.

The QSIZE keyword has been added to specify the 3746 Model 900 software queue size threshold.

The QSIZEDE keyword has been added to specify the 3746 Model 900 software queue discard eligibility threshold

The RETRIES keyword has been changed to enable you to indicate a consecutive error threshold for 3745 frame-relay physical lines.

The SERVLIM keyword has been changed to allow another way to specify how frequently NCP should interrupt its regular scans of the service order table to make a special scan.

TAKEOVER, a new keyword on the LINE statement, enables you to force takeover of an EP line from another host.

The TRANSBUF keyword is added to specify the maximum number of frames that will be queued for a TSS or HPTSS adapter awaiting transmission over a 3745 frame-relay physical line.

The TUSGTIER keyword has changed to support updates to the NCP usage tier definitions.

## OPTIONS

## Migrating from NCP Version 7 Release 3

### PU

The ADDR keyword has been changed to enable you to specify the destination service access point (DSAP) and medium access control point for 3746 Model 900 frame-relay logical connections to remote token-ring-capable type 4 physical units.

The FRSPRI keyword has been added to specify the relative service priority for 3746 Model 900 attached frame-relay stations and ISDN logical stations.

The IPQLIM keyword is changed so that its default value is 3 times the value of MAXFRAME on the LINE definition statement.

The ISDNCFG and ISDNDSCT keywords have been added to support ISDN.

The LLERP keyword has been changed to enable HPR data to be sent without error recovery for 3746 Model 900 token-ring logical stations.

The LMI keyword has changed as part of the new support for switched frame-relay physical lines.

The MAXDATA keyword value for switched subarea PUs is obtained from VTAM and no longer from NCP. If you code the MAXDATA keyword for a switched subarea PU, you must code it on the PU definition statement in the VTAM switched major node because NCP no longer uses the MAXDATA value coded in the NCP generation definition.

The MODULO keyword default has changed.

The PIUCHECK keyword is added to specify whether checksum validation is performed on PIUs sent and received by the subarea station.

The RETRIES keyword has been changed to enable you to indicate a consecutive error threshold for 3745 frame-relay physical lines.

The SNETMASK keyword has been added to enable subnetwork mask specification for channel and frame-relay internet resources.

The SSAP keyword has been added to allow duplicate TIC addressing for token-ring subarea connections.

The TGCONF keyword is changed so that it can be coded for switched PUs in the VTAM switched major node, with the appropriate level of VTAM.

The TGCONF keyword has been changed to enable you to designate standby subarea stations for congestion relief in MLTGs.

The UNIQUE keyword has been added to specify whether a Token Ring's logical subarea station's destination MAC address is a unique locally administered address.

The XMONLNK keyword is changed so that XMONLNK=YES and DIAL=YES are compatible when FRELAY=(PHYSICAL,SUBAREA) or FRELAY=(PHYSICAL,ANY).

### SDLCST

The SERVLIM keyword has been changed to allow another way to specify how frequently NCP should interrupt its regular scans of the service order table to make a special scan.

### SWMMT

The MAXDATA keyword has been added to enable you to specify the maximum frame size.

## Program Generation Characteristics

Table 8-1 shows the locations in the *NCP, SSP, and EP Resource Definition Guide* where you will find descriptions of the functions added in V7R8, V7R7, V7R6, V7R5, and V7R4

Table 8-1 (Page 1 of 3). New Functions Added in V7R8, V7R7, V7R6, V7R5, and V7R4

Function	Location
EP Line Takeover	"Line Characteristics" on page 21-12
EP Shorten V25 BIS Dial Timer	"Timeouts" on page 20-7
Logical Line Pool Sharing for TIC3 Connections	"Unassigned Logical Line Pools" on page 6-23
Enhanced Hung TG Detection	"Monitoring Transmission Group Performance" on page 23-18
Facilitate Minimum-Sized Remote Load Module	"Defining the NCP Environment" on page 2-5
Ignore Data from Undefined 3270 BSC Device	the new function of the FEATURE keyword on page 5-28
3746 Model 900 TIC3 Connection Balancing	the description of the BALANCE keyword on page 6-8
3746 Model 900 Frame Relay BAN Connection Balancing	BALANCE keyword on the DLCI statement on page 16-14
Enhanced Control of the Dynamic Working Window for 3745 Token Ring	the description of the DYNWIND keyword on page 6-42
Enhanced Control of Adaptive Session Pacing	"Defining Session Pacing" on page 24-6
Specifying a Minimum Working Window for 3745 Frame Relay	the description of the DYNWIND keyword on page 16-15
LRC8 Error Checking for EP BSC USASCII	"Devices" on page 20-5
Specifying the number of frames queued for a TSS or HPTSS adapter	TRANSBUF keyword on the LINE definition statement on page 16-13
Committed information rate (CIR) on NCP controlled 3746 Model 900 frame-relay and ISDN lines	CIR keyword on the LINE definition statement on page 16-76 CIR keyword on the DLCI definition statement on page 16-13
Remote access to NCPROUTE in the absence of SNALINK	Exception to P2PDEST/HOSTADDR Matching on page 15-7
Connection balancing of frame-relay boundary access node (BAN) connections over 3745 frame-relay DLCIs	BALANCE keyword on the DLCI statement on page 16-14
IP subports for switched frame-relay lines	"Defining Frame-Relay Attachments for IP" on page 15-44
3746 Model 900 switched frame-relay physical lines	Figure 16-45 on page 16-94
PIU checksum support	PIUCHECK keyword on the PU definition statement on page 24-9
Defining an ISDN backup line for a frame-relay line	"Defining Automatic Frame-Relay Backup over an ISDN"

*Table 8-1 (Page 2 of 3). New Functions Added in V7R8, V7R7, V7R6, V7R5, and V7R4*

<b>Function</b>	<b>Location</b>
Defining backup NCP-NCPROUTE IP interfaces	"Backup IP Channel Interfaces"
Connection balancing for NTRI physical lines	the description of the BALANCE keyword on page 6-8
Limiting the DLCI range for an ISDN B-channel line	MAXDLCI on the LINE definition statement on page 7-7
New way that NCP determines link capacity and transmission time	SPEED keyword related to VTAM topology CAPACITY keyword on page 8-21
Allocating unassigned logical resources to owner-based pools	"Allocating Unassigned Logical Line Pools to Owners"
Defining an internal NCP to Model 900 point-to-point IP connection	"Defining an Internal NCP to Model 900 Point-to-Point IP Connection"
Defining ISDN subarea connectivity through a terminal adapter or a BAN device	"Defining ISDN Subarea Connectivity through a Terminal Adapter or BAN Device"
Defining relative priorities for the types (SNA, IP, and frame handler) of traffic supported by a 3745 frame-relay physical line	FRRATES on the LINE Definition Statement on page 16-11
New usage tier options	"Usage Tiers"
Defining variable subnetting for an IP route or an IP interface	"Defining Routes Explicitly"
Monitoring for excessive buffer usage by a peripheral resource	"Monitoring for Excessive Buffer Usage by a Peripheral Resource"
Specifying Token-Ring destination MAC address uniqueness	Reference to the UNIQUE keyword on page 6-31
Defining switched frame-relay 3745 physical lines	"Defining Switched Frame-Relay Physical Lines"
Controlling VR deactivation when a VR goes out-of-sequence	"Deactivating an Out-of-Sequence Virtual Route"
Integrated Services Digital Network (ISDN) Primary Rate Adapter	Chapter 7, "Integrated Services Digital Network (ISDN) Resources"
Duplicate TIC Addressing for Token-Ring	"Duplicate TIC Addressing"
Hot Standby for Multiple Link Transmission Groups (MLTGs)	"Multilink Transmission Groups"
Boundary Access Node (BAN) for Frame-Relay (FR) Subarea Links	"Boundary Access Node (BAN) for Frame-Relay Subarea Links"
Frame Relay Inoperative 'Error Count' Management Upgrades	"Defining Frame-Relay Physical Lines"
Enhanced Dynamic Windowing Algorithm for 3745 Frame Relay Logical Lines	"Defining Frame-Relay Physical Lines"
Port Sharing for NCP and 3746-900	"Shared 3746 Model 900 Resources between an NCP and 3746 Model 900"
Added flexibility in coding the ADDIFG keyword	"Controlling Adapter Overrun Errors"
X.25 ODLC resource definitions in an X.25 packet switching environment	"NDF-Generated Definition File"

Table 8-1 (Page 3 of 3). New Functions Added in V7R8, V7R7, V7R6, V7R5, and V7R4

Function	Location
Frame relay internal frame switching support	"Defining Frame Handler Connections," "3746 Model 900 Frame Relay"
Direct NCPROUTE information over an IP channel	"Definition Statements for NCP Internet Resources"
Dialing out to frame-relay BAN devices using non-extended dial digits	"Defining Peripheral Device Addresses to VTAM"
Non-error recovery procedures for 3746 Model 900 token-ring logical stations	"Defining the Characteristics of HPR-Capable Links"
Frame relay IP connections in internet sub-networks	"Defining Frame-Relay Attachments for IP"
HPR snap trace diagnostic information for APPN HPR	"NCP and VTAM As a Composite Type 2.1 Node" and "Diagnostic Tests and Traces"

## NCP Migration Aid

If you are using the NCP migration aid, make the following updates:

### OPTIONS

Update the TVERSION keyword to generate NCP V7R8 or V7R8F.



---

## Chapter 9. Migrating from NCP Version 7 Release 1

Changed Defaults	9-2
Deleted Keywords	9-2
Changes to Controller Storage Requirements	9-2
General Program Code Storage	9-2
NCP Initialization	9-2
Dynamically Created Control Blocks	9-3
Physical Units	9-3
All Lines	9-3
Other Control Blocks	9-3
Frame Relay over Token Ring	9-4
IP over Frame Relay	9-4
Native Internet Protocol (IP) Over Channel	9-5
3746 Model 900 Support	9-5
Spare SDLC Lines	9-7
General Updates	9-8
Program Generation Characteristics	9-12
General Considerations	9-14
NCP Migration Aid	9-15
Frame-Relay Support	9-15
Spare SDLC Lines	9-16

This chapter contains information needed for updating the generation definition to migrate to V7R8 and to include new functions added since V7R1.

**Migrating to a New Host System or Hardware:** If you are migrating to a different host operating system or communication controller model or to a type 7 channel adapter, read Chapter 2 to see which keywords you need to change for your new host system or hardware before you begin migrating to NCP V7R8.

**Using the NCP Migration Aid:** The NCP migration aid is an NDF function that simplifies the migration task by automatically making most of the changes required to migrate to NCP V7R8. You should consider using the migration aid before using the information in this chapter. For more information on using the migration aid, see Chapter 1.

Under each topic in this chapter, definition statements are listed in the order in which they appear in a generation definition. You can code certain keywords on more than one definition statement. This book describes each keyword on the lowest-level definition statement on which it can be coded.

After you have identified the definition statements and keywords that you need to change, add, or delete, see the *NCP, SSP, and EP Resource Definition Guide* for more information on their functions, and see the *NCP, SSP, and EP Resource Definition Reference* for information on how to code them.

### Changed Defaults

The default for the following keyword has changed.

PU                   MODULO

---

### Deleted Keywords

None

---

### Changes to Controller Storage Requirements

This section describes the requirements for additional communication controller storage resulting from general changes and specific enhancements since NCP V7R1. The storage sizes in this section are approximate. Your actual storage requirements depend on your configuration. For a more accurate estimate of the storage your NCP will require, use the HONE CF3745 Configurator storage model. For more information, see the *IBM 3745 Communication Controller Configuration Program* book.

### General Program Code Storage

For each of the following functions already in your NCP generation, storage increases by these approximate amounts:

- Add 114 KB to general program code storage.
- Add 12 KB for Internet Protocol (IP) program code storage.
- Add 27.5 KB for frame-relay program code storage if you already have frame relay defined in your NCP generation definition.
- Add 17 KB for token-ring program code storage if you have included frame relay in your generation definition, or 29.5 KB if you have not.
- Add an additional 12.5 KB if you use NTuneMON.

### NCP Initialization

Generation listings include a message (ICN076I) indicating how much storage NCP needs for initialization, beyond the storage that the load module displaces. Add this number to the size of the load module, obtained from the linkage editor output, to determine whether there is enough controller storage available for the buffer pool. For more information, see the *NCP, SSP, and EP Generation and Loading Guide*.

Beginning with SSP V4R8, another way to determine if there is enough controller storage available for the buffer pool is to add the ICNSIZE (MVS and VM) or IFUSIZE (VSE) job step after the linkage editor step. It will give you an estimate of how many NCP buffers will be created for your particular NCP. See the *NCP, SSP, and EP Generation and Loading Guide* and “Generation Steps” on page 67 for related VM information, “Generation Steps” on page 5 for related MVS information, or “Generation Steps” on page 169 for related VSE information.



## Dynamically Created Control Blocks

If you include the NCP function for dynamically created control blocks (DYNPOOL on the BUILD definition statement), NCP may use buffer storage to create additional control blocks as needed. This increases the amount of storage used for control blocks beyond the figures given in this section, and reduces the amount of available buffer storage. For more information on dynamically created control blocks, see the *NCP, SSP, and EP Resource Definition Guide*.

## Physical Units

NCP requires additional storage for each physical unit. To calculate the additional storage required:

- Add 84 bytes for each 3745 peripheral physical unit (PUTYPE=1 or PUTYPE=2 on the PU definition statement)
- Add 68 bytes for each 3745 subarea physical unit (PUTYPE=4 or PUTYPE=5 on the PU definition statement).
- Add 44 bytes for each ODLC peripheral physical unit (PUTYPE=1 or PUTYPE=2 on the PU definition statement)
- Add 28 bytes for each ODLC subarea physical unit (PUTYPE=4 or PUTYPE=5 on the PU definition statement).
- Add 40 bytes for each frame-relay logical ODLC PU.
- Add 36 bytes for each token-ring logical ODLC PU.

## All Lines

When migrating to NCP V7R8:

- Physical lines:
  - Add 80 bytes for each 3745 frame-relay physical line.
  - Add 60 bytes for each 3745 token-ring physical line.
  - Add 4 bytes per 3746 Model 900 token-ring physical line.
  - Add 8 bytes each for all other physical lines.
  - Add 234 bytes for each 3746 Model 900 frame-relay physical line.
- Logical lines:
  - Add 44 bytes for each frame-relay ODLC logical line.
  - Add 44 bytes for each token-ring ODLC logical line.
  - Add 44 bytes for each 3745 frame-relay subarea logical line.
  - Add 64 bytes for each 3745 frame-relay peripheral logical line.
  - Add 32 bytes for each 3745 token-ring logical line.
- Add 24 bytes for each transmission group.

**Note:** Additional storage requirements for particular line types (such as ESCON links, SDLC lines, and token-ring or frame-relay connections) are listed separately for each migration path. Remember to include these storage increases if you add new SDLC, NTRI, token-ring, frame-relay, or 3746 Model 900 resources.

## Other Control Blocks

- Add 8 bytes for each IP DLC interface.
- Add 8 bytes for each IPOWNER.
- Add 40 bytes for each resource eligible for NPA data collection.
- Add 4 bytes for each virtual route.
- Add 24 bytes for each token-ring physical line eligible for NPA data collection.
- Add 28 bytes for each frame-relay physical line eligible for NPA data collection.

- Add 32 bytes for each XRF LU session using Triple-DES encryption (via BACKUP keyword).
- Add 36 bytes for each SSCP owner.
- Add 1024 bytes when 3745 token-ring resources are included.

### Frame Relay over Token Ring

NCP requires additional storage for program code and control blocks when you include NCP support for frame-relay over token-ring functions. This section describes how to estimate the additional storage required for your configuration.

**Program Code Storage:** Use only **one** of the following conditions to determine the additional program code storage:

- If your NCP generation definition previously had neither frame-relay nor token-ring support, add 260 KB to your existing program code storage.
- If your NCP generation definition previously had only frame-relay support, add 89 KB.
- If your NCP generation definition previously had only token-ring support, add 58 KB.

**Control Block Storage:**

- Add 1436 bytes for each frame-relay over token-ring port definition.
- For each NTRI frame handler logical link, add 1196 bytes plus 460 bytes times the number of frame handler subports per logical link.

### IP over Frame Relay

NCP requires additional storage for program code and control blocks when you include NCP support for IP over frame-relay functions. This section describes how to estimate the additional storage required for your configuration.

**Program Code Storage:** To migrate from V7R1 to V7R8, add the following approximate amounts of storage:

- Add 247 KB to your existing program code storage if your system previously had no IP or frame-relay support.
- Add 171 KB if your system previously had only IP support.
- Add 76 KB if your system previously had only frame-relay support.
- Add 134 KB if your system previously had only token-ring support.

**Control Block Storage:** Add 2371 bytes for each frame-relay physical line.

**Common Control Block Storage:** Add the following storage if you include internet support:

- The storage required for internet addresses is 68 times the number of IP over FR interfaces, plus 32 times the value of the ARPTAB keyword on the frame-relay physical link.
- The storage required for internet routes is:

$$(ipintf + iproutes + numroute) \times 50$$

where

*ipintf* is the number of IPLOCAL definition statements.

*iproutes* is the number of IPROUTE definition statements.

*numroute* is the value of NUMROUTE on the IPOWNER definition statement.

## Native Internet Protocol (IP) Over Channel

Native IP over channel became available in NCP V7R3. Storage requirements are the same as for IP over channel with SNALINK.

## 3746 Model 900 Support

NCP requires additional storage for program code and control blocks when you include NCP support for 3746 Model 900 functions (ESCON links, SDLC lines, X.25, token-ring, or frame-relay connections). This section describes how to estimate the additional storage required for your configuration.

**Program Code Storage:** Allocate the following approximate amounts of storage for the following conditions:

- To migrate from V7R1 to V7R8F with ISDN:
  - Add 136 KB to your existing program code storage for the feature (base).
  - Add 8 KB for frame relay on the feature
  - Add 10 KB for ISDN on the feature
- To migrate from V7R1F to V7R8F with ISDN:
  - Add 13.6 KB for feature migration
  - Add 8 KB if you do not have frame relay on the 3746 Model 900
  - Add 10 KB for ISDN on the feature
- To include X.25 ODLC
  - Add 17 KB if neither frame relay nor token ring was previously included in your NCP generation definition.
  - Add 11 KB if frame relay, token ring, or both were previously included in your NCP generation definition.

Some examples may help clarify how the net storage amounts are determined:

1. If you are adding ISDN resources and 3746 Model 900 for the first time, add the following:

10 KB for ISDN on the feature  
 8 KB for frame relay on the 3746 Model 900  
 114 KB for NCP migration (general program code storage)  
 136 KB for 3746 Model 900 base

For a total of 268 KB increase in code storage requirements.

2. If you already have the 3746 Model 900 feature installed, and you want to add ISDN to the 3746 Model 900, you will need to add:

10 KB for ISDN on the feature  
 8 KB for frame relay on the feature (if you do not have frame relay on the 3746 Model 900)  
 114 KB for NCP migration (general program code storage)  
 27.5 KB for frame relay migration (general program code storage)

For a total of 159.5 KB increase in code storage requirements.

- There will be some **reduction** in storage size if you do not continue to use NPSI after adding X.25 ODLC support. See the *X.25 NPSI Version 3 General Information* to determine this amount.

**Control Block Storage:** NCP requires additional control block storage when you define 3746 Model 900 resources. This section describes how to estimate the additional storage required for your configuration.

- If you are defining new 3746 Model 900 SDLC lines, add 1170 bytes for each line.
- If you are converting existing SDLC lines to 3746 Model 900 SDLC lines, add 658 bytes for each half-duplex line, and add 450 bytes for each duplex line.
- If you are defining new X.25 resources, add the following values:
  - (1328 bytes × the number of physical ODLC lines) + (4 bytes × the number of logical ODLC lines)
  - 1104 bytes × the number of peripheral logical lines/PUs
  - 976 bytes × the number of subarea logical lines/PUs
- If you convert existing inboard X.25 resources, you will now use NCP control blocks instead of NPSI control blocks. The net change is:
  - 296 bytes less for each peripheral logical line/PU
  - 424 bytes less for each subarea logical line/PU
- If you are defining new frame-relay frame-handler internal frame switching support:
  - For each 3746 Model 900 frame-relay full duplex physical line, add an additional 1432 bytes + (4 × *maxdlci*) where *maxdlci* is the largest DLCI supported by the line. The largest DLCI is the smaller of the following values:
    - 991
    - The value of the following expression:
$$((maxframe - lmi) / 5) + 15$$
where
      - maxframe* is the value of MAXFRAME on the LINE definition statement.
      - lmi* is 17 when LMI=CCITT on the LMI PU definition statement and 18 when LMI=ANSI.
  - For each 3746 Model 900 frame-relay physical unit, add an additional 480 bytes.
- If you are adding frame-relay resources **other than** for the new frame-relay internal frame switching support:
  - For each 3746 Model 900 frame-relay full duplex physical line, an additional 1432 bytes + (4 × *maxdlci*) where *maxdlci* is the largest DLCI supported by the line. The largest DLCI is the smaller of the following values:
    - 991
    - The value of the following expression:
$$((maxframe - lmi) / 5) + 15$$

where

*maxframe* is the value of MAXFRAME on the LINE definition statement.

*lmi* is 17 when LMI=CCITT on the LMI PU definition statement and 18 when LMI=ANSI.

- For each 3746 Model 900 frame-relay half duplex logical line/PU,
  - An additional 1200 bytes if peripheral, **or**
  - An additional 1068 bytes if subarea.
- For each 3746 Model 900 frame-relay physical unit,
  - An additional 612 bytes if peripheral, **or**
  - An additional 480 bytes if subarea.
- If you are adding ISDN resources:
  - For each 3746 Model 900 ISDN B-channel, an additional 1432 bytes +  $(4 \times \text{maxdlci})$  where *maxdlci* is the largest DLCI supported by the line. The largest DLCI is the smaller of the following values:
    - 991
    - The value of the following expression:
 
$$((\text{maxframe} - \text{lmi}) / 5) + 15$$

where

*maxframe* is the value of MAXFRAME on the LINE definition statement.

*lmi* is 17 when LMI=CCITT on the LMI PU definition statement, and 18 when LMI=ANSI.

- For each 3746 Model 900 ISDN logical line/PU,
  - An additional 1200 bytes if peripheral, **or**
  - An additional 1068 bytes if subarea.
- For each 3746 Model 900 ISDN physical unit,
  - An additional 612 bytes if peripheral, **or**
  - An additional 480 bytes if subarea.

## Spare SDLC Lines

3745-attached SDLC peripheral lines can be generated as spare lines, redefinable lines, or as neither. By generating spare and redefinable lines, you can use NTuneMON with the NTuneNCP tuning feature to enable and disable the activation of physical lines from your communication controller without regenerating and reloading NCP.

Storage requirements for spare or redefinable lines are comparable to any other SDLC line. Use the same storage values for spare lines as you do for active lines.

### General Updates

Make the following general updates.

#### BUILD

Update the VERSION keyword to generate NCP V7R8 or V7R8F.

The new ADPLIMIT keyword enables you to limit the maximum window size that NCP permits on an adaptively paced session.

A new suboperand of the BACKUP keyword specifies the number of LU sessions that support XRF with triple-DES encryption.

The CSSTIER keyword has been added to specify the usage tier level at which you are using the optional NCP Feature for 3746 Model 900 Connectivity Subsystem Support.

The HPR, HPRATT, HPRMLC, HPRMPS and HPRQLIM keywords have been added to support HPR.

The HPRSNAP keyword has been added to specify whether the snap trace function is to be enabled for APPN HPR resources.

The ISDNACC keyword has been added to specify whether the CSS is to include ISDN accounting information.

The new MINILOAD keyword facilitates the generating of a minimum-size remote load module.

The NTUNECOL keyword has been added to specify whether collection in the NCP is active for NTuneMON.

The OWNERPL keyword has been added to enable you to specify the types of unassigned logical resources that will be managed in owner-based pools.

The QSZALERT keyword has been added to support monitoring for excessive NCP buffer usage by a single resource.

The RGENLEVL keyword has been added to specify that NDF is to replace the GENLEVEL keyword value with the default date and time of the NCP generation.

The new TGTIMER keyword provides enhanced hung-TG detection.

The USGTIER keyword has changed to support updates to the NCP usage tier definitions.

The VOSDEACT keyword has been added to specify whether VR (virtual route) deactivation will be initiated when a VR goes out-of-sequence.

The VSUBNETS keyword has been added to support variable subnetting via NDF and dynamic reconfiguration.

#### CLUSTER

There are new suboperands for the FEATURE keyword to allow NCP to ignore data from an undefined 3270 BSC device.

#### DLCI

The DLCI definition statement is added.

The ID keyword specifies the DLCI(s) to which the DLCI statement's keyword parameters apply.

The CIR keyword specifies the bandwidth management parameters to be used for a designated DLCI.

The BALANCE keyword specifies the balancing factor to be applied to the DLCI(s) indicated by the ID keyword.

<b>FRSESET</b>	The SUBPORTS keyword has been changed to allow internal frame switching between a 3746 Model 900 and NCP running on a 3745.
<b>GROUP</b>	<p>The DIAL keyword is changed to enable you to specify DIAL=YES for 3746 Model 900 frame-relay physical lines.</p> <p>The FRELAY keyword is changed to provide the IP value for the second suboperand to indicate IP resources.</p> <p>The ISDN keyword has been added to specify that this GROUP defines an ISDN physical or logical line group.</p> <p>You can now code the PHYPORT keyword on 3746 Model 900 Token-Ring logical peripheral GROUP statements to associate the logicals with one or more physicals.</p> <p>The V25DIAL keyword enables you to set the V.25 dial timer, formerly a fixed 2-minute timer, for EP lines.</p>
<b>IPOWNER</b>	<p>The IPOWNER definition statement is now optional.</p> <p>The IPOWNER definition statement has been changed to enable NCP to send NCPROUTE information directly over an IP channel.</p> <p>The INTFACE keyword has changed to enable you to define backup NCP-NCPROUTE interfaces.</p>
<b>IROUTE</b>	The SNETMASK keyword has been added to support variable subnetting via NDF and dynamic reconfiguration.
<b>LINE</b>	<p>The new ADDIFG keyword specifies whether interframe gaps should be made larger to avoid overrun errors on adjacent adapters to which the 3746 Model 900 is transmitting.</p> <p>The BALANCE keyword has been added to enable connection balancing for NTRI physical lines and the 3746 Model 900.</p> <p>The CCLID keyword has been changed to pass the X.21 calling/called line ID (CCLID) to VTAM without the need for an additional product such as X.21 SH/MPS.</p> <p>The CIR keyword is added to specify whether the Committed Information Rate (CIR) algorithms will be used for bandwidth management.</p> <p>The CLLM keyword is added to specify whether Consolidated Link Layer Management (CLLM) will be used.</p> <p>The COMRATE keyword has been changed to specify the relative transmit priority of a frame-relay resource, that is, TESP or FHSP. The COMRATE keyword, together with the DATABLK keyword, is used to determine a relative priority among all frame-relay resources associated with the same physical line.</p> <p>The CRATEDLY keyword has been added to specify the COMRATE delay threshold in seconds for the 3746 Model 900.</p> <p>The new DATABLK keyword specifies the minimum guaranteed transmission bandwidth in bytes allocated to a frame-relay resource. The DATABLK keyword, together with the COMRATE keyword, is used to determine a relative priority among all frame-relay resources associated with the same physical line.</p> <p>The DSCRDDLY keyword has been added to specify the discard delay threshold in seconds for the 3746 Model 900.</p> <p>The DYNWIND keyword has been changed to enable you to control delays that NCP uses when manipulating the working window for 3745 FRTE stations during congestion.</p>

The DYNWIND keyword has changed to allow additional values for the *dw* and *dwc* suboperands for frame relay and ISDN lines.

By coding the second and third suboperands of the DYNWIND keyword (*dw* and *dwc*), you can now control the amount by which the working window is decreased when frame loss or congestion occurs for 3745 Token-Ring resources.

The *mww* suboperand is added to the DYNWIND keyword to provide a minimum user-specified working window value for frame relay.

The FEATURE keyword has been changed to provide LRC8 error checking for EP BSC USASCII lines running in transparent mode.

The FRRATES keyword has been added to enable setting the relative priorities for types of traffic (SNA, IP, and Frame Handler) supported by a 3745 frame-relay physical line.

The FRSPRI keyword has been added to specify the relative service priority for 3746 Model 900 attached frame-relay stations and ISDN logical stations.

The HLOQSTOP keyword has been added to specify the maximum size of the 3746 Model 900 physical line hardware queue.

The ISDNLPN and ISDNLSA keywords have been added to support ISDN.

The ISDNCALL, ISDNRPN, and ISDNRSA keywords have been added to support frame-relay dial backup over ISDN.

The LOCADD keyword has been changed to enable you to specify the destination service access point (DSAP) and medium access control point (MAC) for 3746 Model 900 frame-relay logical connections to remote token-ring-capable type 4 physical units.

The MAXDLCI keyword has been added to enable you to limit the DLCI range supported by frame-relay physical lines, NTRI frame handler logical lines and ISDN B-channels.

MAXPU, which previously allowed a maximum of 16 ESCON stations, now allows a maximum of 32 ESCON stations.

The MLTGPRI keyword is changed so that it can be coded for switched PUs in the VTAM switched major node, with the appropriate level of VTAM.

The QSIZE keyword has been added to specify the 3746 Model 900 software queue size threshold.

The QSIZEDE keyword has been added to specify the 3746 Model 900 software queue discard eligibility threshold

The RETRIES keyword has been changed to enable you to indicate a consecutive error threshold for 3745 frame-relay physical lines.

The SERVLIM keyword has been changed to allow another way to specify how frequently NCP should interrupt its regular scans of the service order table to make a special scan.

TAKEOVER, a new keyword on the LINE statement, enables you to force takeover of an EP line from another host.

The TRANSBUF keyword is added to specify the maximum number of frames that will be queued for a TSS or HPTSS adapter awaiting transmission over a 3745 frame-relay physical line.



<b>OPTIONS</b>	The TUSGTIER keyword has changed to support updates to the NCP usage tier definitions.
<b>PU</b>	<p>The ADDR keyword has been changed to enable you to specify the destination service access point (DSAP) and medium access control point (MAC) for 3746 Model 900 frame-relay logical connections to remote token-ring-capable type 4 physical units.</p> <p>The FRSPRI keyword has been added to specify the relative service priority for 3746 Model 900 attached frame-relay stations and ISDN logical stations.</p> <p>The IPQLIM keyword has been added to specify the maximum amount of data that can be queued on a frame-relay internet outbound queue.</p> <p>The ISDNCFG and ISDNDSCT keywords have been added to support ISDN.</p> <p>The LLERP keyword has been added to specify whether the link station will perform link level error recovery procedures (ERP) when sending HPR data.</p> <p>The LMI keyword has changed as part of the new support for switched frame-relay physical lines.</p> <p>The MAXDATA keyword value for switched subarea PUs is obtained from VTAM and no longer from NCP. If you code the MAXDATA keyword for a switched subarea PU, you must code it on the PU definition statement in the VTAM switched major node because NCP no longer uses the MAXDATA value coded in the NCP generation definition.</p> <p>The MODULO keyword default has changed.</p> <p>The PIUCHECK keyword is added to specify whether checksum validation is performed on PIUs sent and received by the subarea station.</p> <p>The RETRIES keyword has been changed to enable you to indicate a consecutive error threshold for 3745 frame-relay physical lines.</p> <p>The SNETMASK keyword has been added to enable subnetwork mask specification for channel and frame-relay internet resources.</p> <p>The SSAP keyword has been added to allow duplicate TIC addressing for token-ring logical subarea connections.</p> <p>The TGCONF keyword is changed so that it can be coded for switched PUs in the VTAM switched major node, with the appropriate level of VTAM.</p> <p>The TGCONF keyword has been changed to enable you to designate standby subarea stations for congestion relief in MLTGs.</p> <p>The UNIQUE keyword has been added to specify whether a Token Ring's logical subarea station's destination MAC address is a unique locally administered address.</p> <p>The XMONLNK keyword is changed so that XMONLNK=YES and DIAL=YES are compatible when FRELAY=(PHYSICAL,SUBAREA) or FRELAY=(PHYSICAL,ANY).</p>
<b>SDLCST</b>	The SERVLIM keyword has been changed to allow another way to specify how frequently NCP should interrupt its regular scans of the service order table to make a special scan.
<b>SWMMT</b>	The MAXDATA keyword has been added to enable you to specify the maximum frame size.

## Program Generation Characteristics

Table 9-1 shows the locations in the *NCP, SSP, and EP Resource Definition Guide* where you will find descriptions of the functions added in V7R8, V7R7, V7R6, V7R5, V7R4, and V7R3:

*Table 9-1 (Page 1 of 3). New Functions Added in V7R8, V7R7, V7R6, V7R5, V7R4, and V7R3*

<b>Function</b>	<b>Location</b>
EP Line Takeover	"Line Characteristics" on page 21-12
EP Shorten V25 BIS Dial Timer	"Timeouts" on page 20-7
Logical Line Pool Sharing for TIC3 Connections	"Unassigned Logical Line Pools" on page 6-23
Enhanced Hung TG Detection	"Monitoring Transmission Group Performance" on page 23-18
Facilitate Minimum-Sized Remote Load Module	"Defining the NCP Environment" on page 2-5
Ignore Data from Undefined 3270 BSC Device	the new function of the FEATURE keyword on page 5-28
3746 Model 900 TIC3 Connection Balancing	the description of the BALANCE keyword on page 6-8
3746 Model 900 Frame Relay BAN Connection Balancing	BALANCE keyword on the DLCI statement on page 16-14
Enhanced Control of the Dynamic Working Window for 3745 Token Ring	the description of the DYNWIND keyword on page 6-42
Enhanced Control of Adaptive Session Pacing	"Defining Session Pacing" on page 24-6
Specifying a Minimum Working Window for 3745 Frame Relay	the description of the DYNWIND keyword on page 16-15
LRC8 Error Checking for EP BSC USASCII	"Devices" on page 20-5
Specifying the number of frames queued for a TSS or HPTSS adapter	TRANSBUF keyword on the LINE definition statement on page 16-13
Committed information rate (CIR) on NCP controlled 3746 Model 900 frame-relay and ISDN lines	CIR keyword on the LINE definition statement on page 16-76 CIR keyword on the DLCI definition statement on page 16-13
Remote access to NCPROUTE in the absence of SNALINK	Exception to P2PDEST/HOSTADDR Matching on page 15-7
Connection balancing of frame-relay boundary access node (BAN) connections over 3745 frame-relay DLCIs	BALANCE keyword on the DLCI statement on page 16-14
IP supports for switched frame-relay lines	"Defining Frame-Relay Attachments for IP" on page 15-44
3746 Model 900 switched frame-relay physical lines	Figure 16-45 on page 16-94
PIU checksum support	PIUCHECK keyword on the PU definition statement on page 24-9
Defining an ISDN backup line for a frame-relay line	"Defining Automatic Frame-Relay Backup over an ISDN"

*Table 9-1 (Page 2 of 3). New Functions Added in V7R8, V7R7, V7R6, V7R5, V7R4, and V7R3*

<b>Function</b>	<b>Location</b>
Defining backup NCP-NCPROUTE IP interfaces	"Backup IP Channel Interfaces"
Connection balancing for NTRI physical lines	the description of the BALANCE keyword on page 6-8
Limiting the DLCI range for an ISDN B-channel line	MAXDLCI on the LINE definition statement on page 7-7
New way that NCP determines link capacity and transmission time	SPEED keyword related to VTAM topology CAPACITY keyword on page 8-21
Allocating unassigned logical resources to owner-based pools	"Allocating Unassigned Logical Line Pools to Owners"
Defining an internal NCP to Model 900 point-to-point IP connection	"Defining an Internal NCP to Model 900 Point-to-Point IP Connection"
Defining ISDN subarea connectivity through a terminal adapter or a BAN device	"Defining ISDN Subarea Connectivity through a Terminal Adapter or BAN Device"
Defining relative priorities for the types (SNA, IP, and frame handler) of traffic supported by a 3745 frame-relay physical line	FRRATES on the LINE Definition Statement on page 16-11
New usage tier options	"Usage Tiers"
Defining variable subnetting for an IP route or an IP interface	"Defining Routes Explicitly"
Monitoring for excessive buffer usage by a peripheral resource	"Monitoring for Excessive Buffer Usage by a Peripheral Resource"
Specifying Token-Ring destination MAC address uniqueness	Reference to the UNIQUE keyword on page 6-31
Defining switched frame-relay 3745 physical lines	"Defining Switched Frame-Relay Physical Lines"
Controlling VR deactivation when a VR goes out-of-sequence	"Deactivating an Out-of-Sequence Virtual Route"
Integrated Services Digital Network (ISDN) Primary Rate Adapter	Chapter 7, "Integrated Services Digital Network (ISDN) Resources"
Duplicate TIC Addressing for Token-Ring	"Duplicate TIC Addressing"
Hot Standby for Multiple Link Transmission Groups (MLTGs)	"Multilink Transmission Groups"
Boundary Access Node (BAN) for Frame-Relay (FR) Subarea Links	"Boundary Access Node (BAN) for Frame-Relay Subarea Links"
Frame Relay Inoperative 'Error Count' Management Upgrades	"Defining Frame-Relay Physical Lines"
Enhanced Dynamic Windowing Algorithm for 3745 Frame Relay Logical Lines	"Defining Frame-Relay Physical Lines"
Port Sharing for NCP and 3746-900	"Shared 3746 Model 900 Resources between an NCP and 3746 Model 900"
Added flexibility in coding the ADDIFG keyword	"Controlling Adapter Overrun Errors"
X.25 ODLC resource definitions in an X.25 packet switching environment	"NDF-Generated Definition File"

Table 9-1 (Page 3 of 3). New Functions Added in V7R8, V7R7, V7R6, V7R5, V7R4, and V7R3

Function	Location
Frame relay internal frame switching support	"Defining Frame Handler Connections," "3746 Model 900 Frame Relay"
Direct NCPROUTE information over an IP channel	"Definition Statements for NCP Internet Resources"
Dialing out to frame-relay BAN devices using non-extended dial digits	"Defining Peripheral Device Addresses to VTAM"
Non-error recovery procedures for 3746 Model 900 token-ring logical stations	"Defining the Characteristics of HPR-Capable Links"
Frame relay IP connections in internet sub-networks	"Defining Frame-Relay Attachments for IP"
HPR snap trace diagnostic information for APPN HPR	"NCP and VTAM As a Composite Type 2.1 Node," and "Diagnostic Tests and Traces"
APPN HPR	Chapter 8, "Type 2.1 Node Support"
Frame relay over token ring	"Defining NTRI Attachments for a Frame-Relay Network" in Chapter 16, "Frame-Relay Resources"
IP over frame relay	"Defining Frame-Relay Attachments for IP" in Chapter 15, "Internet Resources"
IP over channel	"Defining 370 I/O Channels for IP" in Chapter 15, "Internet Resources"
Frame-relay BAN support	"Defining Frame-Relay Logical Peripheral Lines" in Chapter 16, "Frame-Relay Resources"
Hot standby MLTGs	"Multilink Transmission Groups" in Chapter 16, "Frame-Relay Resources"

## General Considerations

- The PASSLIM keyword can no longer be coded for token-ring physical units. The COMRATE keyword should now be used. Refer to the *NCP, SSP, and EP Resource Definition Guide*, NTRI on page 6-12 for details. The Migration Aid will delete PASSLIM on token-ring PUs.
- Code HPR=NO on the BUILD definition if you do not want to use the HPR function. This will block HPR connections from being established, and will prevent the unique HPR modules from being included. This will decrease the NCP load module size.
- The DLCI keyword has been added. It allows the coding of 10-bit DLCIs. This allows frame-relay connections to use the full range of DLCIs (up to 991).
- The SPEED keyword may now be coded on the LINE definition statement for all channel types. With the exception of ESCON, NCP does not use this value. This capability was added so this value is available to NETDA/2 and NTuneMON.
- NDF will allow DYNWIND specification on the logical GROUP, LINE, and PU statements for frame-relay logical subarea and token-ring logical subarea resources. NDF will also accept DYNWIND specification on the physical

GROUP, LINE and PU statements. This will allow you to specify a unique DYNWIND value for each physical unit.

## NCP Migration Aid

If you are using the NCP migration aid, make the following updates:

### OPTIONS

Update the TVERSION keyword to generate NCP V7R8 or V7R8F.

Code the TOCONV keyword if you want to consolidate the LOCALTO and REMOTTO keywords into the T1TIMER keyword.

Code the ADDRCONV keyword if you want to use the DLCI keyword instead of the ADDR keyword on your frame-relay lines.

---

## Frame-Relay Support

The 3746 Model 900 supports attachment to a frame-relay network. Support for frame relay on the 3746 Model 900 is the same as support for frame relay on the 3745 with the following exception:

- The PHYSRSC, ADDRESS, and PORTADD keywords may need to be changed.

### FRSESET

Changed keywords:

SUBPORTS

### GROUP

Changed keyword:

PHYSRSC

### LINE

Changed keywords:

MAXPU

PORTADD

SPEED

T2TIMER

### PU

Changed keywords:

ADDR

### 3745 Frame-Relay Keywords Not Used for 3746 Model 900 Frame Relay

You may have used some of the following keywords to define 3745 frame-relay support. You do not need to define these keywords for 3746 Model 900 frame-relay support. If you do define them, they are ignored (except for SRT, which is not valid).

### GROUP

COMPACB

COMPOWN

COMPSWP

LEVEL2

LEVEL3

LEVEL5

LINEADD

XIO

XMITDLY

## Migrating from NCP Version 7 Release 1

<b>LINE</b>	UACB
<b>PU</b>	SRT (not valid)
<b>PUDRPOOL</b>	FRSEDRPU

---

### Spare SDLC Lines

3745-attached SDLC peripheral lines can be generated as spare lines, redefinable lines, or as neither. By generating spare and redefinable lines, you can use NTuneMON with NTuneNCP to enable and disable the activation of physical lines from your communication controller without regenerating and reloading NCP.

**Note:** To be spare or redefinable, a line must be the only line in its group.

To use this function, make the following updates.

<b>LINE</b>	Changed keyword: USE
-------------	-------------------------

---

## Chapter 10. Migrating from NCP Version 6 Release 3

Changed Defaults	10-2
Deleted Keywords	10-2
Changes to Controller Storage Requirements	10-2
General Program Code Storage	10-2
NCP Initialization	10-3
Dynamically Created Control Blocks	10-3
Physical Units	10-3
All Lines	10-3
Other Control Blocks	10-4
Internet Routing Support	10-4
Frame Relay	10-5
Frame Relay over Token Ring	10-6
IP Over Frame Relay	10-7
Native Internet Protocol (IP) Over Channel	10-7
3746 Model 900 Support	10-7
Spare SDLC Lines	10-10
General Updates	10-10
VTAM Updates	10-14
Program Generation Characteristics	10-14
General Considerations	10-17
NCP Migration Aid	10-17
Dynamically Created Control Blocks	10-18
Logical Line Timer Enhancement	10-18
Internet Protocol	10-18
Dynamic Internet Routing	10-18
Internet Routing over NTRI-Attached Token Rings	10-20
Frame Relay	10-20
Frame-Relay Peripheral Links	10-20
3746 Model 900 Frame Relay	10-21
Spare SDLC Lines	10-22

To migrate from NCP Version 6 Release 3 (V6R3) to NCP V7R8, you need to update your NCP V6R3 generation definition so that it will generate NCP V7R8. In addition, you may want to change the generation definition to include functions added to NCP since NCP V6R3. This chapter lists the definition statements and keywords you need to change, add, or delete for either of these purposes.

**Migrating to a New Host System or Hardware:** If you are migrating to a different host operating system or communication controller model or to a type 7 channel adapter, read Chapter 2 to see which keywords you need to change for your new host system or hardware before you begin migrating to NCP V7R8.

**Using the NCP Migration Aid:** The NCP migration aid is an NDF function that simplifies the migration task by automatically making most of the changes required to migrate to NCP V7R8. You should consider using the migration aid before using the information in this chapter. For more information on using the migration aid, see Chapter 1.

Under each topic in this chapter, definition statements are listed in the order in which they appear in a generation definition. You can code certain keywords on more than one definition statement. This book describes each keyword on the lowest-level definition statement on which it can be coded.

After you have identified the definition statements and keywords that you need to change, add, or delete, see the *NCP, SSP, and EP Resource Definition Guide* for more information on their functions, and see the *NCP, SSP, and EP Resource Definition Reference* for information on how to code them.

---

### Changed Defaults

The default for the following keyword has changed.

<b>BUILD</b>	NAMTAB
<b>PU</b>	MODULO

---

### Deleted Keywords

The following keywords have been deleted.

<b>IPSUB</b>	All keywords; the IPSUB definition statement has been replaced by new keywords on the IPLOCAL definition statement.
<b>IPGATE</b>	All keywords; the IPGATE definition statement has been replaced by the IPROUTE definition statement.

---

### Changes to Controller Storage Requirements

This section describes the requirements for additional communication controller storage resulting from general changes and specific enhancements since NCP V6R3. The storage sizes in this section are approximate. Your actual storage requirements depend on your configuration. For a more accurate estimate of the storage your NCP will require, use the HONE CF3745 Configurator storage model. For more information, see the *IBM 3745 Communication Controller Configuration Program* book.

### General Program Code Storage

- Add 114 KB to general program code storage.
- Add 12 KB for IP program code storage.
- Add 27.5 KB for frame-relay program code storage if you already have frame relay defined in your NCP generation definition.
- Add 17 KB for token-ring program code storage if you have included frame relay in your generation, or 29.5 KB if you have not.
- Add an additional 12.5 KB if you use NTuneMON.



## NCP Initialization

Generation listings include a message (ICN076I) indicating how much storage NCP needs for initialization, beyond the storage that the load module displaces. Add this number to the size of the load module, obtained from the linkage editor output, to determine whether there is enough controller storage available for the buffer pool. For more information, see the *NCP, SSP, and EP Generation and Loading Guide*.

Beginning with SSP V4R8, another way to determine if there is enough controller storage available for the buffer pool is to add the ICNSIZE (MVS and VM) or IFUSIZE (VSE) job step after the linkage editor step. It will give you an estimate of how many NCP buffers will be created for your particular NCP. See the *NCP, SSP, and EP Generation and Loading Guide* and “Generation Steps” on page 67 for related VM information, “Generation Steps” on page 5 for related MVS information, or “Generation Steps” on page 169 for related VSE information.

## Dynamically Created Control Blocks

If you include the NCP function for dynamically created control blocks (DYNPOOL on the BUILD definition statement), NCP may use buffer storage to create additional control blocks as needed. This increases the amount of storage used for control blocks beyond the figures given in this section, and reduces the amount of available buffer storage. For more information on dynamically created control blocks, see the *NCP, SSP, and EP Resource Definition Guide*.

## Physical Units

NCP requires additional storage for each physical unit. To calculate the additional storage required:

- Add 84 bytes for each 3745 peripheral physical unit (PUTYPE=1 or PUTYPE=2 on the PU definition statement)
- Add 68 bytes for each 3745 subarea physical unit (PUTYPE=4 or PUTYPE=5 on the PU definition statement).
- Add 44 bytes for each ODLC peripheral physical unit (PUTYPE=1 or PUTYPE=2 on the PU definition statement)
- Add 28 bytes for each ODLC subarea physical unit (PUTYPE=4 or PUTYPE=5 on the PU definition statement).
- Add 40 bytes for each frame-relay logical ODLC PU.
- Add 36 bytes for each token-ring logical ODLC PU.

## All Lines

When migrating to NCP V7R8:

- Physical lines:
  - Add 80 bytes for each 3745 frame-relay physical line.
  - Add 60 bytes for each 3745 token-ring physical line.
  - Add 4 bytes per 3746 Model 900 token-ring physical line.
  - Add 8 bytes each for all other physical lines.
  - Add 234 bytes for each 3746 Model 900 frame-relay physical line.
- Logical lines:
  - Add 44 bytes for each frame-relay ODLC logical line.
  - Add 44 bytes for each token-ring ODLC logical line.
  - Add 44 bytes for each 3745 frame-relay subarea logical line.
  - Add 64 bytes for each 3745 frame-relay peripheral logical line.
  - Add 32 bytes for each 3745 token-ring logical line.

- Add 24 bytes for each transmission group.

**Note:** Additional storage requirements for particular line types (such as ESCON links, SDLC lines, and token-ring or frame-relay connections) are listed separately for each migration path. Remember to include these storage increases if you add new SDLC, NTRI, token-ring, frame-relay, or 3746 Model 900 resources.

### Other Control Blocks

- Add 8 bytes for each IP DLC interface.
- Add 8 bytes for each IPOWNER.
- Add 40 bytes for each resource eligible for NPA data collection.
- Add 4 bytes for each virtual route.
- Add 24 bytes for each token-ring physical line eligible for NPA data collection.
- Add 28 bytes for each frame-relay physical line eligible for NPA data collection.
- Add 32 bytes for each XRF LU session using Triple-DES encryption (via BACKUP keyword).
- Add 36 bytes for each SSCP owner.
- Add 1024 bytes when 3745 token-ring resources are included.

### Internet Routing Support

NCP requires additional storage for program code and control blocks when you include NCP internet routing functions. This section describes how to estimate the additional storage required for your configuration. The figures given here are approximate.

#### ***Program Code Storage:***

- If you include only NCP connectionless SNA transport (NCST) interfaces, the internet code size is 72 KB. At least one NCST interface is required when you include any internet support.
- If you include only NCST and Ethernet-type LAN interfaces, the internet code size is 92 KB. If your NCP already includes Ethernet-type LAN interfaces but not NCST interfaces, adding the required NCST interface increases the code size by 52 KB.
- If you include only NCST and NTRI interfaces:
  - If your NCP already includes NTRI the internet code size is 101.5 KB (72.5 KB + 12 KB IP code increase + 17 KB TR code increase).
  - If your NCP does not already include NTRI, the internet code size is 311.5 KB (282.5 KB + 12 KB IP code increase + 17 KB TR code increase).
- If you include NCST, Ethernet-type LAN, and NTRI interfaces:
  - If your NCP already includes NTRI the internet code size is 121.5KB (92.5 KB + 12 KB IP code increase + 17 KB TR code increase).
  - If your NCP does not already include NTRI, the internet code size is 331.5 KB (302.5 KB + 12 KB IP code increase + 17 KB TR code increase).
  - If your NCP already includes NCST interfaces, but not NTRI, the code size increases by 239 KB.

**Common Control Block Storage:** Add the following storage if you include internet support:

- The storage required for internet addresses is 68 times the number of IP over frame-relay interfaces, plus 32 times the value of the ARPTAB keyword on the frame-relay physical link.
- The storage required for internet routes is:

$$(ipintf + iproutes + numroute) \times 50$$

where

*ipintf* is the number of IPLOCAL definition statements.

*iproutes* is the number of IPROUTE definition statements.

*numroute* is the value of NUMROUTE on the IPOWNER definition statement.

**NCST Control Block Storage:** Add 260 bytes for each NCST logical unit (each LU definition statement under the GROUP definition statement on which you code NCST=IP).

**Ethernet-Type LAN Control Block Storage:** Add the following if you include Ethernet-type LAN interfaces:

- Add 1142 bytes for each Ethernet-type LAN physical link (each LINE definition statement on which you code ETHERNET=PHYSICAL).
- Add 4456 bytes for each Ethernet-type LAN interface (each Ethernet-type subsystem (ESS) adapter defined by ADDRESS on the LINE definition statement).

## Frame Relay

NCP requires additional storage when you include frame-relay functions (FRELAY on the GROUP definition statement). This section describes how to estimate the additional storage required for your configuration. The figures given here are approximate.

### **Program Code Storage:**

**Note:** The following storage information is for 3745 frame-relay support. See “3746 Model 900 Support” on page 10-7 for information about additional 3746 Model 900 frame-relay storage requirements.

To migrate from V6R3 to V7R8, add the following approximate amounts of storage:

- If you include only subarea links, the 3745 frame-relay code size is 84.5 KB if your NCP already includes token-ring resources. The 3745 frame-relay code size is 204.5 KB if your NCP does not already include token-ring resources.
- If you include only peripheral links, the 3745 frame-relay code size is 88.5 KB if your NCP already includes token-ring resources, and 200.5 KB if your NCP does not already include token-ring resources.

- If you include both subarea and peripheral links, the 3745 frame-relay code size is 100.5 KB if your NCP already includes token-ring resources, and 220.5 KB if your NCP does not already include token-ring resources. If your NCP already includes frame-relay subarea links, adding 3745 frame-relay peripheral links increases the frame-relay code size by 48 KB.

### **Control Block Storage:**

- Add 1065 bytes for each frame-relay logical subarea link.
- Add 1141 bytes for each frame-relay logical peripheral link.
- The storage required for each frame-relay physical link is:

$$2335 + (8 \times \text{maxdlci})$$

where *maxdlci* is the largest DLCI supported by the line. The largest DLCI is the smaller of the following values:

- 244 for a TSS line or 991 for an HPTSS line
- The value of the following expression:

$$((\text{maxframe} - \text{lmi}) / 5) + 15)$$

where

*maxframe* is the value of MAXFRAME on the LINE definition statement.

*lmi* is 17 when LMI=CCITT on the LMI PU definition statement and 18 when LMI=ANSI.

### **Performance Data Collection:**

- Add 48 bytes for each frame-relay switching subport physical unit and local management interface (LMI) physical unit defined with either of the following:
  - NPACOLL=YES on the PU definition statement
  - NPACOLL=NO and PUDR=YES on the PU definition statement
- Add 48 bytes times the value of FRSEDRPU on the PUDRPOOL definition statement if your NCP includes frame-relay switching (FRSESET definition statement).

## Frame Relay over Token Ring

NCP requires additional storage for program code and control blocks when you include NCP support for frame-relay over token-ring functions. This section describes how to estimate the additional storage required for your configuration.

**Program Code Storage:** Use only **one** of the following conditions to determine the additional program code storage:

- If your NCP generation definition previously had neither frame-relay nor token-ring support, add 260 KB to your existing program code storage.
- If your NCP generation definition previously had only frame-relay support, add 89 KB.
- If your NCP generation definition previously had only token-ring support, add 58 KB.

**Control Block Storage:**

- Add 1436 bytes for each frame-relay over token-ring port definition.
- For each NTRI frame handler logical link, add 1196 bytes plus 460 bytes times the number of frame handler subports per logical link.

**IP Over Frame Relay**

NCP requires additional storage for program code and control blocks when you include NCP support for IP over frame-relay functions. This section describes how to estimate the additional storage required for your configuration.

**Program Code Storage:** Add the following approximate amounts of storage:

- Add 247 KB to your existing program code storage if your system previously had no IP or frame-relay support.
- Add 171 KB if your system previously had only IP support.
- Add 76 KB if your system previously had only frame-relay support.
- Add 134 KB if your system previously had only token-ring support.

**Control Block Storage:** Add 2351 bytes for each frame-relay physical line.**Native Internet Protocol (IP) Over Channel**

Native IP over channel became available in NCP V7R3. Storage requirements are the same as for IP over channel with SNALINK.

**3746 Model 900 Support**

NCP requires additional storage for program code and control blocks when you include NCP support for 3746 Model 900 functions (ESCON links, SDLC lines, X.25, token-ring, frame-relay, or ISDN connections). This section describes how to estimate the additional storage required for your configuration.

**Program Code Storage:** Allocate the following approximate amounts of storage for the following conditions:

- To migrate from V6R3 to V7R8F with ISDN
  - Add 136 KB to your existing program code storage for the feature (base).
  - Add 8 KB for frame relay on the feature
  - Add 10 KB for ISDN on the feature
- To migrate from V6R3F to V7R8F with ISDN:
  - Add 13.6 KB for feature migration
  - Add 8 KB if you do not have frame relay on the 3746 Model 900
  - Add 10 KB for ISDN on the feature
- To include X.25 ODLC
  - Add 17 KB if neither frame relay nor token ring was previously included in your NCP generation definition.
  - Add 11 KB if frame relay, token ring, or both were previously included in your NCP generation definition.

Some examples may help clarify how the net code storage amounts are determined:

1. If you are adding ISDN resources and 3746 Model 900 for the first time, add the following:

10 KB for ISDN on the feature  
8 KB for frame relay on the feature  
114 KB for NCP migration (general program code storage)  
136 KB for 3746 Model 900 base

For a total of 268 KB increase in code storage requirements.

2. If you already have the 3746 Model 900 feature installed, and you want to add ISDN to the 3746 Model 900, you will need to add:

10 KB for ISDN on the feature  
8 KB for frame relay on the feature (if you do not have frame relay on the 3746 Model 900)  
114 KB for NCP migration (general program code storage)  
27.5 KB for frame relay migration (general program code storage)

For a total of 159.5 KB increase in code storage requirements.

- There will be some **reduction** in storage size if you do not continue to use NPSI after adding X.25 ODLC support. See the *X.25 NPSI Version 3 General Information* to determine this amount.

**Control Block Storage:** NCP requires additional control block storage when you define 3746 Model 900 resources. This section describes how to estimate the additional storage required for your configuration.

- If you are defining new 3746 Model 900 SDLC lines, add 1170 bytes for each line.
- If you are converting existing SDLC lines to 3746 Model 900 SDLC lines, add 658 bytes for each half-duplex line, and add 450 bytes for each duplex line.
- If you are defining new X.25 resources, add the following values:
  - (1328 bytes × the number of physical ODLC lines) + (4 bytes × the number of logical ODLC lines)
  - 1104 bytes × the number of peripheral logical lines/PUs
  - 976 bytes × the number of subarea logical lines/PUs
- If you convert existing inboard X.25 resources, you will now use NCP control blocks instead of NPSI control blocks. The net change is:
  - 296 bytes less for each peripheral logical line/PU
  - 424 bytes less for each subarea logical line/PU
- If you are defining new frame-relay frame-handler internal frame switching support:
  - For each 3746 Model 900 frame-relay full duplex physical line, add an additional 1432 bytes + (4 × *maxdlci*) where *maxdlci* is the largest DLCI supported by the line. The largest DLCI is the smaller of the following values:
    - 991
    - The value of the following expression:
$$((maxframe - lmi) / 5) + 15$$

where

*maxframe* is the value of MAXFRAME on the LINE definition statement.

*lmi* is 17 when LMI=CCITT on the LMI PU definition statement and 18 when LMI=ANSI.

- For each 3746 Model 900 frame-relay physical unit, add an additional 480 bytes.
- If you are adding frame-relay resources **other than** for the new frame-relay internal frame switching support:
  - For each 3746 Model 900 frame-relay full duplex physical line, an additional 1432 bytes + (4 × *maxdlci*) where *maxdlci* is the largest DLCI supported by the line. The largest DLCI is the smaller of the following values:
    - 991
    - The value of the following expression:
 
$$((\text{maxframe} - \text{lmi}) / 5) + 15$$
 where  
*maxframe* is the value of MAXFRAME on the LINE definition statement.  
*lmi* is 17 when LMI=CCITT on the LMI PU definition statement and 18 when LMI=ANSI.
  - For each 3746 Model 900 frame-relay half duplex logical line/PU,
    - An additional 1200 bytes if peripheral, **or**
    - An additional 1068 bytes if subarea.
  - For each 3746 Model 900 frame-relay physical unit,
    - An additional 612 bytes if peripheral, **or**
    - An additional 480 bytes if subarea.
  - If you are adding ISDN resources:
    - For each 3746 Model 900 ISDN B-channel, an additional 1432 bytes + (4 × *maxdlci*) where *maxdlci* is the largest DLCI supported by the line. The largest DLCI is the smaller of the following values:
      - 991
      - The value of the following expression:
 
$$((\text{maxframe} - \text{lmi}) / 5) + 15$$
 where  
*maxframe* is the value of MAXFRAME on the LINE definition statement.  
*lmi* is 17 when LMI=CCITT on the LMI PU definition statement, and 18 when LMI=ANSI.
    - For each 3746 Model 900 ISDN logical line/PU,
      - An additional 1200 bytes if peripheral, **or**
      - An additional 1068 bytes if subarea.
    - For each 3746 Model 900 ISDN physical unit,
      - An additional 612 bytes if peripheral, **or**
      - An additional 480 bytes if subarea.

### Spare SDLC Lines

3745-attached SDLC peripheral lines can be generated as spare lines, redefinable lines, or as neither. By generating spare and redefinable lines, you can use NTuneMON with the NTuneNCP tuning feature to enable and disable the activation of physical lines from your communication controller without regenerating and reloading NCP.

Storage requirements for spare or redefinable lines are comparable to any other SDLC line. Use the same storage values for spare lines as you do for active lines.

---

### General Updates

Make the following general updates.

#### **BUILD**

Update the VERSION keyword to generate NCP V7R8 or V7R8F.

The new ADPLIMIT keyword enables you to limit the maximum window size that NCP permits on an adaptively paced session.

A new suboperand of the BACKUP keyword specifies the number of LU sessions that support XRF with triple-DES encryption.

The CSSTIER keyword has been added to specify the usage tier level at which you are using the optional NCP Feature for 3746 Model 900 Connectivity Subsystem Support.

The HPR, HPRATT, HPRMLC, HPRMPS and HPRQLIM keywords have been added to support HPR.

The HPRSNAP keyword has been added to specify whether the snap trace function is to be enabled for APPN HPR resources.

The ISDNACC keyword has been added to specify whether the CSS is to include ISDN accounting information.

The new MINILOAD keyword facilitates the generating of a minimum-size remote load module.

The NTUNECOL keyword has been added to specify whether collection in the NCP is active for NTuneMON.

The OWNERPL keyword has been added to enable you to specify the types of unassigned logical resources that will be managed in owner-based pools.

The QSZALERT keyword has been added to support monitoring for excessive NCP buffer usage by a single resource.

The RGENLEVL keyword has been added to specify that NDF is to replace the GENLEVEL keyword value with the default date and time of the NCP generation.

The new TGTIMER keyword provides enhanced hung-TG detection.

The USGTIER keyword has changed to support updates to the NCP usage tier definitions.

The VOSDEACT keyword has been added to specify whether VR (virtual route) deactivation will be initiated when a VR goes out-of-sequence.

The VSUBNETS keyword has been added to support variable subnetting via NDF and dynamic reconfiguration.



<b>CLUSTER</b>	There are new suboperands for the FEATURE keyword to allow NCP to ignore data from an undefined 3270 BSC device.
<b>DLCI</b>	<p>The DLCI definition statement is added.</p> <p>The ID keyword specifies the DLCI(s) to which the DLCI statement's keyword parameters apply.</p> <p>The CIR keyword specifies the bandwidth management parameters to be used for a designated DLCI.</p> <p>The BALANCE keyword specifies the balancing factor to be applied to the DLCI(s) indicated by the ID keyword.</p>
<b>FRSESET</b>	The SUBPORTS keyword has been changed to allow internal frame switching between a 3746 Model 900 and NCP running on a 3745.
<b>GROUP</b>	<p>The DIAL keyword is changed to enable you to specify DIAL=YES for 3746 Model 900 frame-relay physical lines.</p> <p>The FRELAY keyword is changed to provide the IP value for the second suboperand to indicate IP resources.</p> <p>The ISDN keyword has been added to specify that this GROUP defines an ISDN physical or logical line group.</p> <p>You can now code the PHYPORT keyword on 3746 Model 900 Token-Ring logical peripheral GROUP statements to associate the logicals with one or more physicals.</p> <p>The V25DIAL keyword enables you to set the V.25 dial timer, formerly a fixed 2-minute timer, for EP lines.</p>
<b>IPOWNER</b>	<p>The IPOWNER definition statement is now optional.</p> <p>The IPOWNER definition statement has been changed to enable NCP to send NCPROUTE information directly over an IP channel.</p> <p>The INTERFACE keyword has changed to enable you to define backup NCP-NCPROUTE interfaces.</p>
<b>IROUTE</b>	The SNETMASK keyword has been added to support variable subnetting via NDF and dynamic reconfiguration.
<b>LINE</b>	<p>The new ADDIFG keyword specifies whether interframe gaps should be made larger to avoid overrun errors on adjacent adapters to which the 3746 Model 900 is transmitting.</p> <p>The BALANCE keyword has been added to enable connection balancing for NTRI physical lines and the 3746 Model 900.</p> <p>The CCLID keyword has been changed to pass the X.21 calling/called line ID (CCLID) to VTAM without the need for an additional product such as X.21 SH/MPS.</p> <p>The CIR keyword is added to specify whether the Committed Information Rate (CIR) algorithms will be used for bandwidth management.</p> <p>The CLLM keyword is added to specify whether Consolidated Link Layer Management (CLLM) will be used.</p> <p>The COMRATE keyword has been changed to specify the relative transmit priority of a frame-relay resource, that is, TESP or FHSP. The COMRATE keyword, together with the DATBLK keyword, is used to determine a relative priority among all frame-relay resources associated with the same physical line.</p>

## Migrating from NCP Version 6 Release 3

The CRATEDLY keyword has been added to specify the COMRATE delay threshold in seconds for the 3746 Model 900.

The new DATBLK keyword specifies the minimum guaranteed transmission bandwidth in bytes allocated to a frame-relay resource. The DATBLK keyword, together with the COMRATE keyword, is used to determine a relative priority among all frame-relay resources associated with the same physical line.

The DSCRDDL keyword has been added to specify the discard delay threshold in seconds for the 3746 Model 900.

The DYNWIND keyword has been changed to enable you to control delays that NCP uses when manipulating the working window for 3745 FRTE stations during congestion.

The DYNWIND keyword has changed to allow additional values for the *dw* and *dwc* suboperands for frame relay and ISDN lines.

By coding the second and third suboperands of the DYNWIND keyword (*dw* and *dwc*), you can now control the amount by which the working window is decreased when frame loss or congestion occurs for 3745 Token-Ring resources.

The *mww* suboperand is added to the DYNWIND keyword to provide a minimum user-specified working window value for frame relay.

The FEATURE keyword has been changed to provide LRC8 error checking for EP BSC USASCII lines running in transparent mode.

The FRRATES keyword has been added to enable setting the relative priorities for types of traffic (SNA, IP, and Frame Handler) supported by a 3745 frame-relay physical line.

The FRSPRI keyword has been added to specify the relative service priority for 3746 Model 900 attached frame-relay stations and ISDN logical stations.

The HLOQSTOP keyword has been added to specify the maximum size of the 3746 Model 900 physical line hardware queue.

The ISDNLPN and ISDNLSA keywords have been added to support ISDN.

The ISDNCALL, ISDNRPN, and ISDNRSA keywords have been added to support frame-relay dial backup over ISDN.

The LOCADD keyword has been changed to enable you to specify the destination service access point (DSAP) and medium access control point (MAC) for 3746 Model 900 frame-relay logical connections to remote token-ring-capable type 4 physical units.

The MAXDLCI keyword has been added to enable you to limit the DLCI range supported by frame-relay physical lines, NTRI frame handler logical lines and ISDN B-channels.

MAXPU, which previously allowed a maximum of 16 ESCON stations, now allows a maximum of 32 ESCON stations.

The MLTGPRI keyword is changed so that it can be coded for switched PUs in the VTAM switched major node, with the appropriate level of VTAM.

The QSIZE keyword has been added to specify the 3746 Model 900 software queue size threshold.

The QSIZEDE keyword has been added to specify the 3746 Model 900 software queue discard eligibility threshold

The RETRIES keyword has been changed to enable you to indicate a consecutive error threshold for 3745 frame-relay physical lines.

The SERVLIM keyword has been changed to allow another way to specify how frequently NCP should interrupt its regular scans of the service order table to make a special scan.

TAKEOVER, a new keyword on the LINE statement, enables you to force takeover of an EP line from another host.

The new TITIMER keyword defines the inactivity timer (TI) value for all logical connections on a token-ring or frame-relay physical line.

The TRANSBUF keyword is added to specify the maximum number of frames that will be queued for a TSS or HPTSS adapter awaiting transmission over a 3745 frame-relay physical line.

### OPTIONS

The TUSGTIER keyword has changed to support updates to the NCP usage tier definitions.

### PU

The ADDR keyword has been changed to enable you to specify the destination service access point (DSAP) and medium access control point (MAC) for 3746 Model 900 frame-relay logical connections to remote token-ring-capable type 4 physical units.

The FRSPRI keyword has been added to specify the relative service priority for 3746 Model 900 attached frame-relay stations and ISDN logical stations.

The new INNPOR keyword specifies whether a type 1 physical unit is to remain active when a VTAM HALT or VARY INACT command is issued. INNPOR was formerly a VTAM-only keyword.

The IPQLIM keyword has been added to specify the maximum amount of data that can be queued on a frame-relay internet outbound queue.

The ISDNCFG and ISDNDSCT keywords have been added to support ISDN.

The LLERP keyword has been added to specify whether the link station will perform link level error recovery procedures (ERP) when sending HPR data.

The LMI keyword has changed as part of the new support for switched frame-relay physical lines.

The MAXDATA keyword value for switched subarea PUs is obtained from VTAM and no longer from NCP. If you code the MAXDATA keyword for a switched subarea PU, you must code it on the PU definition statement in the VTAM switched major node because NCP no longer uses the MAXDATA value coded in the NCP generation definition.

The MODULO keyword default has changed.

The PIUCHECK keyword is added to specify whether checksum validation is performed on PIUs sent and received by the subarea station.

The RETRIES keyword has been changed to enable you to indicate a consecutive error threshold for 3745 frame-relay physical lines.

The SNETMASK keyword has been added to enable subnetwork mask specification for channel and frame-relay internet resources.

The SSAP keyword has been added to allow duplicate TIC addressing for token-ring logical subarea connections.

## Migrating from NCP Version 6 Release 3

The TGCONF keyword is changed so that it can be coded for switched PUs in the VTAM switched major node, with the appropriate level of VTAM.

The TGONF keyword has been changed to enable you to designate standby subarea stations for congestion relief in MLTGs.

The UNIQUE keyword has been added to specify whether a Token Ring's logical subarea station's destination MAC address is a unique locally administered address.

The XMONLNK keyword is changed so that XMONLNK=YES and DIAL=YES are compatible when FRELAY=(PHYSICAL,SUBAREA) or FRELAY=(PHYSICAL,ANY).

### SDLCST

The SERVLIM keyword has been changed to allow another way to specify how frequently NCP should interrupt its regular scans of the service order table to make a special scan.

### SWMMT

The MAXDATA keyword has been added to enable you to specify the maximum frame size.

---

## VTAM Updates

For detailed explanations of VTAM-only definition statements and keywords, or for information on how to code them, see the *VTAM Resource Definition Reference*.

### PATH

For the definition of a switched major node, the new DLCADDR keyword replaces the DIALNO keyword for specifying dial information.

### GROUP

The following VTAM-only keywords have been added:

NATIVE  
VNGROUP  
VNNAME

### LINE

The following VTAM-only keywords have been added:

NATIVE  
VNGROUP  
VNNAME

### PU

The following VTAM-only keyword has been added:

NATIVE

---

## Program Generation Characteristics

Table 10-1 shows the locations in the *NCP, SSP, and EP Resource Definition Guide* where you will find descriptions of the functions added in V7R8, V7R7, V7R6, V7R5, V7R4, and V7R3.

*Table 10-1 (Page 1 of 4). New Functions Added in V7R8, V7R7, V7R6, V7R5, V7R4, and V7R3*

Function	Location
EP Line Takeover	"Line Characteristics" on page 21-12
EP Shorten V25 BIS Dial Timer	"Timeouts" on page 20-7
Logical Line Pool Sharing for TIC3 Connections	"Unassigned Logical Line Pools" on page 6-23

Table 10-1 (Page 2 of 4). New Functions Added in V7R8, V7R7, V7R6, V7R5, V7R4, and V7R3

Function	Location
Enhanced Hung TG Detection	"Monitoring Transmission Group Performance" on page 23-18
Facilitate Minimum-Sized Remote Load Module	"Defining the NCP Environment" on page 2-5
Ignore Data from Undefined 3270 BSC Device	the new function of the FEATURE keyword on page 5-28
3746 Model 900 TIC3 Connection Balancing	the description of the BALANCE keyword on page 6-8
3746 Model 900 Frame Relay BAN Connection Balancing	BALANCE keyword on the DLCI statement on page 16-14
Enhanced Control of the Dynamic Working Window for 3745 Token Ring	the description of the DYNWIND keyword on page 6-42
Enhanced Control of Adaptive Session Pacing	"Defining Session Pacing" on page 24-6
Specifying a Minimum Working Window for 3745 Frame Relay	the description of the DYNWIND keyword on page 16-15
LRC8 Error Checking for EP BSC USASCII	"Devices" on page 20-5
Specifying the number of frames queued for a TSS or HPTSS adapter	TRANSBUF keyword on the LINE definition statement on page 16-13
Committed information rate (CIR) on NCP controlled 3746 Model 900 frame-relay and ISDN lines	CIR keyword on the LINE definition statement on page 16-76 CIR keyword on the DLCI definition statement on page 16-13
Remote access to NCPROUTE in the absence of SNALINK	Exception to P2PDEST/HOSTADDR Matching on page 15-7
Connection balancing of frame-relay boundary access node (BAN) connections over 3745 frame-relay DLCIs	BALANCE keyword on the DLCI statement on page 16-14
IP supports for switched frame-relay lines	"Defining Frame-Relay Attachments for IP" on page 15-44
3746 Model 900 switched frame-relay physical lines	Figure 16-45 on page 16-94
PIU checksum support	PIUCHECK keyword on the PU definition statement on page 24-9
Defining an ISDN backup line for a frame-relay line	"Defining Automatic Frame-Relay Backup over an ISDN"
Defining backup NCP-NCPROUTE IP interfaces	"Backup IP Channel Interfaces"
Connection balancing for NTRI physical lines	the description of the BALANCE keyword on page 6-8
Limiting the DLCI range for an ISDN B-channel line	MAXDLCI on the LINE definition statement on page 7-7
New way that NCP determines link capacity and transmission time	SPEED keyword related to VTAM topology CAPACITY keyword on page 8-21
Allocating unassigned logical resources to owner-based pools	"Allocating Unassigned Logical Line Pools to Owners"

Table 10-1 (Page 3 of 4). New Functions Added in V7R8, V7R7, V7R6, V7R5, V7R4, and V7R3

Function	Location
Defining an internal NCP to Model 900 point-to-point IP connection	"Defining an Internal NCP to Model 900 Point-to-Point IP Connection"
Defining ISDN subarea connectivity through a terminal adapter or a BAN device	"Defining ISDN Subarea Connectivity through a Terminal Adapter or BAN Device"
Defining relative priorities for the types (SNA, IP, and frame handler) of traffic supported by a 3745 frame-relay physical line	FRRATES on the LINE Definition Statement on page 16-11
New usage tier options	"Usage Tiers"
Defining variable subnetting for an IP route or an IP interface	"Defining Routes Explicitly"
Monitoring for excessive buffer usage by a peripheral resource	"Monitoring for Excessive Buffer Usage by a Peripheral Resource"
Specifying Token-Ring destination MAC address uniqueness	Reference to the UNIQUE keyword on page 6-31
Defining switched frame-relay 3745 physical lines	"Defining Switched Frame-Relay Physical Lines"
Controlling VR deactivation when a VR goes out-of-sequence	"Deactivating an Out-of-Sequence Virtual Route"
Integrated Services Digital Network (ISDN) Primary Rate Adapter	Chapter 7, "Integrated Services Digital Network (ISDN) Resources"
Duplicate TIC Addressing for Token-Ring	"Duplicate TIC Addressing"
Hot Standby for Multiple Link Transmission Groups (MLTGs)	"Multilink Transmission Groups"
Boundary Access Node (BAN) for Frame-Relay (FR) Subarea Links	"Boundary Access Node (BAN) for Frame-Relay Subarea Links"
Frame Relay Inoperative 'Error Count' Management Upgrades	"Defining Frame-Relay Physical Lines"
Enhanced Dynamic Windowing Algorithm for 3745 Frame Relay Logical Lines	"Defining Frame-Relay Physical Lines"
Port Sharing for NCP and 3746-900	"Shared 3746 Model 900 Resources between an NCP and 3746 Model 900"
Added flexibility in coding the ADDIFG keyword	"Controlling Adapter Overrun Errors"
X.25 ODLC resource definitions in an X.25 packet switching environment	"NDF-Generated Definition File"
Frame relay internal frame switching support	"Defining Frame Handler Connections," "3746 Model 900 Frame Relay"
Direct NCPROUTE information over an IP channel	"Definition Statements for NCP Internet Resources"
Dialing out to frame-relay BAN devices using non-extended dial digits	"Defining Peripheral Device Addresses to VTAM"
Non-error recovery procedures for 3746 Model 900 token-ring logical stations	"Defining the Characteristics of HPR-Capable Links"
Frame relay IP connections in internet sub-networks	"Defining Frame-Relay Attachments for IP"

Table 10-1 (Page 4 of 4). New Functions Added in V7R8, V7R7, V7R6, V7R5, V7R4, and V7R3

Function	Location
HPR snap trace diagnostic information for APPN HPR	"NCP and VTAM As a Composite Type 2.1 Node," and "Diagnostic Tests and Traces"
APPN HPR	Chapter 8, "Type 2.1 Node Support"
Frame relay over token ring	"Defining NTRI Attachments for a Frame-Relay Network" in Chapter 16, "Frame-Relay Resources"
IP over frame relay	"Defining Frame-Relay Attachments for IP" in Chapter 15, "Internet Resources"
IP over channel	"Defining 370 I/O Channels for IP" in Chapter 15, "Internet Resources"
Frame-relay BAN support	"Defining Frame-Relay Logical Peripheral Lines" in Chapter 16, "Frame-Relay Resources"
Hot standby MLTGs	"Multilink Transmission Groups" in Chapter 16, "Frame-Relay Resources"

## General Considerations

- The PASSLIM keyword can no longer be coded for token-ring physical units. The COMRATE keyword should now be used. Refer to the *NCP, SSP, and EP Resource Definition Guide*, NTRI on page 6-12 for details. The Migration Aid will delete PASSLIM on token-ring PUs.
- Code HPR=NO on the BUILD definition if you do not want to use the HPR function. This will block HPR connections from being established, and will prevent the unique HPR modules from being included. This will decrease the NCP load module size.
- The DLCI keyword has been added. It allows the coding of 10-bit DLCIs. This allows frame-relay connections to use the full range of DLCIs (up to 991).
- The SPEED keyword may now be coded on the LINE definition statement for all channel types. With the exception of ESCON, NCP does not use this value. This capability was added so this value is available to NETDA/2 and NTuneMON.
- NDF will allow DYNWIND specification on the logical GROUP, LINE, and PU statements for frame-relay logical subarea and token-ring logical subarea resources. NDF will also accept DYNWIND specification on the physical GROUP, LINE, and PU statements. This will allow you to specify a unique DYNWIND value for each physical unit.

## NCP Migration Aid

If you are using the NCP migration aid, make the following updates.

### OPTIONS

Changed keywords:

TMODEL  
TVERSION

Code the TOCONV keyword if you want to consolidate the LOCALTO and REMOTTO keywords into the T1TIMER keyword.

Code the ADDRCONV keyword if you want to use the DLCI keyword instead of the ADDR keyword on your frame-relay lines.

### Dynamically Created Control Blocks

NCP can dynamically create certain control blocks and table entries when NCP needs more than are defined in your generation definition. This enables you to provide temporary resources for high-use situations without permanently allocating NCP storage for those resources.

**Note:** Using these dynamically created resources can degrade NCP performance, so it is recommended that you define all the resources you expect to need in your generation definition and use this function only to handle unexpected demand.

To use this function, make the following updates.

#### BUILD

The new DYNNSC keyword specifies how many NPM session counter control blocks (NSCs) NCP can create dynamically.

The new DYNNSX keyword specifies how many NSC extensions NCP can create dynamically.

The new DYNPOOL keyword specifies how much controller buffer storage NCP can use for dynamically created control blocks, and defines a dynamic resource alert threshold.

Changed keywords:

BACKUP  
BFRS  
GWSESAC  
SESSACC

### Logical Line Timer Enhancement

NCP maintains a timer for a NTRI or frame-relay logical line only when the line is active, which improves NCP performance. You do not need to update your generation definition to use this enhancement.

#### GROUP

The TIMER keyword is ignored for NTRI and frame-relay logical lines.

---

## Internet Protocol

The definition of NCP internet resources has changed since NCP V6R3. For a detailed description of the process for migrating NCP V6R3 internet resources to NCP V7R8, see the *NCP, SSP, and EP Resource Definition Guide*.

### Dynamic Internet Routing

NCP internet routing can be dynamically controlled by NCPROUTE, a server that runs in the owning IBM Transmission Control Protocol/Internet Protocol (TCP/IP) host.<sup>1</sup> NCPROUTE receives internet routing changes through Routing Information Protocol (RIP) datagrams from other internet hosts and communicates these changes to NCP.

---

<sup>1</sup> For information on which IBM TCP/IP product releases and operating systems support NCPROUTE, see the IBM TCP/IP documentation for your host operating system.



**Note:** For dynamic control of NCP internet routing, the Ethernet-type subsystem (ESS) adapter in your controller must have one of the following microcode levels:

- C38006 for the IBM 3745 Models 130, 150, 160, and 170
- C37967 for the IBM 3745 Models 210, 310, 410, and 610
- D39888 for the IBM 3745 Models 21A, 31A, 41A, and 61A.
- D40002 for the IBM 3745 Models 17A.

To use dynamic internet routing, make the following updates.

<b>BUILD</b>	The new IPSNAP keyword activates the NCP snap trace for internet resources.
<b>IHOST</b>	<p>The new IHOST definition statement defines an internet host on an Ethernet-type LAN or NTRI-attached token ring.</p> <p>The new HDWADDR keyword specifies the hardware address of the internet host.</p> <p>The new IPADDR keyword specifies the internet address of the internet host.</p> <p>The new LANTYPE keyword (for Ethernet type LANs only) specifies the type of frame format the host supports.</p>
<b>IPOWNER</b>	<p>The new IPOWNER definition statement defines the internet address of the owning IBM TCP/IP host and a route to the host.</p> <p>The new HOSTADDR keyword specifies the internet address of the owning host.</p> <p>The new INTERFACE keyword specifies the local NCST interface to the owning host.</p> <p>The new MAXHELLO keyword specifies how many <i>Hello</i> datagrams NCP is to send to the owning host without receiving an acknowledgment.</p> <p>The new NUMROUTE keyword specifies how many routes the owning host can add beyond the number defined in your generation definition.</p> <p>The new UDPPORT keyword specifies the User Datagram Protocol port address the owning host will use to communicate with NCP.</p>
<b>IPLOCAL</b>	<p>The IPLOCAL definition statement defines an internet route to a locally attached NCST logical unit, Ethernet-type LAN, or NTRI-attached token ring.</p> <p>The new METRIC keyword assigns a metric to the interface to enable NCPROUTE to select the most desirable route to a destination.</p> <p>The new P2PDEST keyword for NCST connections specifies the internet address of the host that contains the remote NCST logical unit.</p> <p>The new PROTOCOL keyword specifies whether the interface is to be managed by NCPROUTE through RIP.</p> <p>The new SNETMASK keyword defines a mask that identifies the subnetwork portion of the address specified by LADDR.</p> <p>Changed keywords:</p> <p style="margin-left: 40px;">INTERFACE</p> <p style="margin-left: 40px;">LADDR</p>
<b>IPSUB</b>	The IPSUB definition statement and its keywords have been replaced by new keywords on the IPLOCAL definition statement.
<b>IPGATE</b>	The IPGATE definition statement has been replaced by the IPRROUTE definition statement.

## Migrating from NCP Version 6 Release 3

<b>IPROUTE</b>	<p>The new IPROUTE definition statement defines a route to a network, subnetwork, or internet host.</p> <p>The new DESTADDR keyword specifies the internet address of the destination network, subnetwork, or internet host.</p> <p>The new DISP keyword specifies whether NCPROUTE can dynamically delete or change the route.</p> <p>The new HOSTRT keyword specifies whether the route is to a host or to a subnetwork or network.</p> <p>The new INTFACE keyword identifies which internet router interface provides the route to the destination.</p> <p>The new METRIC keyword assigns a metric to the route to enable NCPROUTE to select the most desirable route to a destination.</p> <p>The new NEXTADDR keyword identifies the internet address of the next internet router on the route.</p>
----------------	--

## Internet Routing over NTRI-Attached Token Rings

NCP can route internet traffic over token rings attached to NCP through NTRI. NCP can route both SNA and internet traffic over the same NTRI attachment. To route internet traffic over a NTRI-attached token ring, make the following updates.

<b>LINE</b>	<p>Changed keywords:</p> <ul style="list-style-type: none"><li>INTERFACE</li><li>LOCADD</li><li>MAXPU</li></ul>
<b>PU</b>	<p>The new NETWORK keyword specifies whether the network represented by the PU definition statement will be used for SNA or internet traffic.</p> <p>Changed keywords:</p> <ul style="list-style-type: none"><li>ADDR</li><li>ANS</li><li>ARPTAB</li><li>PASSLIM</li></ul>

---

## Frame Relay

### Frame-Relay Peripheral Links

You can attach peripheral nodes (type 2 or type 2.1 physical units) to NCP through a frame-relay network. A single HPTSS physical line can carry traffic for both peripheral and subarea nodes as well as frame-relay frame handler (FRFH) traffic.

To define frame-relay peripheral links, make the following updates.

<b>GROUP</b>	<p>Changed keywords:</p> <ul style="list-style-type: none"><li>AUTOGEN</li><li>FRELAY</li><li>PHYSRSC</li></ul>
--------------	---

**LINE** Changed keywords:  
 LSPRI  
 PORTADD

### 3746 Model 900 Frame Relay

The 3746 Model 900 supports attachment to a frame-relay network. Support for frame relay on the 3746 Model 900 is the same as support for frame relay on the 3745 with the following exception:

- The PHYSRSC, ADDRESS, and PORTADD keywords may need to be changed.

**FRSESET** Changed keywords:  
 SUBPORTS

**GROUP** Changed keyword:  
 PHYSRSC

**LINE** Changed keywords:  
 MAXPU  
 PORTADD  
 SPEED  
 T2TIMER

**PU** Changed keywords:  
 ADDR

### 3745 Frame-Relay Keywords Not Used for 3746 Model 900 Frame Relay

You may have used some of the following keywords to define 3745 frame-relay support. You do not need to define these keywords for 3746 Model 900 frame-relay support. If you do define them, they are ignored (except for SRT, which is not valid).

**GENEND** INIT  
 TMRTICK  
 UGLOBAL

**GROUP** COMPACB  
 COMPOWN  
 COMPSWP  
 LEVEL2  
 LEVEL3  
 LEVEL5  
 LINEADD  
 XIO  
 XMITDLY

**LINE** UACB

**PU** SRT (not valid)

**PUDRPOOL** FRSEDRPU

### Spare SDLC Lines

3745-attached SDLC peripheral lines can be generated as spare lines, redefinable lines, or as neither. By generating spare and redefinable lines, you can use NTuneMON with NTuneNCP to enable and disable the activation of physical lines from your communication controller without regenerating and reloading NCP.

**Note:** To be spare or redefinable, a line must be the only line in its group.

To use this function, make the following updates.

#### LINE

Changed keyword:

USE

---

## Chapter 11. Migrating from NCP Version 6 Release 2

Changed Defaults	11-2
Deleted Keywords	11-2
Changes to Controller Storage Requirements	11-2
General Program Code Storage	11-2
NCP Initialization	11-3
Dynamically Created Control Blocks	11-3
Physical Units	11-3
All Lines	11-3
Other Control Blocks	11-4
Internet Routing Support	11-4
Frame Relay	11-5
Frame Relay over Token Ring	11-6
IP over Frame Relay	11-7
Native Internet Protocol (IP) Over Channel	11-7
3746 Model 900 Support	11-7
Advanced Peer-to-Peer Networking High Performance Routing (APPN HPR)	11-10
Spare SDLC Lines	11-12
General Updates	11-12
VTAM Updates	11-16
Program Generation Characteristics	11-17
General Considerations	11-19
NCP Migration Aid	11-20
Dynamically Created Control Blocks	11-20
Logical Line Timer Enhancement	11-20
NCP and Link-Attached Devices	11-21
3746 Model 900 Connectivity Subsystem SDLC Lines	11-21
Spare SDLC Lines	11-21
Internet Protocol	11-21
Dynamic Internet Routing	11-21
Internet Routing over NTRI-Attached Token Rings	11-23
Frame Relay	11-24
Frame-Relay Peripheral Links	11-24
3746 Model 900 Frame-Relay Support	11-24

To migrate from NCP Version 6 Release 2 (V6R2) to NCP V7R8, you need to update your NCP V6R2 generation definition so that it will generate NCP V7R8. In addition, you may want to change the generation definition to include functions added to NCP since NCP V6R2. This chapter lists the definition statements and keywords you need to change, add, or delete for either of these purposes.

**Migrating to a New Host System or Hardware:** If you are migrating to a different host operating system or communication controller model or to a type 7 channel adapter, read Chapter 2 to see which keywords you need to change for your new host system or hardware before you begin migrating to NCP V7R8.

**Using the NCP Migration Aid Function:** The NCP migration aid is an NDF function that simplifies the migration task by automatically making most of the changes required to migrate to NCP V7R8. You should consider using the

migration aid before using the information in this chapter. For more information on using the migration aid, see Chapter 1.

Under each topic in this chapter, definition statements are listed in the order in which they appear in a generation definition. You can code certain keywords on more than one definition statement. This book describes each keyword on the lowest-level definition statement on which it can be coded.

After you have identified the definition statements and keywords that you need to change, add, or delete, see the *NCP, SSP, and EP Resource Definition Guide* for more information on their functions, and see the *NCP, SSP, and EP Resource Definition Reference* for information on how to code them.

---

### Changed Defaults

The defaults for the following keywords have changed.

<b>BUILD</b>	NAMTAB
<b>LINE</b>	CA
<b>PU</b>	MODULO

---

### Deleted Keywords

The following keywords have been deleted.

<b>IPSUB</b>	All keywords; the IPSUB definition statement has been replaced by new keywords on the IPLOCAL definition statement.
<b>IPGATE</b>	All keywords; the IPGATE definition statement has been replaced by the IPROUTE definition statement.

---

### Changes to Controller Storage Requirements

This section describes the requirements for additional communication controller storage resulting from general changes and specific enhancements since NCP V6R2. The storage sizes in this section are approximate. Your actual storage requirements depend on your configuration. For a more accurate estimate of the storage your NCP will require, use the HONE CF3745 Configurator storage model. For more information, see the *IBM 3745 Communication Controller Configuration Program* book.

### General Program Code Storage

- Add 114 KB to general program code storage.
- Add 12 KB for IP program code storage.
- Add 27.5 KB for frame-relay program code storage if you already have frame relay defined in your NCP generation definition.
- Add 17 KB for token-ring program code storage if you have included frame relay in your generation, or 29.5 KB if you have not.
- Add an additional 12.5 KB if you use NTuneMON.

## NCP Initialization

Generation listings include a message (ICN0761) indicating how much storage NCP needs for initialization, beyond the storage that the load module displaces. Add this number to the size of the load module, obtained from the linkage editor output, to determine whether there is enough controller storage available for the buffer pool. For more information, see the *NCP, SSP, and EP Generation and Loading Guide*.

Beginning with SSP V4R8, another way to determine if there is enough controller storage available for the buffer pool is to add the ICNSIZE (MVS and VM) or IFUSIZE (VSE) job step after the linkage editor step. It will give you an estimate of how many NCP buffers will be created for your particular NCP. See the *NCP, SSP, and EP Generation and Loading Guide* and “Generation Steps” on page 67 for related VM information, “Generation Steps” on page 5 for related MVS information, or “Generation Steps” on page 169 for related VSE information.

## Dynamically Created Control Blocks

If you include the NCP function for dynamically created control blocks (DYNPOOL on the BUILD definition statement), NCP may use buffer storage to create additional control blocks as needed. This increases the amount of storage used for control blocks beyond the figures given in this section, and reduces the amount of available buffer storage. For more information on dynamically created control blocks, see the *NCP, SSP, and EP Resource Definition Guide*.

## Physical Units

NCP requires additional storage for each physical unit. To calculate the additional storage required:

- Add 84 bytes for each 3745 peripheral physical unit (PUTYPE=1 or PUTYPE=2 on the PU definition statement)
- Add 68 bytes for each 3745 subarea physical unit (PUTYPE=4 or PUTYPE=5 on the PU definition statement).
- Add 44 bytes for each ODLC peripheral physical unit (PUTYPE=1 or PUTYPE=2 on the PU definition statement)
- Add 28 bytes for each ODLC subarea physical unit (PUTYPE=4 or PUTYPE=5 on the PU definition statement).
- Add 40 bytes for each frame-relay logical ODLC PU.
- Add 36 bytes for each token-ring logical ODLC PU.

## All Lines

When migrating to NCP V7R8:

- Physical lines:
  - Add 80 bytes for each 3745 frame-relay physical line.
  - Add 60 bytes for each 3745 token-ring physical line.
  - Add 4 bytes per 3746 Model 900 token-ring physical line.
  - Add 8 bytes each for all other physical lines.
  - Add 234 bytes for each 3746 Model 900 frame-relay physical line.
- Logical lines:
  - Add 44 bytes for each frame-relay ODLC logical line.
  - Add 44 bytes for each token-ring ODLC logical line.
  - Add 44 bytes for each 3745 frame-relay subarea logical line.
  - Add 64 bytes for each 3745 frame-relay peripheral logical line.
  - Add 32 bytes for each 3745 token-ring logical line.

## Migrating from NCP Version 6 Release 2

- Add 24 bytes for each transmission group.

**Note:** Additional storage requirements for particular line types (such as ESCON links, SDLC lines, and token-ring or frame-relay connections) are listed separately for each migration path. Remember to include these storage increases if you add new SDLC, NTRI, token-ring, frame-relay, or 3746 Model 900 resources.

### Other Control Blocks

- Add 8 bytes for each IP DLC interface.
- Add 8 bytes for each IPOWNER.
- Add 40 bytes for each resource eligible for NPA data collection.
- Add 4 bytes for each virtual route.
- Add 24 bytes for each token-ring physical line eligible for NPA data collection.
- Add 28 bytes for each frame-relay physical line eligible for NPA data collection.
- Add 32 bytes for each XRF LU session using Triple-DES encryption (via BACKUP keyword).
- Add 36 bytes for each SSCP owner.
- Add 1024 bytes when 3745 token-ring resources are included.

### Internet Routing Support

NCP requires additional storage for program code and control blocks when you include NCP internet routing functions. This section describes how to estimate the additional storage required for your configuration. The figures given here are approximate.

#### ***Program Code Storage:***

- If you include only NCP connectionless SNA transport (NCST) interfaces, the internet code size is 72 KB. At least one NCST interface is required when you include any internet support.
- If you include only NCST and Ethernet-type LAN interfaces, the internet code size is 92 KB. If your NCP already includes Ethernet-type LAN interfaces but not NCST interfaces, adding the required NCST interface increases the code size by 52 KB.
- If you include only NCST and NTRI interfaces:
  - If your NCP already includes NTRI the internet code size is 101.5 KB (72.5 KB + 12 KB IP code increase + 17 KB TR code increase).
  - If your NCP does not already include NTRI, the internet code size is 311.5KB (282.5 KB + 12 KB IP code increase + 17 KB TR code increase).
- If you include NCST, Ethernet-type LAN, and NTRI interfaces:
  - If your NCP already includes NTRI the internet code size is 121.5KB (92.5 KB + 12 KB IP code increase + 17 KB TR code increase).
  - If your NCP does not already include NTRI, the internet code size is 331.5KB (302.5 KB + 12 KB IP code increase + 17 KB TR code increase).
  - If your NCP already includes NCST interfaces, but not NTRI, the code size increases by 239 KB.



**Common Control Block Storage:** Add the following storage if you include internet support:

- The storage required for internet addresses is 68 times the number of IP over frame-relay interfaces, plus 32 times the value of the ARPTAB keyword on the frame-relay physical link.
- The storage required for internet routes is:

$$(ipintf + iproutes + numroute) \times 50$$

where

*ipintf* is the number of IPLOCAL definition statements.

*iproutes* is the number of IPRROUTE definition statements.

*numroute* is the value of NUMROUTE on the IPOWNER definition statement.

**NCST Control Block Storage:** Add 260 bytes for each NCST logical unit (each LU definition statement under the GROUP definition statement on which you code NCST=IP).

**Ethernet-Type LAN Control Block Storage:** Add the following if you include Ethernet-type LAN interfaces:

- Add 1142 bytes for each Ethernet-type LAN physical link (each LINE definition statement on which you code ETHERNET=PHYSICAL).
- Add 4456 bytes for each Ethernet-type LAN interface (each Ethernet-type subsystem (ESS) adapter defined by ADDRESS on the LINE definition statement).

## Frame Relay

NCP requires additional storage when you include frame-relay functions (FRELAY on the GROUP definition statement). This section describes how to estimate the additional storage required for your configuration. The figures given here are approximate.

### **Program Code Storage:**

**Note:** The following storage information is for 3745 frame-relay support. See “3746 Model 900 Support” on page 11-7 for information about additional 3746 Model 900 frame-relay storage requirements.

To migrate from V6R2 to V7R8, add the following approximate amounts of storage:

- If you include only subarea links, the 3745 frame-relay code size is 84.5 KB if your NCP already includes token-ring resources. The 3745 frame-relay code size is 204.5 KB if your NCP does not already include token-ring resources.
- If you include only peripheral links, the 3745 frame-relay code size is 88.5 KB if your NCP already includes token-ring resources, and 200.5 KB if your NCP does not already include token-ring resources.

- If you include both subarea and peripheral links, the 3745 frame-relay code size is 100.5 KB if your NCP already includes token-ring resources, and 220.5 KB if your NCP does not already include token-ring resources. If your NCP already includes frame-relay subarea links, adding 3745 frame-relay peripheral links increases the frame-relay code size by 48 KB.

### **Control Block Storage:**

- Add 1065 bytes for each frame-relay logical subarea link.
- Add 1141 bytes for each frame-relay logical peripheral link.
- The storage required for each frame-relay physical link is:

$$2355 + (8 \times \text{maxdlci})$$

where *maxdlci* is the largest DLCI supported by the line. The largest DLCI is the smaller of the following values:

- 244 for a TSS line or 991 for an HPTSS line
- The value of the following expression:

$$((\text{maxframe} - \text{lmi}) / 5) + 15)$$

where

*maxframe* is the value of MAXFRAME on the LINE definition statement.

*lmi* is 17 when LMI=CCITT on the LMI PU definition statement and 18 when LMI=ANSI.

### **Performance Data Collection:**

- Add 48 bytes for each frame-relay switching subport physical unit and local management interface (LMI) physical unit defined with either of the following:
  - NPACOLL=YES on the PU definition statement
  - NPACOLL=NO and PUDR=YES on the PU definition statement
- Add 48 bytes times the value of FRSEDRPU on the PUDRPOOL definition statement if your NCP includes frame-relay switching (FRSESET definition statement).

## Frame Relay over Token Ring

NCP requires additional storage for program code and control blocks when you include NCP support for frame-relay over token-ring functions. This section describes how to estimate the additional storage required for your configuration.

**Program Code Storage:** Use only **one** of the following conditions to determine the additional program code storage:

- If your NCP generation definition previously had neither frame-relay nor token-ring support, add 260 KB to your existing program code storage.
- If your NCP generation definition previously had only frame-relay support, add 89 KB.
- If your NCP generation definition previously had only token-ring support, add 58 KB.

**Control Block Storage:**

- Add 1436 bytes for each frame-relay over token-ring port definition.
- For each NTRI frame handler logical link, add 1196 bytes plus 460 bytes times the number of frame handler subports per logical link.

**IP over Frame Relay**

NCP requires additional storage for program code and control blocks when you include NCP support for IP over frame-relay functions. This section describes how to estimate the additional storage required for your configuration.

**Program Code Storage:** Add the following approximate amounts of storage:

- Add 247 KB to your existing program code storage if your system previously had no IP or frame-relay support.
- Add 171 KB if your system previously had only IP support.
- Add 76 KB if your system previously had only frame-relay support.
- Add 134 KB if your system previously had only token-ring support.

**Control Block Storage:** Add 2351 bytes for each frame-relay physical line.**Native Internet Protocol (IP) Over Channel**

Native IP over channel became available in NCP V7R3. Storage requirements are the same as for IP over channel with SNALINK.

**3746 Model 900 Support**

NCP requires additional storage for program code and control blocks when you include NCP support for 3746 Model 900 functions (ESCON links, SDLC lines, X.25, token-ring, frame-relay, or ISDN connections). This section describes how to estimate the additional storage required for your configuration.

**Program Code Storage:** Allocate the following approximate amounts of storage for the following conditions:

- To migrate from V6R2 to V7R8F with ISDN
  - Add 136 KB to your existing program code storage for the feature (base).
  - Add 8 KB for frame relay on the feature
  - Add 10 KB for ISDN on the feature
- To migrate from V6R2F to V7R8F with ISDN:
  - Add 13.6 KB for feature migration
  - Add 8 KB if you do not have frame relay on the 3746 Model 900
  - Add 10 KB for ISDN on the feature
- To include X.25 ODLC
  - Add 17 KB if neither frame relay nor token ring was previously included in your NCP generation definition.
  - Add 11 KB if frame relay, token ring, or both were previously included in your NCP generation definition.

Some examples may help clarify how the net storage amounts are determined:

1. If you are adding ISDN resources and 3746 Model 900 for the first time, add the following:

## Migrating from NCP Version 6 Release 2

10 KB for ISDN  
8 KB for frame relay in M900  
114 KB for NCP migration (general program code storage)  
136 KB for M900 base

For a total of 268 KB increase in code storage requirements.

2. If you already have the 3746 Model 900 feature installed, and you want to add ISDN to the 3746 Model 900, you will need to add:

10 KB for ISDN  
8 KB for frame relay on the feature (if you do not have frame relay on the 3746 Model 900)  
114 KB for NCP migration (general program code storage)  
27.5 KB for frame relay migration (general program code storage)

For a total of 159.5 KB increase in code storage requirements.

- There will be some **reduction** in storage size if you do not continue to use NPSI after adding X.25 ODLC support. See the *X.25 NPSI Version 3 General Information* to determine this amount.

**Control Block Storage:** NCP requires additional control block storage when you define 3746 Model 900 resources. This section describes how to estimate the additional storage required for your configuration.

- If you are defining new 3746 Model 900 SDLC lines, add 1170 bytes for each line.
- If you are converting existing SDLC lines to 3746 Model 900 SDLC lines, add 658 bytes for each half-duplex line, and add 450 bytes for each duplex line.
- If you are defining new X.25 resources, add the following values:
  - (1328 bytes × the number of physical ODLC lines) + (4 bytes × the number of logical ODLC lines)
  - 1104 bytes × the number of peripheral logical lines/PUs
  - 976 bytes × the number of subarea logical lines/PUs
- If you convert existing inboard X.25 resources, you will now use NCP control blocks instead of NPSI control blocks. The net change is:
  - 296 bytes less for each peripheral logical line/PU
  - 424 bytes less for each subarea logical line/PU
- If you are defining new frame-relay frame-handler internal frame switching support:
  - For each 3746 Model 900 frame-relay full duplex physical line, add an additional 1432 bytes + (4 × *maxdlci*) where *maxdlci* is the largest DLCI supported by the line. The largest DLCI is the smaller of the following values:
    - 991
    - The value of the following expression:
$$((\text{maxframe} - \text{Imi}) / 5) + 15$$

where

*maxframe* is the value of MAXFRAME on the LINE definition statement.

*lmi* is 17 when LMI=CCITT on the LMI PU definition statement and 18 when LMI=ANSI.

- For each 3746 Model 900 frame-relay physical unit, add an additional 480 bytes.
- If you are adding frame-relay resources **other than** for the new frame-relay internal frame switching support:
  - For each 3746 Model 900 frame-relay full duplex physical line, an additional 1432 bytes + (4 × *maxdlci*) where *maxdlci* is the largest DLCI supported by the line. The largest DLCI is the smaller of the following values:
    - 991
    - The value of the following expression:  

$$((\text{maxframe} - \text{lmi}) / 5) + 15$$
 where  
*maxframe* is the value of MAXFRAME on the LINE definition statement.  
*lmi* is 17 when LMI=CCITT on the LMI PU definition statement and 18 when LMI=ANSI.
  - For each 3746 Model 900 frame-relay half duplex logical line/PU,
    - An additional 1200 bytes if peripheral, **or**
    - An additional 1068 bytes if subarea.
  - For each 3746 Model 900 frame-relay physical unit,
    - An additional 612 bytes if peripheral, **or**
    - An additional 480 bytes if subarea.
  - If you are adding ISDN resources:
    - For each 3746 Model 900 ISDN B-channel, an additional 1432 bytes + (4 × *maxdlci*) where *maxdlci* is the largest DLCI supported by the line. The largest DLCI is the smaller of the following values:
      - 991
      - The value of the following expression:  

$$((\text{maxframe} - \text{lmi}) / 5) + 15$$
 where  
*maxframe* is the value of MAXFRAME on the LINE definition statement.  
*lmi* is 17 when LMI=CCITT on the LMI PU definition statement, and 18 when LMI=ANSI.
    - For each 3746 Model 900 ISDN logical line/PU,
      - an additional 1200 bytes if peripheral, **or**
      - An additional 1068 bytes if subarea.
    - For each 3746 Model 900 ISDN physical unit,
      - an additional 612 bytes if peripheral, **or**
      - An additional 480 bytes if subarea.

## Advanced Peer-to-Peer Networking High Performance Routing (APPN HPR)

Storage requirements are substantially reduced when migrating to APPN HPR from APPN without HPR. Typically, in APPN without HPR, every LU-LU session from NCP to an adjacent APPN node requires a set of session control blocks. In APPN with HPR, the sessions that run over HPR will not require any session control blocks in the NCP. You must examine the entire network to determine which sessions will run over HPR. Use NTuneMON to monitor your control block usage.

The following figures illustrate where the savings in APPN HPR occur:

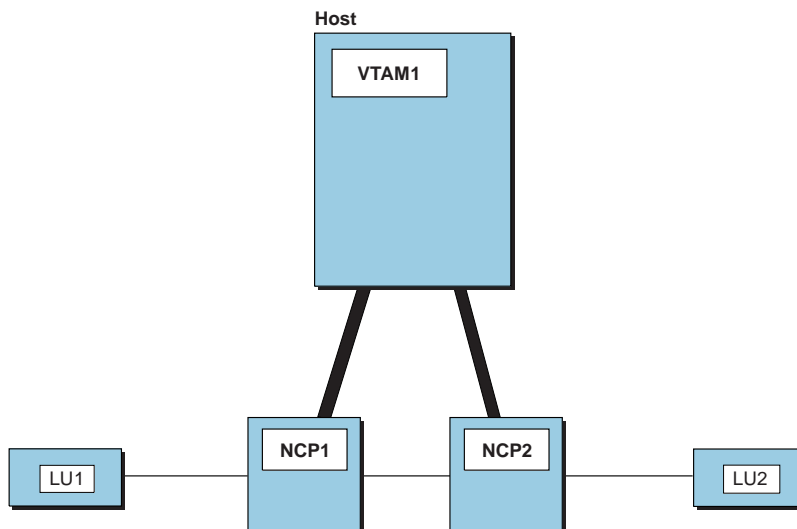


Figure 11-1. LU-LU Connection through Two NCPs

In the example in Figure 11-1, each NCP would save one set of session control blocks.

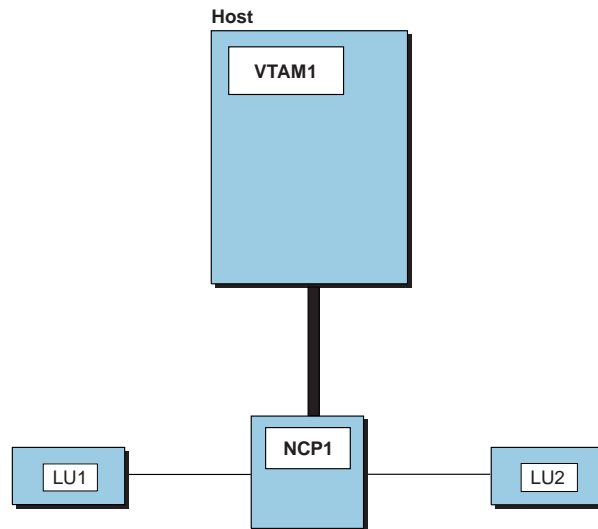


Figure 11-2. LU-LU Connection through One NCP

In the example in Figure 11-2, the NCP would save two sets of session control blocks.

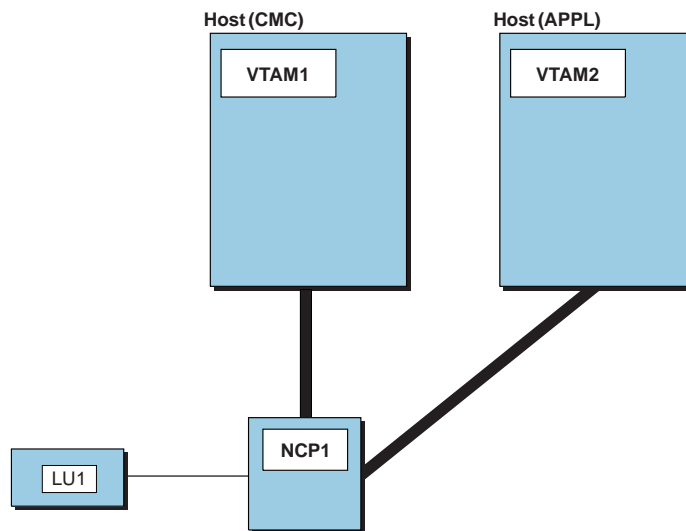


Figure 11-3. Pre-APPN Configuration

Figure 11-3 shows that there is also a savings in migrating pre-APPN configurations directly to APPN/HPR. In this pre-APPN configuration, the APPL VTAM is subarea-attached, LU1 is peripheral-attached, and the NCP contains a set of session control blocks. To migrate to APPN/HPR, the APPL VTAM connection would have to be converted to a peripheral connection, and LU1 would have to be upgraded to HPR. Neither peripheral connection would require a set of session control blocks, and the NCP would save one set of session control blocks.

The storage savings for each session in APPN with HPR is the sum of the following calculations:

- Half-session control blocks for primary logical units (PLUs). The control block size for each PLU is given by the following expression:

$$(plussess \times 212) + ((parsess + 1) \times 32)$$

where:

*plussess* is the number of half-sessions associated with the PLU.

*parsess* is the number of parallel half-sessions associated with the PLU that have the same secondary logical unit (SLU).

- Half-session control blocks for SLUs. The control block size for each SLU is given by the following expression:

$$(slussess \times 212) + 64$$

where *slussess* is the number of half-sessions associated with the SLU.

## Spare SDLC Lines

3745-attached SDLC peripheral lines can be generated as spare lines, redefinable lines, or as neither. By generating spare and redefinable lines, you can use NTuneMON with the NTuneNCP tuning feature to enable and disable the activation of physical lines from your communication controller without regenerating and reloading NCP. Storage requirements for spare or redefinable lines are comparable to any other SDLC line. Use the same storage values for spare lines as you do for active lines.

---

## General Updates

Make the following general update.

### BUILD

Update the VERSION keyword to generate NCP V7R8 or V7R8F.

The new ADPLIMIT keyword enables you to limit the maximum window size that NCP permits on an adaptively paced session.

A new suboperand of the BACKUP keyword specifies the number of LU sessions that support XRF with triple-DES encryption.

The CSSTIER keyword has been added to specify the usage tier level at which you are using the optional NCP Feature for 3746 Model 900 Connectivity Subsystem Support.

The HPR, HPRATT, HPRMLC, HPRMPS and HPRQLIM keywords have been added to support HPR.

The HPRSNAP keyword has been added to specify whether the snap trace function is to be enabled for APPN HPR resources.

The ISDNACC keyword has been added to specify whether the CSS is to include ISDN accounting information.

The new MINILOAD keyword facilitates the generating of a minimum-size remote load module.

The NTUNECOL keyword has been added to specify whether collection in the NCP is active for NTuneMON.



The OWNERPL keyword has been added to enable you to specify the types of unassigned logical resources that will be managed in owner-based pools.

The QSZALERT keyword has been added to support monitoring for excessive NCP buffer usage by a single resource.

The RGENLEVL keyword has been added to specify that NDF is to replace the GENLEVEL keyword value with the default date and time of the NCP generation.

The new TGTIMER keyword provides enhanced hung-TG detection.

The USGTIER keyword has changed to support updates to the NCP usage tier definitions.

The VOSDEACT keyword has been added to specify whether VR (virtual route) deactivation will be initiated when a VR goes out-of-sequence.

The VSUBNETS keyword has been added to support variable subnetting via NDF and dynamic reconfiguration.

### **CLUSTER**

There are new suboperands for the FEATURE keyword to allow NCP to ignore data from an undefined 3270 BSC device.

### **DLCI**

The DLCI definition statement is added.

The ID keyword specifies the DLCI(s) to which the DLCI statement's keyword parameters apply.

The CIR keyword specifies the bandwidth management parameters to be used for a designated DLCI.

The BALANCE keyword specifies the balancing factor to be applied to the DLCI(s) indicated by the ID keyword.

### **FRSESET**

The SUBPORTS keyword has been changed to allow internal frame switching between a 3746 Model 900 and NCP running on a 3745.

### **GROUP**

The DIAL keyword is changed to enable you to specify DIAL=YES for 3746 Model 900 frame-relay physical lines.

The FRELAY keyword is changed to provide the IP value for the second suboperand to indicate IP resources.

The ISDN keyword has been added to specify that this GROUP defines an ISDN physical or logical line group.

You can now code the PHYPORT keyword on 3746 Model 900 Token-Ring logical peripheral GROUP statements to associate the logicals with one or more physicals.

The V25DIAL keyword enables you to set the V.25 dial timer, formerly a fixed 2-minute timer, for EP lines.

### **IPOWNER**

The IPOWNER definition statement has been changed so that it is now optional.

The IPOWNER definition statement has been changed to enable NCP to send NCPROUTE information directly over an IP channel.

The INTFACE keyword has changed to enable you to define backup NCP-NCPROUTE interfaces.

### **IPROUTE**

The SNETMASK keyword has been added to support variable subnetting via NDF and dynamic reconfiguration.

### **LINE**

The new ADDIFG keyword specifies whether interframe gaps should be made larger to avoid overrun errors on adjacent adapters to which the 3746 Model 900 is transmitting.

## Migrating from NCP Version 6 Release 2

The BALANCE keyword has been added to enable connection balancing for NTRI physical lines and the 3746 Model 900.

The CCLID keyword has been changed to pass the X.21 calling/called line ID (CCLID) to VTAM without the need for an additional product such as X.21 SH/MPS.

The CIR keyword is added to specify whether the Committed Information Rate (CIR) algorithms will be used for bandwidth management.

The CLLM keyword is added to specify whether Consolidated Link Layer Management (CLLM) will be used.

The CRATEDLY keyword has been added to specify the COMRATE delay threshold in seconds for the 3746 Model 900.

The new DATBLK keyword, together with the COMRATE keyword, is used to determine a relative priority among frame-relay resources.

The DSCRDDLY keyword has been added to specify the discard delay threshold in seconds for the 3746 Model 900.

The new DYNWIND keyword defines the dynamic characteristics of the frame transmission window for all logical connections on a token-ring or frame-relay physical line.

In addition, the DYNWIND keyword enables you to control delays that NCP uses when manipulating the working window for 3745 FRTE stations during congestion.

By coding the second and third suboperands of the DYNWIND keyword (*dw* and *dwc*), you can now control the amount by which the working window is decreased when frame loss or congestion occurs for 3745 Token-Ring resources.

The *mww* suboperand is added to the DYNWIND keyword to provide a minimum user-specified working window value for frame relay.

The FEATURE keyword has been changed to provide LRC8 error checking for EP BSC USASCII lines running in transparent mode.

The FRRATES keyword has been added to enable setting the relative priorities for types of traffic (SNA, IP, and Frame Handler) supported by a 3745 frame-relay physical line.

The FRSPRI keyword has been added to specify the relative service priority for 3746 Model 900 attached frame-relay stations and ISDN logical stations.

The HLOQSTOP keyword has been added to specify the maximum size of the 3746 Model 900 physical line hardware queue.

The ISDNLPN and ISDNLSA keywords have been added to support ISDN.

The ISDNCALL, ISDNRPN, and ISDNRSA keywords have been added to support frame-relay dial backup over ISDN.

The LOCADD keyword has been changed to enable you to specify the destination service access point (DSAP) and medium access control point (MAC) for 3746 Model 900 frame-relay logical connections to remote token-ring-capable type 4 physical units.

The MAXDLCI keyword has been added to enable you to limit the DLCI range supported by frame-relay physical lines, NTRI frame handler logical lines and ISDN B-channels.

MAXPU, which previously allowed a maximum of 16 ESCON stations, now allows a maximum of 32 ESCON stations.

The MLTGPRI keyword is changed so that it can be coded for switched PUs in the VTAM switched major node, with the appropriate level of VTAM.

The QSIZE keyword has been added to specify the 3746 Model 900 software queue size threshold.

The QSIZEDE keyword has been added to specify the 3746 Model 900 software queue discard eligibility threshold

The RETRIES keyword has been changed to enable you to indicate a consecutive error threshold for 3745 frame-relay physical lines.

TAKEOVER, a new keyword on the LINE statement, enables you to force takeover of an EP line from another host.

The new TITIMER keyword defines the inactivity timer (TI) value for all logical connections on a token-ring or frame-relay physical line.

The TRANSBUF keyword is added to specify the maximum number of frames that will be queued for a TSS or HPTSS adapter awaiting transmission over a 3745 frame-relay physical line.

Changed keywords:

COMRATE  
HOSTLINK  
MAXPU

### OPTIONS

The TUSGTIER keyword has changed to support updates to the NCP usage tier definitions.

### PU

The ADDR keyword has been changed to enable you to specify the destination service access point (DSAP) and medium access control point (MAC) for 3746 Model 900 frame-relay logical connections to remote token-ring-capable type 4 physical units.

The FRSPRI keyword has been added to specify the relative service priority for 3746 Model 900 attached frame-relay stations and ISDN logical stations.

The new INNPORT keyword specifies whether a type 1 physical unit is to remain active when a VTAM HALT or VARY INACT command is issued. INNPORT was formerly a VTAM-only keyword.

The IPQLIM keyword has been added to specify the maximum amount of data that can be queued on a frame-relay internet outbound queue.

The ISDNCFG and ISDNDSCT keywords have been added to support ISDN.

The LLERP keyword has been added to specify whether the link station will perform link level error recovery procedures (ERP) when sending HPR data.

The LMI keyword has changed as part of the new support for switched frame-relay physical lines.

The MAXDATA keyword value for switched subarea PUs is obtained from VTAM and no longer from NCP. If you code the MAXDATA keyword for a switched subarea PU, you must code it on the PU definition statement in the VTAM switched major node because NCP no longer uses the MAXDATA value coded in the NCP generation definition.

The MODULO keyword default has changed.

The PIUCHECK keyword is added to specify whether checksum validation is performed on PIUs sent and received by the subarea station.

## Migrating from NCP Version 6 Release 2

The RETRIES keyword has been changed to enable you to indicate a consecutive error threshold for 3745 frame-relay physical lines.

The SNETMASK keyword has been added to enable subnetwork mask specification for channel and frame-relay internet resources.

The SSAP keyword has been added to allow duplicate TIC addressing for token-ring logical subarea connections.

The TGCONF keyword has been changed to enable you to specify standby subarea stations for congestion relief in MLTGs.

The TGCONF keyword is changed so that it can be coded for switched PUs in the VTAM switched major node, with the appropriate level of VTAM.

The UNIQUE keyword has been added to specify whether a Token Ring's logical subarea station's destination MAC address is a unique locally administered address.

The XMONLNK keyword is changed so that XMONLNK=YES and DIAL=YES are compatible when FRELAY=(PHYSICAL,SUBAREA) or FRELAY=(PHYSICAL,ANY).

### PUDRPOOL

Changed keyword:

FRSEDRPU

### SDLCST

The SERVLIM keyword has been changed to allow another way to specify how frequently NCP should interrupt its regular scans of the service order table to make a special scan.

### SWMMT

The MAXDATA keyword has been added to enable you to specify the maximum frame size.

---

## VTAM Updates

For detailed explanations of VTAM-only definition statements and keywords, or for information on how to code them, see the *VTAM Resource Definition Reference*.

### PATH

For the definition of a switched major node, the new DLCADDR keyword replaces the DIALNO keyword for specifying dial information.

### GROUP

The following VTAM-only keywords have been added:

NATIVE  
VNGROUP  
VNNAME

### LINE

The following VTAM-only keywords have been added:

NATIVE  
VNGROUP  
VNNAME

### PU

The following VTAM-only keyword has been added:

NATIVE

## Program Generation Characteristics

Table 11-1 shows the locations in the *NCP, SSP, and EP Resource Definition Guide* where you will find descriptions of the functions added in V7R8, V7R7, V7R6, V7R5, V7R4, and V7R3.

Table 11-1 (Page 1 of 3). New Functions Added in V7R8, V7R7, V7R6, V7R5, V7R4, and V7R3

Function	Location
EP Line Takeover	"Line Characteristics" on page 21-12
EP Shorten V25 BIS Dial Timer	"Timeouts" on page 20-7
Logical Line Pool Sharing for TIC3 Connections	"Unassigned Logical Line Pools" on page 6-23
Enhanced Hung TG Detection	"Monitoring Transmission Group Performance" on page 23-18
Facilitate Minimum-Sized Remote Load Module	"Defining the NCP Environment" on page 2-5
Ignore Data from Undefined 3270 BSC Device	the new function of the FEATURE keyword on page 5-28
3746 Model 900 TIC3 Connection Balancing	the description of the BALANCE keyword on page 6-8
3746 Model 900 Frame Relay BAN Connection Balancing	BALANCE keyword on the DLCI statement on page 16-14
Enhanced Control of the Dynamic Working Window for 3745 Token Ring	the description of the DYNWIND keyword on page 6-42
Enhanced Control of Adaptive Session Pacing	"Defining Session Pacing" on page 24-6
Specifying a Minimum Working Window for 3745 Frame Relay	the description of the DYNWIND keyword on page 16-15
LRC8 Error Checking for EP BSC USASCII	"Devices" on page 20-5
Specifying the number of frames queued for a TSS or HPTSS adapter	TRANSBUF keyword on the LINE definition statement on page 16-13
Committed information rate (CIR) on NCP controlled 3746 Model 900 frame-relay and ISDN lines	CIR keyword on the LINE definition statement on page 16-76 CIR keyword on the DLCI definition statement on page 16-13
Remote access to NCPROUTE in the absence of SNALINK	Exception to P2PDEST/HOSTADDR Matching on page 15-7
Connection balancing of frame-relay boundary access node (BAN) connections over 3745 frame-relay DLCIs	BALANCE keyword on the DLCI statement on page 16-14
IP subports for switched frame-relay lines	"Defining Frame-Relay Attachments for IP" on page 15-44
3746 Model 900 switched frame-relay physical lines.	Figure 16-45 on page 16-94
PIU checksum support	PIUCHECK keyword on the PU definition statement on page 24-9
Defining an ISDN backup line for a frame-relay line	"Defining Automatic Frame-Relay Backup over an ISDN"

Table 11-1 (Page 2 of 3). New Functions Added in V7R8, V7R7, V7R6, V7R5, V7R4, and V7R3

Function	Location
Defining backup NCP-NCPROUTE IP interfaces	"Backup IP Channel Interfaces"
Connection balancing for NTRI physical lines	the description of the BALANCE keyword on page 6-8
Limiting the DLCI range for an ISDN B-channel line	MAXDLCI on the LINE definition statement on page 7-7
New way that NCP determines link capacity and transmission time	SPEED keyword related to VTAM topology CAPACITY keyword on page 8-21
Allocating unassigned logical resources to owner-based pools	"Allocating Unassigned Logical Line Pools to Owners"
Defining an internal NCP to Model 900 point-to-point IP connection	"Defining an Internal NCP to Model 900 Point-to-Point IP Connection"
Defining ISDN subarea connectivity through a terminal adapter or a BAN device	"Defining ISDN Subarea Connectivity through a Terminal Adapter or BAN Device"
Defining relative priorities for the types (SNA, IP, and frame handler) of traffic supported by a 3745 frame-relay physical line	FRRATES on the LINE Definition Statement on page 16-11
New usage tier options	"Usage Tiers"
Defining variable subnetting for an IP route or an IP interface	"Defining Routes Explicitly"
Monitoring for excessive buffer usage by a peripheral resource	"Monitoring for Excessive Buffer Usage by a Peripheral Resource"
Specifying Token-Ring destination MAC address uniqueness	Reference to the UNIQUE keyword on page 6-31
Defining switched frame-relay 3745 physical lines	"Defining Switched Frame-Relay Physical Lines"
Controlling VR deactivation when a VR goes out-of-sequence	"Deactivating an Out-of-Sequence Virtual Route"
Integrated Services Digital Network (ISDN) Primary Rate Adapter	Chapter 7, "Integrated Services Digital Network (ISDN) Resources"
Duplicate TIC Addressing for Token-Ring	"Duplicate TIC Addressing"
Hot Standby for Multiple Link Transmission Groups (MLTGs)	"Multilink Transmission Groups"
Boundary Access Node (BAN) for Frame-Relay (FR) Subarea Links	"Boundary Access Node (BAN) for Frame-Relay Subarea Links"
Frame Relay Inoperative 'Error Count' Management Upgrades	"Defining Frame-Relay Physical Lines"
Enhanced Dynamic Windowing Algorithm for 3745 Frame Relay Logical Lines	"Defining Frame-Relay Physical Lines"
Port Sharing for NCP and 3746-900	"Shared 3746 Model 900 Resources between an NCP and 3746 Model 900"
Added flexibility in coding the ADDIFG keyword	"Controlling Adapter Overrun Errors"
X.25 ODLC resource definitions in an X.25 packet switching environment	"NDF-Generated Definition File"

Table 11-1 (Page 3 of 3). New Functions Added in V7R8, V7R7, V7R6, V7R5, V7R4, and V7R3

Function	Location
Frame relay internal frame switching support	"Defining Frame Handler Connections," "3746 Model 900 Frame Relay"
Direct NCPROUTE information over an IP channel	"Definition Statements for NCP Internet Resources"
Dialing out to frame-relay BAN devices using non-extended dial digits	"Defining Peripheral Device Addresses to VTAM"
Non-error recovery procedures for 3746 Model 900 token-ring logical stations	"Defining the Characteristics of HPR-Capable Links"
Frame relay IP connections in internet sub-networks	"Defining Frame-Relay Attachments for IP"
HPR snap trace diagnostic information for APPN HPR	"NCP and VTAM As a Composite Type 2.1 Node," and "Diagnostic Tests and Traces"
APPN HPR	Chapter 8, "Type 2.1 Node Support"
Frame relay over token ring	"Defining NTRI Attachments for a Frame-Relay Network" in Chapter 16, "Frame-Relay Resources"
IP over frame relay	"Defining Frame-Relay Attachments for IP" in Chapter 15, "Internet Resources"
IP over channel	"Defining 370 I/O Channels for IP" in Chapter 15, "Internet Resources"
Frame-relay BAN support	"Defining Frame-Relay Logical Peripheral Lines" in Chapter 16, "Frame-Relay Resources"
Hot standby MLTGs	"Multilink Transmission Groups" in Chapter 16, "Frame-Relay Resources"

## General Considerations

- Code HPR=NO on the BUILD definition if you do not want to use the HPR function. This will block HPR connections from being established, and will prevent the unique HPR modules from being included. This will decrease the NCP load module size.
- The DLCI keyword has been added. It allows the coding of 10-bit DLCIs. This allows frame-relay connections to use the full range of DLCIs (up to 991).
- The SPEED keyword may now be coded on the LINE definition statement for all channel types. With the exception of ESCON, NCP does not use this value. This capability was added so this value is available to NETDA/2 and NTuneMON.
- NDF will allow DYNWIND specification on the logical GROUP, LINE, and PU statements for frame-relay logical subarea and token-ring logical subarea resources. NDF will also accept DYNWIND specification on the physical GROUP, LINE and PU statements. This will allow you to specify a unique DYNWIND value for each physical unit.

### NCP Migration Aid

If you are using the NCP migration aid function, make the following updates.

#### OPTIONS

Changed keywords:

TMODEL

TVERSION

Update the TVERSION keyword to generate NCP V7R8 or V7R8F.

Code the TOCONV keyword if you want to consolidate the LOCALTO and REMOTTO keywords into the T1TIMER keyword.

Code the ADDRCONV keyword if you want to use the DLCI keyword instead of the ADDR keyword on your frame-relay lines.

### Dynamically Created Control Blocks

NCP can dynamically create certain control blocks and table entries when NCP needs more than are defined in your generation definition. This enables you to provide temporary resources for high-use situations without permanently allocating NCP storage for those resources.

**Note:** Using these dynamically created resources can degrade NCP performance, so it is recommended that you define all the resources you expect to need in your generation definition and use this function only to handle unexpected demand.

To use this function, make the following updates.

#### BUILD

The new DYNNSC keyword specifies how many NPM session counter control blocks (NSCs) NCP can create dynamically.

The new DYNNSX keyword specifies how many NSC extensions NCP can create dynamically.

The new DYNPOOL keyword specifies how much controller buffer storage NCP can use for dynamically created control blocks, and defines a dynamic resource alert threshold.

Changed keywords:

BACKUP

BFRS

GWSESAC

SESSACC

### Logical Line Timer Enhancement

NCP maintains a timer for a NTRI or frame-relay logical line only when the line is active, which improves NCP performance. You do not need to update your generation definition to use this enhancement.

#### GROUP

The TIMER keyword is ignored for NTRI and frame-relay logical lines.



---

## NCP and Link-Attached Devices

### 3746 Model 900 Connectivity Subsystem SDLC Lines

You can attach switched and nonswitched Synchronous Data Link Control (SDLC) lines to NCP through the 3746 Model 900 connectivity subsystem using a communication line adapter (CLA). The 3746 Model 900 improves NCP performance by performing NCP data link control processing. To use the 3746 Model 900, you must obtain the NCP V7R8 feature from IBM.

To define a 3746 Model 900 SDLC connection, make the following updates.

<b>BUILD</b>	The new CSSTIER keyword specifies the usage tier for the optional NCP feature for 3746 Model 900 support.
<b>GROUP</b>	Changed keyword: X21NTWK
<b>LINE</b>	Changed keywords: ADDRESS AUTO LPDATS LPDA2DL SPEED

### Spare SDLC Lines

3745-attached SDLC peripheral lines can be generated as spare lines, redefinable lines, or as neither. By generating spare and redefinable lines, you can use NTuneMON with NTuneNCP to enable and disable the activation of physical lines from your communication controller without regenerating and reloading NCP.

**Note:** To be spare or redefinable, a line must be the only line in its group.

To use this function, make the following updates.

<b>LINE</b>	Changed keyword: USE
-------------	-------------------------

---

## Internet Protocol

The definition of NCP internet resources has changed since NCP V6R2. For a detailed description of the process for migrating NCP V6R2 internet resources to NCP V7R8, see the *NCP, SSP, and EP Resource Definition Guide*.

### Dynamic Internet Routing

NCP internet routing can be dynamically controlled by NCPROUTE, a server that runs in the owning IBM Transmission Control Protocol/IP (TCP/IP) host.<sup>1</sup> NCPROUTE receives internet routing changes through Routing Information Protocol

---

<sup>1</sup> For information on which IBM TCP/IP product releases and operating systems support NCPROUTE, see the IBM TCP/IP documentation for your host operating system.

## Migrating from NCP Version 6 Release 2

(RIP) datagrams from other internet hosts and communicates these changes to NCP.

**Note:** For dynamic control of NCP internet routing, the Ethernet-type subsystem (ESS) adapter in your controller must have one of the following microcode levels:

- C38006 for the IBM 3745 Models 130, 150, 160, and 170
- C37967 for the IBM 3745 Models 210, 310, 410, and 610
- D39888 for the IBM 3745 Models 21A, 31A, 41A, and 61A
- D400002 for the IBM 3745 Model 17A.

To use dynamic internet routing, make the following updates.

### **BUILD**

The new IPSNAP keyword activates the NCP snap trace for internet resources.

### **IHOST**

The new IHOST definition statement defines an internet host on an Ethernet-type LAN or NTRI-attached token ring.

The new HDWADDR keyword specifies the hardware address of the internet host.

The new IPADDR keyword specifies the internet address of the internet host.

The new LANTYPE keyword (for Ethernet type LANs only) specifies the type of frame format the host supports.

### **IPOWNER**

The new IPOWNER definition statement defines the internet address of the owning IBM TCP/IP host and a route to the host.

The new HOSTADDR keyword specifies the internet address of the owning host.

The new INTFACE keyword specifies the local NCST interface to the owning host.

The new MAXHELLO keyword specifies how many *Hello* datagrams NCP is to send to the owning host without receiving an acknowledgment.

The new NUMROUTE keyword specifies how many routes the owning host can add beyond the number defined in your generation definition.

The new UDPPORT keyword specifies the User Datagram Protocol port address the owning host will use to communicate with NCP.

### **IPLOCAL**

The IPLOCAL definition statement defines an internet route to a locally attached NCST logical unit, Ethernet-type LAN, or NTRI-attached token ring.

The new METRIC keyword assigns a metric to the interface to enable NCPROUTE to select the most desirable route to a destination.

The new P2PDEST keyword for NCST connections specifies the internet address of the host that contains the remote NCST logical unit.

The new PROTOCOL keyword specifies whether the interface is to be managed by NCPROUTE through RIP.

The new SNETMASK keyword defines a mask that identifies the subnetwork portion of the address specified by LADDR.

Changed keywords:

INTFACE  
LADDR

### **IPSUB**

The IPSUB definition statement and its keywords have been replaced by new keywords on the IPLOCAL definition statement.

<b>IPGATE</b>	The IPGATE definition statement has been replaced by the IPRROUTE definition statement.
<b>IPROUTE</b>	<p>The new IPRROUTE definition statement defines a route to a network, subnetwork, or internet host.</p> <p>The new DESTADDR keyword specifies the internet address of the destination network, subnetwork, or internet host.</p> <p>The new DISP keyword specifies whether NCPROUTE can dynamically delete or change the route.</p> <p>The new HOSTRT keyword specifies whether the route is to a host or to a subnetwork or network.</p> <p>The new INTFACE keyword identifies which internet router interface provides the route to the destination.</p> <p>The new METRIC keyword assigns a metric to the route to enable NCPROUTE to select the most desirable route to a destination.</p> <p>The new NEXTADDR keyword identifies the internet address of the next internet router on the route.</p>

### Internet Routing over NTRI-Attached Token Rings

NCP can route internet traffic over token rings attached to NCP through NTRI. NCP can route both SNA and internet traffic over the same NTRI attachment. To route internet traffic over a NTRI-attached token ring, make the following updates.

<b>LINE</b>	<p>Changed keywords:</p> <ul style="list-style-type: none"><li>INTERFACE</li><li>LOCADD</li><li>MAXPU</li></ul>
<b>PU</b>	<p>The new NETWORK keyword specifies whether the network represented by the PU definition statement will be used for SNA or internet traffic.</p> <p>Changed keywords:</p> <ul style="list-style-type: none"><li>ADDR</li><li>ANS</li><li>ARPTAB</li><li>PASSLIM</li></ul>

### Frame Relay

#### Frame-Relay Peripheral Links

You can attach peripheral nodes (type 2 or type 2.1 physical units) to NCP through a frame-relay network. A single HPTSS physical line can carry traffic for both peripheral and subarea nodes as well as frame-relay frame handler (FRFH) traffic.

To define frame-relay peripheral links, make the following updates.

**GROUP** Changed keywords:

AUTOGEN  
FRELAY  
PHYSRSC

**LINE** Changed keywords:

LSPRI  
PORTADD

#### 3746 Model 900 Frame-Relay Support

The 3746 Model 900 supports attachment to a frame-relay network. Support for frame relay on the 3746 Model 900 is the same as support for frame relay on the 3745 with the following exception:

- The PHYSRSC, ADDRESS, and PORTADD keywords may need to be changed.

**FRSESET** The new SUBPORTS keyword specifies the two FHSPs at the ends of the PVC segment and optionally defines a substitute FHSP for each end of the PVC segment.

**GROUP** Changed keyword:

PHYSRSC

**LINE** Changed keywords:

MAXPU  
PORTADD  
SPEED  
T2TIMER

**PU** Changed keywords:

ADDR

**3745 Frame-Relay Keywords Not Used for 3746 Model 900 Frame Relay**

You may have used some the following keywords to define 3745 frame- relay support. You do not need to define these keywords for 3746 Model 900 frame- relay support. If you do define them they are ignored (except for SRT, which is not valid).

<b>GROUP</b>	COMPACB COMPOWN COMPSWP LEVEL2 LEVEL3 LEVEL5 LINEADD XIO XMITDLY
<b>LINE</b>	UACB
<b>PU</b>	SRT (not valid)
<b>PUDRPOOL</b>	FRSEDRPU



---

## Chapter 12. Migrating from NCP Version 5 Release 4

Changed Defaults	12-3
Deleted Keywords	12-3
Changes to Storage Requirements	12-4
NCP Initialization	12-4
General Updates	12-4
VTAM Updates	12-10
Program Generation Characteristics	12-12
General Considerations	12-14
NCP/EP Definition Facility	12-15
NCP Migration Aid	12-15
Reusable NEWDEFN File	12-16
Channel Addressing by Physical Position	12-16
Usage Tiers	12-16
Logical Unit Resource Pool Definition Enhancement	12-16
Variable Explicit Route Limits	12-17
Automatic Resource Definition	12-17
Dynamically Created Control Blocks	12-18
Logical Line Timer Enhancement	12-19
Type 2.1 Node Support	12-19
Type 2.1 Peripheral Node Support	12-19
Non-Native Network Attachment	12-20
Dynamic Definition of Independent Logical Units	12-20
APPN Support	12-20
Channel Attachments and Access Methods	12-21
Channel-Link Definition	12-21
Network Addressability	12-22
Subarea Channel-Link Activation	12-24
Enterprise Systems Connection Support	12-24
NCP and Link-Attached Devices	12-25
IBM 3745 Line Interface Coupler 4 Requirement for SPEED	12-25
Shared Port Identification	12-25
SSCP Monitor Mode Function	12-26
IBM 4941 Modems	12-26
Multiple Local Modem Support	12-26
IBM 3174 Group Poll	12-26
V.25 Bis	12-26
3746 Model 900 Connectivity Subsystem SDLC Lines	12-27
Spare SDLC Lines	12-27
Token-Ring Resources	12-27
NTRI Lines	12-27
Token-Ring Interface Coupler Swap	12-30
16-Megabit Token-Ring Speed	12-30
Token-Ring Serviceability Enhancement	12-31
Network Performance Data Collection for Token-Ring Resources	12-31
Counter Thresholds for NTRI Lines	12-31
NTRI Delayed Logical Link Activation	12-31
3746 Model 900 Connectivity Subsystem Token-Ring Resources	12-32
Routes between Subareas	12-33
Dynamic Path Update	12-33
Switched Subarea Support	12-34

## Migrating from NCP Version 5 Release 4

Casual Connection	12-34
Multilink Transmission Group Processing Enhancements	12-35
Blocked Virtual Route Alerts	12-35
Connections between Subarea Nodes	12-36
Multipoint Subarea Support	12-36
Pause Enhancement	12-37
Parallel Transmission Group Support for Channel Links	12-38
Enhanced Loading and Activation for Remote Controllers	12-38
Interconnected Networks	12-39
SNA Network Interconnection Session Limit Increase	12-39
Dynamic Network Identification	12-39
Gateway Session Accounting	12-39
Gateway Session Pacing Override	12-40
Emulation Mode Resources	12-40
Selection of EP Sense Codes	12-40
Teletypewriter Exchange Service	12-40
Teletypewriter Exchange Service Auto-Speed Detection	12-40
Customized Functions	12-40
Maximum Load Module Size Increase	12-40
Defining Diagnostic Aids	12-41
Channel Adapter IOH Trace	12-41
Link Problem Determination Aid	12-41
IBM 786x Modems Extended LPDA2 Capability	12-41
Backup and Recovery Procedures	12-42
Extended Recovery Facility	12-42
Performance Characteristics	12-42
Network Performance Data Collection	12-42
Session Accounting	12-42
Link Session Priority	12-43
NPM Data Collection for IBM Special Products or User-Written Code	12-43
NPM Session Accounting for IBM Special Products or User-Written Code	12-43
Adaptive Session Pacing Enhancement	12-43
PIU Blocking Performance Improvements for Subarea Links	12-44
NPM Data Collection by Transmission Priority	12-44
Internet Protocol	12-44
General Internet Resources	12-44
Internet Routing over SNA Networks	12-44
Internet Routing over Ethernet-Type LANs	12-45
Internet Routing over NTRI-Attached Token Rings	12-46
Internet Routes	12-47
Frame Relay	12-48
Frame-Relay Physical Lines	12-48
Frame-Relay Logical Subarea Lines	12-49
Frame-Relay Logical Peripheral Links	12-50
Frame-Relay Switching Support	12-50
3746 Model 900 Frame-Relay Support	12-51

To migrate from NCP Version 5 Release 4 (V5R4) to NCP V7R8, update your NCP V5R4 generation definition so that it will generate NCP V7R8. In addition, you can change the generation definition to include functions added to NCP since NCP V5R4. This chapter lists the definition statements and keywords you need to change, add, or delete for either of these purposes.



**Migrating to a New Host System or Hardware:** If you are migrating to a different host operating system or communication controller model or to a type 7 channel adapter, read Chapter 2 to see which keywords you need to change for your new host system or hardware before you begin migrating to NCP V7R8.

**Using the NCP Migration Aid Function:** The NCP migration aid is an NDF function that simplifies the migration task by automatically making most of the changes required to migrate to NCP V7R8. You should consider using the migration aid before using the information in this chapter. For more information on using the migration aid, see Chapter 1.

Under each topic in this chapter, definition statements are listed in the order in which they appear in a generation definition. You can code certain keywords on more than one definition statement. This book describes each keyword on the lowest-level definition statement on which it can be coded.

After you have identified the definition statements and keywords that you need to change, add, or delete, see the *NCP, SSP, and EP Resource Definition Guide* for more information on their functions, and see the *NCP, SSP, and EP Resource Definition Reference* for information on how to code them.

---

## Changed Defaults

The defaults for the following keywords have changed.

<b>SDLCST</b>	TADDR
<b>GROUP</b>	RETRYTO
<b>LINE</b>	ADDRESS HISPEED TADDR TRANSFR
<b>PU</b>	MAXDATA MODULO PASSLIM

---

## Deleted Keywords

The following keywords have been deleted.

<b>BUILD</b>	CA CANETID DELAY DYNADMP HICHAN LENAME LOCHAN NCPCA RESOEXT TIMEOUT VRACT XITB
--------------	---

## Migrating from NCP Version 5 Release 4

<b>HOST</b>	All NCP keywords; HOST is now a VTAM-only definition statement.
<b>PUDRPOOL</b>	MAXLU
<b>GROUP</b>	BERPROC
<b>LINE</b>	LTRUNC
<b>PU</b>	SUBAREA
<b>LU</b>	BATCH

---

## Changes to Storage Requirements

Your actual storage requirements depend on your configuration. For an estimate of the storage your NCP will require, use the HONE CF3745 Configurator storage model. For more information, see the *IBM 3745 Communication Controller Configuration Program* book.

## NCP Initialization

Generation listings include a message (ICN0761) indicating how much storage NCP needs for initialization, beyond the storage that the load module displaces. Add this number to the size of the load module, obtained from the linkage editor output, to determine whether there is enough controller storage available for the buffer pool. For more information, see the *NCP, SSP, and EP Generation and Loading Guide*.

Beginning with SSP V4R8, another way to determine if there is enough controller storage available for the buffer pool is to add the ICNSIZE (MVS and VM) or IFUSIZE (VSE) job step after the linkage editor step. It will give you an estimate of how many NCP buffers will be created for your particular NCP. See the *NCP, SSP, and EP Generation and Loading Guide* and “Generation Steps” on page 67 for related VM information, “Generation Steps” on page 5 for related MVS information, or “Generation Steps” on page 169 for related VSE information.

---

## General Updates

Make the following general updates.

### **BUILD**

Update the VERSION keyword to generate NCP V7R8 or V7R8F.

The new ADPLIMIT keyword enables you to limit the maximum window size that NCP permits on an adaptively paced session.

A new suboperand of the BACKUP keyword specifies the number of LU sessions that support XRF with triple-DES encryption.

The CSSTIER keyword has been added to specify the usage tier level at which you are using the optional NCP Feature for 3746 Model 900 Connectivity Subsystem Support.

The GENLEVEL keyword enables a host to activate an NCP, even though the host did not generate that particular NCP.

The HPR, HPRATT, HPRMLC, HPRMPS and HPRQLIM keywords have been added to support HPR.

The HPRSNAP keyword has been added to specify whether the snap trace function is to be enabled for APPN HPR resources.

The ISDNACC keyword has been added to specify whether the CSS is to include ISDN accounting information.

The new MINILOAD keyword facilitates the generating of a minimum-size remote load module.

The NETID keyword specifies the name of the native network.

The NTUNECOL keyword has been added to specify whether collection in the NCP is active for NTuneMON.

The OWNERPL keyword has been added to enable you to specify the types of unassigned logical resources that will be managed in owner-based pools.

The PUNAME keyword specifies the name of the physical unit.

The QSZALERT keyword has been added to support monitoring for excessive NCP buffer usage by a single resource.

The RGENLEVL keyword has been added to specify that NDF is to replace the GENLEVEL keyword value with the default date and time of the NCP generation.

The new TGTIMER keyword provides enhanced hung-TG detection.

The USGTIER keyword has changed to support updates to the NCP usage tier definitions.

The VOSDEACT keyword has been added to specify whether VR (virtual route) deactivation will be initiated when a VR goes out-of-sequence.

The VSUBNETS keyword has been added to support variable subnetting via NDF and dynamic reconfiguration.

Changed keywords:

- HSBPOOL
- NEWNAME
- PRTGEN
- TRANSFR

Deleted keywords:

- RESOEXT
- VRACT
- XITB

If you are not using dynamic path update, code the following keywords with a value of 0 so that storage will not be wasted:

- PATHEXT
- TGBXTRA

The second suboperand of VRPOOL

### **CLUSTER**

There are new suboperands for the FEATURE keyword to allow NCP to ignore data from an undefined 3270 BSC device.

### **DLCI**

The DLCI definition statement is added.

The ID keyword specifies the DLCI(s) to which the DLCI statement's keyword parameters apply.

The CIR keyword specifies the bandwidth management parameters to be used for a designated DLCI.

The BALANCE keyword specifies the balancing factor to be applied to the DLCI(s) indicated by the ID keyword.

## Migrating from NCP Version 5 Release 4

- FRSESET** The SUBPORTS keyword has been changed to allow internal frame switching between a 3746 Model 900 and NCP running on a 3745.
- GROUP** If you code the CHAREC keyword, specify characters using the parallel data field (PDF) representation of characters transmitted to the terminal. Do not specify characters using reversed code. See *NCP and EP Reference Summary and Data Areas, Volume 2* for information on character codes.
- The DIAL keyword is changed to enable you to specify DIAL=YES for 3746 Model 900 frame-relay physical lines.
- The new DSRTO keyword specifies how long NCP is to wait for an emulator line to become data-set-ready (DSR) before timing out on an ENABLE command.
- The FRELAY keyword is changed to provide the IP value for the second suboperand to indicate IP resources.
- The ISDN keyword has been added to specify that this GROUP defines an ISDN physical or logical line group.
- You can now code the PHYPORT keyword on 3746 Model 900 Token-Ring logical peripheral GROUP statements to associate the logicals with one or more physicals.
- The V25DIAL keyword enables you to set the V.25 dial timer, formerly a fixed 2-minute timer, for EP lines.
- Changed keywords:
- REPLYTO
  - RETRIES
  - RETRYTO
  - RNRLIMIT
  - USERID
  - XIO
- IPOWNER** The IPOWNER definition statement has been changed so that it is now optional.
- The IPOWNER definition statement has been changed to enable NCP to send NCPROUTE information directly over an IP channel.
- The INTFACE keyword has changed to enable you to define backup NCP-NCPROUTE interfaces.
- IPROUTE** The SNETMASK keyword has been added to support variable subnetting via NDF and dynamic reconfiguration.
- LINE** The new ADDIFG keyword specifies whether interframe gaps should be made larger to avoid overrun errors on adjacent adapters to which the 3746 Model 900 is transmitting.
- The BALANCE keyword has been added to enable connection balancing for NTRI physical lines and the 3746 Model 900.
- The new CCLID keyword specifies CCLID support for X.21 lines.
- The CIR keyword is added to specify whether the Committed Information Rate (CIR) algorithms will be used for bandwidth management.
- The CLLM keyword is added to specify whether Consolidated Link Layer Management (CLLM) will be used.
- The new COMRATE keyword specifies whether certain frames sent over this line can be discarded by the frame-relay network to expedite the processing of other

frames when the network is congested. COMRATE also establishes the relative priority of the FRTE or the FHSP.

The CRATEDLY keyword has been added to specify the COMRATE delay threshold in seconds for the 3746 Model 900.

The new DATBLK keyword, together with the COMRATE keyword, is used to determine a relative priority among frame-relay resources.

The DSCRDDLY keyword has been added to specify the discard delay threshold in seconds for the 3746 Model 900.

The new DYNWIND keyword defines the dynamic characteristics of the frame transmission window for all logical connections on a token-ring or frame-relay physical line.

In addition, the DYNWIND keyword enables you to control delays that NCP uses when manipulating the working window for 3745 FRTE stations during congestion.

By coding the second and third suboperands of the DYNWIND keyword (*dw* and *dwc*), you can now control the amount by which the working window is decreased when frame loss or congestion occurs for 3745 Token-Ring resources.

The *mww* suboperand is added to the DYNWIND keyword to provide a minimum user-specified working window value for frame relay.

The FEATURE keyword has been changed to provide LRC8 error checking for EP BSC USASCII lines running in transparent mode.

The FRRATES keyword has been added to enable setting the relative priorities for types of traffic (SNA, IP, and Frame Handler) supported by a 3745 frame-relay physical line.

The FRSPRI keyword has been added to specify the relative service priority for 3746 Model 900 attached frame-relay stations and ISDN logical stations.

The HLOQSTOP keyword has been added to specify the maximum size of the 3746 Model 900 physical line hardware queue.

The ISDNLPN and ISDNLSA keywords have been added to support ISDN.

The ISDNCALL, ISDNRPN, and ISDNRSA keywords have been added to support frame-relay dial backup over ISDN.

The new LIMRES keyword defines a line as a limited resource that should be deactivated automatically when session traffic ceases on a switched link.

The LOCADD keyword has been changed to enable you to specify the destination service access point (DSAP) and medium access control point (MAC) for 3746 Model 900 frame-relay logical connections to remote token-ring-capable type 4 physical units.

The MAXDLCI keyword has been added to enable you to limit the DLCI range supported by frame-relay physical lines, NTRI frame handler logical lines and ISDN B-channels.

MAXPU, which previously allowed a maximum of 16 ESCON stations, now allows a maximum of 32 ESCON stations.

The MLTGPRI keyword is changed so that it can be coded for switched PUs in the VTAM switched major node, with the appropriate level of VTAM.

The QSIZE keyword has been added to specify the 3746 Model 900 software queue size threshold.

## Migrating from NCP Version 5 Release 4

The QSIZEDE keyword has been added to specify the 3746 Model 900 software queue discard eligibility threshold

The new RCVCHAR keyword specifies whether a start-stop line receives data in burst mode or character mode.

The RETRIES keyword has been changed to enable you to indicate a consecutive error threshold for 3745 frame-relay physical lines.

The SERVLIM keyword has been changed to allow another way to specify how frequently NCP should interrupt its regular scans of the service order table to make a special scan.

TAKEOVER, a new keyword on the LINE statement, enables you to force takeover of an EP line from another host.

The new TITIMER keyword defines the inactivity timer (TI) value for all logical connections on a token-ring or frame-relay physical line.

The TRANSBUF keyword is added to specify the maximum number of frames that will be queued for a TSS or HPTSS adapter awaiting transmission over a 3745 frame-relay physical line.

Changed keywords:

DYNADMP  
INBFRS  
MAXPU  
TRANSFR

Deleted keyword:

LTRUNC

### LU

The new MAXSESS keyword specifies how many LU-LU sessions a boundary logical unit can have.

If the PACING keyword is coded, delete the second value on it.

Changed keyword:

MAXCOLL

### LUDRPOOL

Changed keywords:

NUMTYP1  
NUMTYP2

### NETWORK

This definition statement is valid only when HSBPOOL is coded on the BUILD definition statement.

If you are not using dynamic path update, code the PATHEXT keyword with a value of 0 so that storage will not be wasted.

If you are not using dynamic path update, code the TGBXTRA keyword with a value of 4 so that storage will not be wasted.

### OPTIONS

The NEWDEFN keyword causes NDF to create a new generation definition as part of the NCP generation process. See the *NCP, SSP, and EP Resource Definition Guide*

The TUSGTIER keyword has changed to support updates to the NCP usage tier definitions.

**PU**

The ADDR keyword has been changed to enable you to specify the destination service access point (DSAP) and medium access control point (MAC) for 3746 Model 900 frame-relay logical connections to remote token-ring-capable type 4 physical units.

The FRSPRI keyword has been added to specify the relative service priority for 3746 Model 900 attached frame-relay stations and ISDN logical stations.

The new INNPORT keyword specifies whether a type 1 physical unit is to remain active when a VTAM HALT or VARY INACT command is issued.

The IPQLIM keyword has been added to specify the maximum amount of data that can be queued on a frame-relay internet outbound queue.

The ISDNCFG and ISDNDSCT keywords have been added to support ISDN.

The LLERP keyword has been added to specify whether the link station will perform link level error recovery procedures (ERP) when sending HPR data.

The LMI keyword has changed as part of the new support for switched frame-relay physical lines.

The MAXDATA keyword value for switched subarea PUs is obtained from VTAM and no longer from NCP. If you code the MAXDATA keyword for a switched subarea PU, you must code it on the PU definition statement in the VTAM switched major node because NCP no longer uses the MAXDATA value coded in the NCP generation definition.

The MODULO keyword default has changed.

The PIUCHECK keyword is added to specify whether checksum validation is performed on PIUs sent and received by the subarea station.

The RETRIES keyword has been changed to enable you to indicate a consecutive error threshold for 3745 frame-relay physical lines.

The SNETMASK keyword has been added to enable subnetwork mask specification for channel and frame-relay internet resources.

The SSAP keyword has been added to allow duplicate TIC addressing for token-ring logical subarea connections.

The TGCONF keyword has been changed to enable you to designate standby subarea stations for congestion relief in MLTGs.

The TGCONF keyword is changed so that it can be coded for switched PUs in the VTAM switched major node, with the appropriate level of VTAM.

The UNIQUE keyword has been added to specify whether a Token Ring's logical subarea station's destination MAC address is a unique locally administered address.

The XMONLNK keyword is changed so that XMONLNK=YES and DIAL=YES are compatible when FRELAY=(PHYSICAL,SUBAREA) or FRELAY=(PHYSICAL,ANY).

If VIRTUAL=NO (the default) on the GROUP definition statement for the line of this physical unit, delete the MAXLU keyword.

## Migrating from NCP Version 5 Release 4

Changed keywords:

ADDR  
ANS  
DATMODE  
MAXDATA  
MAXOUT  
MODULO  
PASSLIM  
SRT

### **PUDRPOOL**

Deleted keyword:

MAXLU

### **SDLCST**

The SERVLIM keyword has been changed to allow another way to specify how frequently NCP should interrupt its regular scans of the service order table to make a special scan.

### **SWMMT**

The MAXDATA keyword has been added to enable you to specify the maximum frame size.

### **TERMINAL**

The new SESSREQ keyword specifies whether a session is required with a terminal before NCP begins polling.

At line activation time, if you do not want NCP to transmit the ID defined in the TWXID keyword, code the XTWXID keyword.

If you have a device that requires special printer processing but is not a true printer, code the VPRINT keyword.

---

## VTAM Updates

For detailed explanations of VTAM-only definition statements and keywords, or for information on how to code them, see the *VTAM Resource Definition Reference*.

Make the following VTAM updates.

### **HOST**

HOST is now a VTAM-only definition statement.

### **PATH**

When defining a switched major node, the new DLCADDR keyword replaces the DIALNO keyword for specifying dial information.

### **GROUP**

The following VTAM-only keywords have been added:

CAPACITY  
CONNTYPE  
COSBYTE  
COSTTIME  
CPCP  
DYNADJCP  
DYNPU  
DYNPUPFX  
NATIVE  
NN  
PDELAY  
REGISTER  
SECURITY  
TGP



TOPO  
UPARM1  
UPARM2  
UPARM3  
VERSALID  
VNGROUP  
VNNAME

**LINE** The following VTAM-only keywords have been added:

CAPACITY  
CONNTYPE  
COSBYTE  
COSTTIME  
CPCP  
DYNADJCP  
DYNPU  
DYNPUPFX  
NATIVE  
NN  
PDELAY  
REGISTER  
SECURITY  
TGP  
TOPO  
UPARM1  
UPARM2  
UPARM3  
VERSALID  
VNGROUP  
VNNAME

**TERMINAL** The following VTAM-only keywords have been added:

ASLENT  
ASLTAB  
MDLENT  
MDLTAB

**PU** The following VTAM-only keywords have been added:

DYNLU  
LIMRES  
LUGROUP  
LUSEED  
NATIVE  
REGISTER

**LU** The following VTAM-only keywords have been added:

ASLENT  
ASLTAB  
MDLENT  
MDLTAB  
REGISTER

## Program Generation Characteristics

Table 12-1 shows the locations in the *NCP, SSP, and EP Resource Definition Guide* where you will find descriptions of the functions added in V7R8, V7R7, V7R6, V7R5, V7R4, and V7R3.

Table 12-1 (Page 1 of 3). New Functions Added in V7R8, V7R7, V7R6, V7R5, V7R4, and V7R3

Function	Location
EP Line Takeover	"Line Characteristics" on page 21-12
EP Shorten V25 BIS Dial Timer	"Timeouts" on page 20-7
Logical Line Pool Sharing for TIC3 Connections	"Unassigned Logical Line Pools" on page 6-23
Enhanced Hung TG Detection	"Monitoring Transmission Group Performance" on page 23-18
Facilitate Minimum-Sized Remote Load Module	"Defining the NCP Environment" on page 2-5
Ignore Data from Undefined 3270 BSC Device	the new function of the FEATURE keyword on page 5-28
3746 Model 900 TIC3 Connection Balancing	the description of the BALANCE keyword on page 6-8
3746 Model 900 Frame Relay BAN Connection Balancing	BALANCE keyword on the DLCI statement on page 16-14
Enhanced Control of the Dynamic Working Window for 3745 Token Ring	the description of the DYNWIND keyword on page 6-42
Enhanced Control of Adaptive Session Pacing	"Defining Session Pacing" on page 24-6
Specifying a Minimum Working Window for 3745 Frame Relay	the description of the DYNWIND keyword on page 16-15
LRC8 Error Checking for EP BSC USASCII	"Devices" on page 20-5
Specifying the number of frames queued for a TSS or HPTSS adapter	TRANSBUF keyword on the LINE definition statement on page 16-13
Committed information rate (CIR) on NCP controlled 3746 Model 900 frame-relay and ISDN lines	CIR keyword on the LINE definition statement on page 16-76 CIR keyword on the DLCI definition statement on page 16-13
Remote access to NCPROUTE in the absence of SNALINK	Exception to P2PDEST/HOSTADDR Matching on page 15-7
Connection balancing of frame-relay boundary access node (BAN) connections over 3745 frame-relay DLCIs	BALANCE keyword on the DLCI statement on page 16-14
IP supports for switched frame-relay lines	"Defining Frame-Relay Attachments for IP" on page 15-44
3746 Model 900 switched frame-relay physical lines.	Figure 16-45 on page 16-94
PIU checksum support	PIUCHECK keyword on the PU definition statement on page 24-9
Defining an ISDN backup line for a frame-relay line	"Defining Automatic Frame-Relay Backup over an ISDN"

Table 12-1 (Page 2 of 3). New Functions Added in V7R8, V7R7, V7R6, V7R5, V7R4, and V7R3

Function	Location
Defining backup NCP-NCPROUTE IP interfaces	"Backup IP Channel Interfaces"
Connection balancing for NTRI physical lines	the description of the BALANCE keyword on page 6-8
Limiting the DLCI range for an ISDN B-channel line	MAXDLCI on the LINE definition statement on page 7-7
New way that NCP determines link capacity and transmission time	SPEED keyword related to VTAM topology CAPACITY keyword on page 8-21
Allocating unassigned logical resources to owner-based pools	"Allocating Unassigned Logical Line Pools to Owners"
Defining an internal NCP to Model 900 point-to-point IP connection	"Defining an Internal NCP to Model 900 Point-to-Point IP Connection"
Defining ISDN subarea connectivity through a terminal adapter or a BAN device	"Defining ISDN Subarea Connectivity through a Terminal Adapter or BAN Device"
Defining relative priorities for the types (SNA, IP, and frame handler) of traffic supported by a 3745 frame-relay physical line	FRRATES on the LINE Definition Statement on page 16-11
New usage tier options	"Usage Tiers"
Defining variable subnetting for an IP route or an IP interface	"Defining Routes Explicitly"
Monitoring for excessive buffer usage by a peripheral resource	"Monitoring for Excessive Buffer Usage by a Peripheral Resource"
Specifying Token-Ring destination MAC address uniqueness	Reference to the UNIQUE keyword on page 6-31
Defining switched frame-relay 3745 physical lines	"Defining Switched Frame-Relay Physical Lines"
Controlling VR deactivation when a VR goes out-of-sequence	"Deactivating an Out-of-Sequence Virtual Route"
Integrated Services Digital Network (ISDN) Primary Rate Adapter	Chapter 7, "Integrated Services Digital Network (ISDN) Resources"
Duplicate TIC Addressing for Token-Ring	"Duplicate TIC Addressing"
Hot Standby for Multiple Link Transmission Groups (MLTGs)	"Multilink Transmission Groups"
Boundary Access Node (BAN) for Frame-Relay (FR) Subarea Links	"Boundary Access Node (BAN) for Frame-Relay Subarea Links"
Frame Relay Inoperative 'Error Count' Management Upgrades	"Defining Frame-Relay Physical Lines"
Enhanced Dynamic Windowing Algorithm for 3745 Frame Relay Logical Lines	"Defining Frame-Relay Physical Lines"
Port Sharing for NCP and 3746-900	"Shared 3746 Model 900 Resources between an NCP and 3746 Model 900"
Added flexibility in coding the ADDIFG keyword	"Controlling Adapter Overrun Errors"
X.25 ODLC resource definitions in an X.25 packet switching environment	"NDF-Generated Definition File"

Table 12-1 (Page 3 of 3). New Functions Added in V7R8, V7R7, V7R6, V7R5, V7R4, and V7R3

Function	Location
Frame relay internal frame switching support	"Defining Frame Handler Connections," "3746 Model 900 Frame Relay"
Direct NCPROUTE information over an IP channel	"Definition Statements for NCP Internet Resources"
Dialing out to frame-relay BAN devices using non-extended dial digits	"Defining Peripheral Device Addresses to VTAM"
Non-error recovery procedures for 3746 Model 900 token-ring logical stations	"Defining the Characteristics of HPR-Capable Links"
Frame relay IP connections in internet sub-networks	"Defining Frame-Relay Attachments for IP"
HPR snap trace diagnostic information for APPN HPR	"NCP and VTAM As a Composite Type 2.1 Node," and "Diagnostic Tests and Traces"
APPN HPR	Chapter 8, "Type 2.1 Node Support"
Frame relay over token ring	"Defining NTRI Attachments for a Frame-Relay Network" in Chapter 16, "Frame-Relay Resources"
IP over frame relay	"Defining Frame-Relay Attachments for IP" in Chapter 15, "Internet Resources"
IP over channel	"Defining 370 I/O Channels for IP" in Chapter 15, "Internet Resources"
Frame-relay BAN support	"Defining Frame-Relay Logical Peripheral Lines" in Chapter 16, "Frame-Relay Resources"
Hot standby MLTGs	"Multilink Transmission Groups" in Chapter 16, "Frame-Relay Resources"

## General Considerations

- Code HPR=NO on the BUILD definition if you do not want to use the HPR function. This will block HPR connections from being established, and will prevent the unique HPR modules from being included. This will decrease the NCP load module size.
- The DLCI keyword has been added. It allows the coding of 10-bit DLCIs. This allows frame-relay connections to use the full range of DLCIs (up to 991).
- The SPEED keyword may now be coded on the LINE definition statement for all channel types. With the exception of ESCON, NCP does not use this value. This capability was added so this value is available to NETDA/2 and NTuneMON.
- NDF will allow DYNWIND specification on the logical GROUP, LINE, and PU statements for frame-relay logical subarea and token-ring logical subarea resources. NDF will also accept DYNWIND specification on the physical GROUP, LINE, and PU statements. This will allow you to specify a unique DYNWIND value for each physical unit.

## NCP/EP Definition Facility

If your IBM support representative tells you to run a global trace, make the following updates.

### OPTIONS

The new NOTRGLOB keyword deactivates the global trace.

The new TRGLOB keyword activates the global trace.

Update the TVERSION keyword to generate NCP V7R8 or V7R8F.

### NCP/EP Definition Facility Standard Attachment Facility

The NDF standard attachment facility allows user-written generation applications to interface with NDF to define resources for user-written line control functions. To use the NDF standard attachment facility, make the following updates.

### OPTIONS

The new NEWDEFN keyword.

The new USERGEN keyword.

### NCPNAU

If you have a programmed SNA resource that is generated using the NDF standard attachment facility, code the VIROWNER keyword on the NCPNAU definition statement that generates your programmed SNA resource.

### GROUP

If this group of lines has user line control that is generated using the NDF standard attachment facility, code the LNKOWNER keyword.

If this group of lines is attached to an SNA programmed resource that is generated using the NDF standard attachment facility, code the VIROWNER keyword.

## NCP Migration Aid

The NCP migration aid is an NDF function that helps you migrate an NCP generation definition to a different NCP version or communication controller model. For a complete description of the migration aid, see Chapter 1.

To use the migration aid, make the following updates.

### OPTIONS

The new CHANNELS keyword causes 370 I/O channel definitions to be coded on the GROUP, LINE, and PU definition statements in the NEWDEFN file.

The new DPU keyword prevents the default allocation of resources for the dynamic path update function.

The new NERLIM keyword causes NDF to add the ERLIMIT keyword to all NETWORK definition statements in your generation definition. The NERLIM keyword is valid only for generation definitions that include SNA network interconnection (SNI).

The new REMOVCOM keyword specifies whether you want NDF to remove the comments added to the NEWDEFN file by the migration aid.

The new SAVEADDR keyword causes NDF to preserve device-specific values specified in the input generation definition.

The new TMODEL keyword specifies the IBM 3745 Communication Controller model to which you are migrating.

The new TUSGTIER keyword specifies the usage tier for the migrated generation definition.

## Migrating from NCP Version 5 Release 4

The new TVERSION keyword specifies that you are migrating to NCP V7R8 or V7R8F.

Code the TOCONV keyword if you want to consolidate the LOCALTO and REMOTTO keywords into the T1TIMER keyword.

Code the ADDRCONV keyword if you want to use the DLCI keyword instead of the ADDR keyword on your frame-relay lines.

### Reusable NEWDEFN File

To direct NDF to build your NEWDEFN file so that it can be reused as the input to NDF, make the following update.

#### OPTIONS

Changed keyword:

NEWDEFN

For information about NEWDEFN, see the *NCP, SSP, and EP Generation and Loading Guide*.

### Channel Addressing by Physical Position

You can specify a physical position instead of a logical address to define a channel link and to define the channel link associated with an emulator subchannel. To specify physical position, make the following update.

#### LINE

Changed keyword:

ADDRESS

### Usage Tiers

To specify the number of line adapters, token-ring adapters, and channel adapters allowed on your controller, to specify the operating mode for an IBM 3745-410 or IBM 3745-610 Communication Controller, and to eliminate the positional restrictions on line addresses for all IBM 3745 models, make the following updates.

#### BUILD

The new USGTIER keyword specifies the number of line adapters, token-ring adapters, and channel adapters allowed on your controller and to specify the operating mode of your IBM 3745-410 or 3745-610.

#### LINE

Changed keyword:

ADDRESS

### Logical Unit Resource Pool Definition Enhancement

To allow the full exploitation of available element addresses while specifying the number of logical units for dynamic reconfiguration or switched SDLC peripheral telecommunications links, make the following updates.

#### LUDRPOOL

Changed keywords:

NUMILU  
NUMTYP1  
NUMTYP2

## Variable Explicit Route Limits

To optimize storage by defining the explicit route capacity of a non-native network separately from that of the native networks, make the following update.

### NETWORK

The new ERLIMIT keyword specifies whether the non-native network defined by this NETWORK definition statement is to support 8 or 16 explicit routes.

**Note:** If you are using the migration aid to migrate to NCP V7R8, you can code the NERLIM keyword on the OPTIONS definition statement to add the ERLIMIT keyword to all NETWORK definition statements in your generation definition. For a description of the NERLIM keyword, see the *NCP, SSP, and EP Resource Definition Reference*.

## Automatic Resource Definition

This section describes keyword changes for *autocopy* and *autoline*. These NDF functions simplify the coding of similar lines by creating copies of a single line definition you code. Autocopy is more powerful and flexible than autoline. It is recommended that you use autocopy instead of autoline whenever possible.

**Note:** You cannot use autocopy or autoline to define certain resources. See the *NCP, SSP, and EP Resource Definition Guide* for a list of these resources.

### Automatic Resource Copying Enhancement

If you have a large network with similar lines, you can use the autocopy function to simplify coding your generation definition. Autocopy makes copies of a LINE definition statement and its subordinate definition statements and generates a unique line address for each copy in a format you specify.

To use the autocopy function, make the following updates.

### LINE

The new AUTOCOPY keyword specifies the number of copies and the label for the next copy.

### CLUSTER

The new NEXT keyword controls the format of the labels generated for the copies of this definition statement.

### TERMINAL

The new NEXT keyword controls the format of the labels generated for the copies of this definition statement.

### COMP

The new NEXT keyword controls the format of the labels generated for the copies of this definition statement.

### PU

The new NEXT keyword controls the format of the labels generated for the copies of this definition statement.

### LU

The new NEXT keyword controls the format of the labels generated for the copies of this definition statement.

### ENDAUTO

The new ENDAUTO definition statement marks the end of a group of definition statements to be copied.

### Automatic Line Generation

If you have a large network with similar lines, you can use the autoline function to simplify coding your generation definition. Autoline makes copies of a LINE definition statement and its subordinate definition statements and generates a unique line address for each copy.

**Note:** The autocopy function, described in “Automatic Resource Copying Enhancement” on page 12-17, is more powerful and flexible than autoline. It is recommended that you use autocopy instead of autoline whenever possible.

To use the autoline function, make the following updates.

<b>OPTIONS</b>	The new NEWDEFN keyword specifies whether you want the output to be formatted.
<b>LINE</b>	<p>The new ADDRESS keyword specifies the beginning address of the series of LINE definition statements to be replicated.</p> <p>You need to embed the line address in the label of the LINE definition statement, and in the label of each subordinate statement of the LINE definition statement.</p> <p>If the line address appears more than once in a statement label, the first occurrence will be used or modified in the generation of new statements.</p> <p>The new AUTOLINE keyword specifies the ending address of the last LINE definition statement that you want to be generated.</p>
<b>ENDAUTO</b>	The new ENDAUTO definition statement after the LINE definition statement's last resource.
<b>SERVICE</b>	There is no automatic line generation capability when the ORDER keyword is coded.

### Dynamically Created Control Blocks

NCP can dynamically create certain control blocks and table entries when NCP needs more than are defined in your generation definition. This enables you to provide temporary resources for high-use situations without permanently allocating NCP storage for those resources.

**Note:** Using these dynamically created resources can degrade NCP performance, so it is recommended that you define all the resources you expect to need in your generation definition and use this function only to handle unexpected demand.

To use this function, make the following updates.

<b>BUILD</b>	<p>The new DYNNSC keyword specifies how many NPM session counter control blocks (NSCs) NCP can create dynamically.</p> <p>The new DYNNSX keyword specifies how many NSC extensions NCP can create dynamically.</p> <p>The new DYNPOOL keyword specifies how much controller buffer storage NCP can use for dynamically created control blocks, and defines a dynamic resource alert threshold.</p> <p>Changed keyword:</p> <p style="padding-left: 40px;">BFRS</p>
--------------	--



## Logical Line Timer Enhancement

NCP maintains a timer for a NTRI or frame-relay logical line only when the line is active, which improves NCP performance. You do not need to update your generation definition to use this enhancement.

**GROUP** The TIMER keyword is ignored for NTRI and frame-relay logical lines.

## Type 2.1 Node Support

### Type 2.1 Peripheral Node Support

Type 2.1 node support provides communication between logical units in an SNA subarea network without the need for a host application program to relay information between the logical units. To use type 2.1 node support for peripheral nodes, make the following updates.

- BUILD** The new ADDSESS keyword specifies the number of LU-LU boundary session control blocks available for use by any independent logical unit.
- The new AUXADDR keyword specifies the number of additional addresses that can be assigned to all peripheral logical units.
- The new MAXSESS keyword specifies the maximum number of LU-LU sessions that any single NCP boundary logical unit can have.
- The new NAMTAB keyword specifies the number of entries for the network name table.
- LUDRPOOL** The new NUMILU keyword specifies the number of independent logical units you wish to add dynamically.
- GROUP** The new XMITDLY keyword specifies the length of time that NCP delays its initial transmission after answering an incoming call.
- PU** The new XID keyword enables the physical unit to receive and respond to an XID while in normal disconnected mode.
- Note:** A type 2.1 peripheral node attached by a multipoint peripheral link must be configured as a secondary station.
- LU** The new RESSCB keyword specifies the number of reserved boundary session control blocks generated for this particular independent logical unit.
- If you are using adaptive session pacing, code the VPACING keyword to override batch mode window sizes.
- Note:** If you are not using adaptive session pacing, the VPACING keyword is a VTAM-only keyword.
- Changed keyword:
- PACING

### Non-Native Network Attachment

**PU** For non-native network attachment, NETID is a VTAM-only keyword. For more information on VTAM-only definition statements and keywords, see the *VTAM Network Implementation Guide*.

### Dynamic Definition of Independent Logical Units

You can allow VTAM V3R4.1 and later releases to dynamically define independent logical units as they are needed by defining them as cross-domain resources in the VTAMLST. To allow NCP to take advantage of this VTAM feature, make the following changes.

**BUILD** If your generation definition includes LU definition statements for independent logical units and you do not want to delete them manually, code the GENILU keyword to prevent element addresses and control blocks from being generated for independent logical units with LUDR=YES.

Changed keyword:

MAXSESS

**LUDRPOOL** Changed keyword:

NUMILU

**LU** If your generation definition includes independent logical units, it is recommended that you delete the LU definition statements for these logical units and define them as cross-domain resources in the VTAMLST instead.

### APPN Support

Using APPN with VTAM V4R1 or later, NCP V7R8 can appear as a composite network node. To use this enhancement, make the following updates.

**BUILD** Changed keyword:

NAMTAB

**PU** Changed keywords:

PUTYPE

XID

**LU** The new NETID keyword specifies the name of the network that contains this logical unit.

Changed keyword:

LUDR

---

## Channel Attachments and Access Methods

### Channel-Link Definition

All 370 I/O channel attachments are defined as *channel links* on the GROUP and LINE definition statements. Each channel link has a Systems Network Architecture (SNA) network address. There are two types of channel links. Subarea channel links connect NCP to the subarea host node. Peripheral channel links connect NCP to a peripheral host node.

To define a 370 I/O channel attachment as a channel link, make the following updates.

#### BUILD

Deleted keywords:

CA  
CANETID  
DELAY  
DYNADMP  
HICHAN  
LOCHAN  
NCPCA  
TIMEOUT

#### HOST

HOST becomes a VTAM-only definition statement once channel links are defined.

For detailed explanations of VTAM-only definition statements and keywords, or for information on how to code them, see the *VTAM Network Implementation Guide*.

#### GROUP

On a separate GROUP definition statement, code LNCTL=CA to identify channel adapter definitions.

#### LINE

Code one LINE definition statement for each channel adapter.

Only the following keywords are valid:

ADDRESS  
AUTOLINE  
CA  
CASDL  
DELAY  
DYNADMP  
ETRATIO  
HICHAN  
INBFRS  
LOCHAN  
NCPCA  
NPACOLL  
TIMEOUT  
TRANSFR

The new ADDRESS keyword specifies the logical address of the channel adapter.

The new CA keyword specifies the channel adapter type.

The new CASDL keyword specifies how long the channel adapter can block inbound traffic before signaling that the station is inoperative.

## Migrating from NCP Version 5 Release 4

The new HICHAN keyword specifies the highest subchannel address on the channel adapter associated with any line operating in emulation mode, or the address of the subchannel used for the dynamic dump operation.

The new LOCHAN keyword specifies the lowest subchannel address on the channel adapter associated with any line operating in emulation mode.

The new NCPKA keyword specifies the status of the channel adapter operating in network control mode.

The new TIMEOUT keyword specifies the interval NCP is to wait for a response to an attention signal it sent to the host before initiating channel discontact.

Changed keywords:

NPACOLL  
TRANSFR

### PU

This definition statement is invalid if LNCTL=CA on the GROUP definition statement and NCPKA=INACTIVE on the LINE definition statement. Only one PU definition statement is allowed for each line if LNCTL=CA on the GROUP definition statement and NCPKA=ACTIVE on the LINE definition statement.

The new NETID keyword specifies the name of the native network.

If you are defining a peripheral channel link, code PUTYPE=2. If you are defining a subarea channel link, code PUTYPE=5.

Only the following keywords are valid:

ANS  
NETID  
NPACOLL  
PUTYPE  
TGN

Changed keyword:

NPACOLL

### LU

This definition statement is invalid if PUTYPE=5 on the PU definition statement.

Only the following keywords are valid:

LOCADDR  
LUDR  
NPACOLL  
NUMSESS  
PACING  
RESSCB

Changed keyword:

NPACOLL

## Network Addressability

This section describes the updates you need to make if you want to add the following to your NCP:

- *Extended subarea addressing*, which allows you to use subarea addresses up to 16 bits long
- *Increased explicit route capability*, which allows either 8 or 16 explicit routes between subarea pairs.

### Extended Subarea Addressing

To allow subarea addresses to range up to 16 bits, make the following updates.

<b>BUILD</b>	<p>The new SALIMIT keyword defines the largest subarea address supported by this node in the native network.</p> <p>Changed keywords:</p> <ul style="list-style-type: none"> <li>NUMHSAS</li> <li>PATHEXT</li> <li>SUBAREA</li> <li>TGBXTRA</li> <li>VRPOOL</li> </ul>
<b>HOST</b>	<p>Changed keyword:</p> <ul style="list-style-type: none"> <li>SUBAREA</li> </ul>
<b>PATH</b>	<p>Changed keywords:</p> <ul style="list-style-type: none"> <li>DESTSA</li> <li>ER0 through ER7</li> </ul>
<b>SDLCST</b>	<p>Changed default:</p> <ul style="list-style-type: none"> <li>TADDR</li> </ul>
<b>LINE</b>	<p>Changed keyword:</p> <ul style="list-style-type: none"> <li>TADDR</li> </ul>
<b>PU</b>	<p>Deleted keyword:</p> <ul style="list-style-type: none"> <li>SUBAREA</li> </ul>
<b>NETWORK</b>	<p>The new SALIMIT keyword defines the largest subarea address supported by this node in this non-native network.</p> <p>The new TGBXTRA keyword specifies the number of extra transmission group control blocks needed in this non-native network.</p> <p>Changed keywords:</p> <ul style="list-style-type: none"> <li>NUMHSAS</li> <li>PATHEXT</li> <li>SUBAREA</li> </ul>

### Increased Explicit Route Capability

To allow support for either 8 or 16 explicit routes between subarea pairs, make the following updates.

<b>BUILD</b>	<p>The new ERLIMIT keyword specifies whether you want your NCP to support 8 or 16 explicit routes.</p>
<b>PATH</b>	<p>The new ER8 through ER15 keywords specifies the adjacent subarea and transmission group number for each explicit route.</p> <p>Changed keywords:</p> <ul style="list-style-type: none"> <li>VR0 through VR7 keywords</li> </ul>

### Subarea Channel-Link Activation

To support activation and deactivation of subarea channel links by a system services control point (SSCP), make the following updates.

**LINE** Changed keyword:

MONLINK

**PU** Changed keyword:

ANS

### Enterprise Systems Connection Support

An Enterprise Systems Connection (ESCON) link provides multiple logical connections through an ESCON adapter to another host in your network over a single physical line.

ESCON links also take advantage of the 3746 Model 900 connectivity subsystem, which improves NCP performance by performing NCP data link control processing. To use ESCON links, you must have the 3746 Model 900 installed in your communication controller and you must obtain the NCP V7R8 feature from IBM.

The 3745 Model 900 comes with the 3745 ESCON Generation Assistant, which is an IBM PS/2 tool that helps you define ESCON links to NCP, the I/O Configuration Program (IOCP), and the maintenance and operator subsystem extended (MOSS-E). The 3745 ESCON Generation Assistant is provided on a diskette contained in *3745 Model A Migration and Planning Guide*.

To use ESCON links, make the following updates.

**BUILD** The new CSSTIER keyword specifies the usage tier for the optional NCP feature for 3746 Model 900 support.

Changed keyword:

TRCPIU

**GROUP** The new PHYSRSC keyword associates a token-ring logical line with a physical station.

Changed keywords:

LNCTL

**LINE** The new HOSTLINK keyword associates a logical line with the host link to a peripheral or subarea node.

Changed keywords:

ADDRESS  
AUTOLINE  
CASDL  
DELAY  
MAXPU  
MONLINK  
NPACOLL  
SPEED  
TIMEOUT  
TRANSFER

**PU**

The new CASDL keyword specifies how long the link can block inbound data before signaling that the station is inoperative.

The new DELAY keyword specifies the minimum interval that NCP is to delay from the time data is available to the host to the time an attention signal is presented to the link.

The new MONLINK keyword causes SMMF to activate the logical link whenever this station is activated.

The new TIMEOUT keyword defines how long NCP is to wait for a response from the host.

The new TRANSFR keyword specifies how much data NCP can receive from this station during a single data transfer operation.

Changed keywords:

ADDR  
ANS  
MAXBFRU  
NETID  
NPACOLL  
PUDR  
PUTYPE  
SRT  
TGN  
XMONLNK

---

## **NCP and Link-Attached Devices**

### **IBM 3745 Line Interface Coupler 4 Requirement for SPEED**

If you are using the X.21 interface, make the following updates.

**LINE**

Changed keywords:

CLOCKNG  
SPEED

### **Shared Port Identification**

You can assign more than one node that can communicate with NCP to the same NCP port. In this configuration, the shared port identification function can reduce the amount of VTAM processing required to determine whether a node can communicate with NCP. It does this by allowing VTAM to identify the port through which the node communicates rather than the node itself; since there are fewer ports than nodes, less processing is required.

To use the shared port identification function, make the following update.

**LINE**

The new ID keyword specifies the hexadecimal representation of the node identification field to be returned to the host in the request contact response/request unit (RU) when a dial connection is made.

### SSCP Monitor Mode Function

To cause NCP to use the SSCP monitor mode function (SMMF) to activate SDLC peripheral links, make the following update.

**PU** The new XMONLNK keyword specifies that NCP can activate nonswitched SDLC links for physical units other than type 4.

### IBM 4941 Modems

To use IBM 4941 modems, make the following updates.

**LINE** The new AUTO keyword.

The new LPDA2DL keyword specifies whether the line uses modems that support the LPDA2 modem dial facility but are not LPDA2 modems.

The new RING keyword specifies that the modem has the ring-indicator interface.

### Multiple Local Modem Support

Multiple local modem support allows LPDA2 tests to be run on lines that use multiple local modems. Multiple local modems may exist on both segments of a tailed line. To create addressability and direct LPDA2 testing to a specific modem, make the following updates.

**TERMINAL** The new LMODADR keyword specifies the modem address and segment.

**LINE** Code LPDATS=LPDA2 on the line associated with this station.

**PU** The new LMODADR keyword specifies the modem address and segment.

### IBM 3174 Group Poll

When an IBM 3174 controller acts as a gateway between NCP and an IBM Token-Ring Network, NCP can determine whether any station on the token ring has data to send by polling the controller rather than by polling each station on the token ring, which improves NCP performance. To enable NCP to use the group poll function, make the following update.

**PU** The new GP3174 keyword indicates that a poll to an IBM 3174 gateway controller can be a group poll for any station.

### V.25 Bis

The V.25 bis protocol uses a single line to establish a call and to send and receive data. This can be more efficient than using a separate line for each of these functions.

To use the V.25 bis protocol for NCP or EP lines, make the following updates.

**GROUP** The new PROPID keyword as PROPID=*label*, where *label* is the address label to a user-defined subvector X'11' that contains the product identifier for IBM special products or user-written code. This identifier is used in a generic alert in the event of a V.25 bis modem dial failure.

**LINE** The new V25BIS keyword specifies that the modem for this line supports the V.25 bis protocol.



## 3746 Model 900 Connectivity Subsystem SDLC Lines

You can attach switched and nonswitched Synchronous Data Link Control (SDLC) lines to NCP through the 3746 Model 900 connectivity subsystem using a communication line adapter (CLA). The 3746 Model 900 improves NCP performance by performing NCP data link control processing. To use the 3746 Model 900, you must obtain the NCP V7R8 feature from IBM.

To define a 3746 Model 900 SDLC connection, make the following updates.

<b>BUILD</b>	The new CSSTIER keyword specifies the usage tier for the optional NCP feature for 3746 Model 900 support.
<b>GROUP</b>	Changed keyword: X21NTWK
<b>LINE</b>	Changed keywords: ADDRESS AUTO LPDATS LPDA2DL SPEED

## Spare SDLC Lines

3745-attached SDLC peripheral lines can be generated as spare lines, redefinable lines, or as neither. By generating spare and redefinable lines, you can use NTuneMON with NTuneNCP to enable and disable the activation of physical lines from your communication controller without regenerating and reloading NCP.

**Note:** To be spare or redefinable, a line must be the only line in its group.

To use this function, make the following updates.

<b>LINE</b>	Changed keyword: USE
-------------	-------------------------

---

## Token-Ring Resources

### NTRI Lines

You can use NCP/Token-Ring interconnection (NTRI) to enable NCP to communicate with subarea or peripheral nodes on a token ring. To include NTRI resources in your network configuration, make the following updates.

**Note:** To generate NTRI resources, you need to define at least one physical line and at least one logical line.

<b>OPTIONS</b>	Code YES as the first suboperand of the NEWDEFN keyword.
<b>BUILD</b>	The new LOCALTO keyword specifies the NTRI acknowledgment timer value when a logical connection is established with a terminal connected to a local IBM Token-Ring Network.

The new REMOTTO keyword specifies the NTRI acknowledgment timer value when a logical connection is established with a terminal connected to a remote IBM Token-Ring Network.

The new T2TIMER keyword specifies the maximum number of I-frames you want NTRI to receive over all logical subarea lines before sending a receive-ready (RR) or receive-not-ready (RNR) acknowledgment.

### **NTRI Subarea Lines**

You can use NTRI to allow NCP to communicate with subarea nodes on physical subarea lines and logical subarea lines on the token ring. The following sections describe the coding for physical subarea lines and logical subarea lines.

***NTRI Physical Subarea Lines:*** To define a NTRI physical subarea line, update the following keywords.

#### **LUDRPOOL**

The new NUMTYP2 keyword specifies the number of logical units included in the logical unit pool.

#### **GROUP**

The new ECLTYPE keyword specifies that this group defines a physical connection to the IBM Token-Ring Network.

**Note:** Coding ECLTYPE causes certain definition statements and keywords to be added automatically to the generation definition. You can also code these definition statements and keywords manually.

The new second suboperand on the ECLTYPE keyword specifies that this group of lines communicates with subarea nodes.

#### **LINE**

Update the relative line number on the ADDRESS keyword.

Code FULL as the data transfer mode on the ADDRESS keyword.

The new BEACTO keyword specifies a beacon time-out value.

The new LOCADD keyword specifies the locally administered address for the token-ring interface coupler (TIC).

The new MAXTSL keyword specifies the maximum transmit segment length.

The new PORTADD keyword specifies the port address associated with the TIC.

The new RCVBUFC keyword specifies the receive buffer capacity.

#### **PU**

Changed keyword:

ANS

***NTRI Logical Subarea Lines:*** To define a NTRI logical subarea line, update the following keywords.

#### **GROUP**

The new ECLTYPE keyword specifies that this group defines a logical connection to the IBM Token-Ring Network.

**Note:** Coding ECLTYPE causes certain definition statements and keywords to be added automatically to the generation definition. You can also code these definition statements and keywords manually.

The new second suboperand on the ECLTYPE keyword specifies this group of lines communicates with subarea nodes.

The new PHYPORT keyword specifies the physical port address or TIC with which the lines in this group will be associated.

**Note:** Ensure that the second suboperand on the ECLTYPE keyword matches between physical and logical line definitions that have the same values coded for PORTADD and PHYPORT.

This keyword is not valid:

XMITDLY

**LINE**

The new LOCALTO keyword specifies the NTRI acknowledgment timer value for a single line when a logical connection is established with a terminal connected to a local IBM Token-Ring Network.

The new REMOTTO keyword specifies the NTRI acknowledgment timer value for a single line when a logical connection is established with a terminal connected to a remote IBM Token-Ring Network.

The new RETRIES keyword specifies the number of attempts to recover from errors occurring during transmission over the logical line.

The new SDLCST keyword defines the values used when NCP is in a primary or secondary state.

The new T2TIMER keyword specifies the maximum number of I-frames you want NTRI to receive over a particular logical subarea line before sending a receive-ready (RR) or receive-not-ready (RNR) acknowledgment.

**PU**

Changed keyword:

ADDR

**NTRI Peripheral Lines**

You can use NTRI to allow NCP to communicate with peripheral nodes on physical peripheral lines and logical peripheral lines on the token ring. The following two sections describe the coding for physical peripheral lines and logical peripheral lines.

***NTRI Physical Peripheral Lines:*** To define a NTRI physical peripheral line, update the following keywords.

**LUDRPOOL**

The new NUMTYP2 keyword specifies the number of logical units included in the logical unit pool.

**GROUP**

The new ECLTYPE keyword specifies that this group defines a physical connection to the IBM Token-Ring Network.

**Note:** Coding ECLTYPE causes certain definition statements and keywords to be added automatically to the generation definition. You can also manually code these definition statements and keywords.

The new second suboperand on the ECLTYPE keyword specifies that this group of lines communicates with peripheral nodes.

**Note:** Peripheral is the default for the second suboperand.

Changed keyword:

LSPRI

## Migrating from NCP Version 5 Release 4

**LINE** Update the relative line number on the ADDRESS keyword.  
Code FULL as the data transfer mode on the ADDRESS keyword.  
The new BEACTO keyword specifies a beacon time-out value.  
The new LOCADD keyword specifies the locally administered address for the TIC.  
The new MAXTSL keyword specifies the maximum transmit segment length.  
The new PORTADD keyword specifies the port address associated with the TIC.  
The new RCVBUFC keyword specifies the receive buffer capacity.

**PU** Changed keyword:  
ANS

***NTRI Logical Peripheral Lines:*** To define a NTRI logical peripheral line, update the following keywords.

**GROUP** The new AUTOGEN keyword specifies the number of LINE and PU definition statement pairs that you want NDF to automatically add to the GROUP definition statement.  
The new ECLTYPE keyword specifies that this group defines a logical connection to the IBM Token-Ring Network.  
**Note:** Coding ECLTYPE causes certain definition statements and keywords to be added automatically to the generation definition. You can also manually code these definition statements and keywords.  
The new second suboperand on the ECLTYPE keyword specifies that this group of lines communicates with peripheral nodes.  
**Note:** Peripheral is the default for the second suboperand.  
The new PHYPORT keyword specifies the physical port address or TIC with which the lines in this group will be associated.  
**Note:** Ensure that the second suboperand on the ECLTYPE keyword matches between physical and logical line definitions that have the same values for PORTADD and PHYPORT.

**LINE** The new RETRIES keyword specifies the number of attempts to recover from errors occurring during transmission over the logical line.

### Token-Ring Interface Coupler Swap

To define a spare TIC, make the following update.

**GROUP** Changed keyword:  
COMPSWP

### 16-Megabit Token-Ring Speed

To support 4 Mbps and 16 Mbps token-ring speed or early token release at 16 Mbps, or to support subarea and peripheral nodes through the same adapter, make the following updates.

**GROUP** The new ECLTYPE keyword allows support for a mixture of subarea and peripheral nodes on the same adapter.

**LINE** The new ADAPTER keyword specifies the type of adapter you are using.

The new TRSPEED keyword specifies whether you want your NCP to function at 4 Mbps or 16 Mbps.

Changed keywords:

MAXTSL  
RCVBUFC

## Token-Ring Serviceability Enhancement

To activate the NCP snap trace for token-ring resources, make the following update.

**BUILD** The new NCPTRACE keyword specifies whether the NCP snap trace is to be activated for token-ring resources.

## Network Performance Data Collection for Token-Ring Resources

To allow NetView Performance Monitor (NPM) to collect performance data for designated token-ring resources, make the following update.

**LINE** Changed keyword:

NPACOLL

## Counter Thresholds for NTRI Lines

You can define a threshold for the number of transmissions and for the number of retries associated with a physical unit. When either of these thresholds is reached, NCP sends a PIU to notify the host of the condition. To define these thresholds for a NTRI logical line, make the following update.

**PU** Changed keyword:

SRT

## NTRI Delayed Logical Link Activation

To cause VTAM 4.3.1 and later releases to delay the activation of an NCP/Token-Ring interconnection (NTRI) logical line associated with a physical station until the station is activated, make the following update.

**GROUP** The new PHYSRSC keyword associates a NTRI logical line with a physical station and is used to delay the activation of the line until the station is activated.

## 3746 Model 900 Connectivity Subsystem Token-Ring Resources

You can connect a token ring to NCP through the 3746 Model 900 connectivity subsystem using the type 3 token-ring interface coupler. The 3746 Model 900 improves NCP performance by performing NCP data link control processing. To use the 3746 Model 900, you must obtain the NCP V7R8 feature from IBM.

To define a 3746 Model 900 token-ring connection, make the following updates.

<b>BUILD</b>	<p>The new CSSTIER keyword specifies the usage tier for the optional NCP feature for 3746 Model 900 support.</p> <p>Changed keyword:</p> <p>TRCPIU</p>
<b>GROUP</b>	<p>The new ADAPTER keyword specifies which type of token-ring interface coupler is attached to the token-ring physical lines in this group.</p> <p>The new PHYSRSC keyword associates a token-ring logical line with a physical station.</p> <p>Changed keywords:</p> <p>AUTOGEN ECLTYPE</p>
<b>LINE</b>	<p>The new LOCALTO keyword specifies the token-ring acknowledgement timer value when a logical connection is established with a terminal connected to a remote IBM Token-Ring Network.</p> <p>Changed keywords:</p> <p>ADAPTER ADDRESS BEACTO LOCADD LSPRI PORTADD SPEED TRSPEED</p>
<b>PU</b>	<p>Changed keywords:</p> <p>ADDR PUTYPE TGN XMONLNK</p>

### NTRI Keywords Not Used for 3746 Model 900 Token Ring

The following keywords, which define resources for NTRI, are ignored (or invalid, as indicated) for 3746 Model 900 token ring. For a step-by-step description of how to convert a NTRI definition to a 3746 Model 900 token-ring definition, see the *NCP, SSP, and EP Resource Definition Guide*.

<b>GROUP</b>	<p>COMPACB COMPOWN COMPSWP COMPTAD LEVEL2</p>
--------------	---

	LEVEL3
	LEVEL5
	LINEADD
	TIMER
	USERID
	XIO
	XMITDLY
<b>LINE</b>	RCVBUFC
	UACB
<b>PU</b>	SRT (invalid)
<b>LU</b>	Entire definition statement (invalid)

---

## Routes between Subareas

### Dynamic Path Update

Dynamic path update enables you to update an NCP routing table without interrupting network operation. With dynamic path update, you can:

- Define a transmission group dynamically
- Change the transmission priority thresholds of a transmission group
- Change the mapping of explicit routes to virtual routes
- Change the size of virtual route pacing windows.

To use dynamic path update, make the following updates.

<b>PCCU</b>	<p>PCCU is a VTAM-only definition statement. The new NEWPATH keyword represents the path table update members.</p> <p>For detailed explanations of VTAM-only definition statements and keywords, or for information on how to code them, see the <i>VTAM Network Implementation Guide</i>.</p>
<b>BUILD</b>	<p>The new PATHEXT keyword specifies the number of extra transit-routing-table rows and explicit-route-to-virtual-route mapping list rows that NDF should generate for the native network after the PATH definition statements are processed.</p> <p>The new TGBXTRA keyword specifies the number of extra transmission group control blocks that must be generated for the native network after the PATH definition statements are processed.</p> <p>The new second suboperand of the VRPOOL keyword to specify the number of window size specifications that you are adding to those already defined by the PATH definition statements.</p>
<b>NETWORK</b>	<p>The new PATHEXT keyword specifies the number of extra transit-routing-table rows and explicit-route-to-virtual-route mapping list rows that NDF should generate for each non-native network after the PATH definition statements are processed.</p> <p>The new TGBXTRA keyword specifies the number of extra transmission group control blocks that must be generated for each non-native network after the PATH definition statements are processed.</p>

### Switched Subarea Support

Switched subarea support increases network flexibility by providing subarea-to-subarea communication over switched subarea links. To use switched subarea support, make the following updates.

#### GROUP

Changed keyword:

ACTIVTO

The new DIAL keyword specifies whether the lines in the group require switched line control procedures.

Code NETID=(name, ANY) if different values for NETID are to be specified on one PU definition statement for this group.

The new PUTYPE keyword specifies a switched subarea group.

#### LINE

The ID keyword is invalid.

#### PU

The new BRKCON keyword specifies that NCP can break the switched connection if the line has been idle for the period of time specified by the ACTIVTO keyword on the configurable GROUP definition statement.

On all PU definition statements in each group, code the same value for the NETID keyword, unless NETID=(name, ANY) is coded on the GROUP definition statement.

The following keywords are invalid:

ANS  
MAXOUT  
TGN

### Casual Connection

To allow NCP to appear as a type 2.1 physical unit in a local environment, make the following updates.

#### GROUP

Changed keywords:

DIAL  
MODE

#### LINE

The new SRETRY keyword specifies the number of retries that you want a secondary physical unit to attempt.

Changed keywords:

CALINE  
CHANLA  
CHNLZ  
CLINES  
CORNUM  
DUPLEX  
HDXSP  
LPDATS  
MAXPU  
NEWSYNC  
RETRIES  
SERVLIM  
TADDR  
TAILING



**SERVICE** This definition statement may be omitted when MODE=SECONDARY is specified on the GROUP definition statement.

Changed keywords:

MAXLIST  
ORDER

**PU** The new ROLE keyword specifies switched SDLC lines as negotiable or primary.

Changed keywords:

IRETRY  
PUDR  
RETRIES  
XID

Changed default:

PASSLIM

## Multilink Transmission Group Processing Enhancements

### Line Selection Order

NCP can select individual lines in a multilink transmission group (MLTG) either in the order in which they are activated or in order of user-defined line priority. To specify line selection order, make the following updates.

**BUILD** The new MLTGORDR keyword specifies whether lines are to be selected in order of activation or order of priority.

**LINE** The new MLTGPRI keyword assigns a priority to a line.

### Mixed-Media Multilink Transmission Groups

An MLTG can contain more than one token-ring or frame-relay line, and can contain a combination of SDLC, token-ring, and frame-relay lines. To take advantage of this enhancement, make the following updates.

**PU** The new TGCONF keyword specifies whether a subarea link station is in a single-link or multilink transmission group.

Changed keywords:

MAXDATA  
TGN

## Blocked Virtual Route Alerts

To cause NCP to generate generic alerts for a blocked virtual route, make the following updates.

**BUILD** The new VRTIMER $n$  keyword specifies, for all of NCP, the length of time a virtual route can be congested before NCP sends an alert, and the length of time a virtual route can be held before NCP deactivates the route and sends an alert.

**NETWORK** The new VRTIMER $n$  keyword specifies, for a single non-native network, the length of time a virtual route can be congested before NCP sends an alert, and the length of time a virtual route can be held before NCP deactivates the route and sends an alert.

## Connections between Subarea Nodes

### Multipoint Subarea Support

You can define a single SDLC line as a multipoint subarea link to connect a single *primary* NCP to multiple *secondary* nodes (VTAM hosts or other NCPs) in a network. In this configuration, the primary NCP can exchange data with all the secondary nodes, but the secondary nodes cannot exchange data among themselves.

To define a multipoint subarea link, you need to define:

- A point-to-point subarea link between the primary NCP and each of the secondary nodes
- A multipoint subarea link connecting the primary NCP to all the secondary nodes.

#### Predefined Subarea Links for Primary Stations

To define the primary station on a point-to-point subarea link, make the following updates.

**GROUP**

Code two GROUP definition statements, the first with the MODE keyword describing NCP as primary and the second describing NCP before the controllers are contacted.

**LINE**

The new SDLCST keyword specifies which SDLC selection table entry NCP uses.

#### Predefined Subarea Links for Secondary Stations

To define a secondary station on a point-to-point subarea link, make the following updates.

**GROUP**

Code two GROUP definition statements, the first with the MODE keyword describing NCP as secondary and the second describing NCP before the controllers are contacted.

**LINE**

The new SDLCST keyword specifies which SDLC selection table entry NCP uses.

Changed keyword:

LPDATS

#### Multipoint Subarea Links for Primary Stations

To define the primary station on a multipoint subarea link, make the following updates.

**GROUP**

Code one GROUP definition statement with the MODE keyword describing NCP as primary.

**LINE**

These keywords are not valid:

CONFIG

IPL

SDLCST

TADDR

**SERVICE** This keyword is not valid:

MAXLIST

**PU** Code the new ADDR keyword on all PU definition statements.

Any valid PUTYPE value (1, 2, or 4) may be specified if at least one PU statement has PUTYPE coded as 4.

**Note:** PUTYPE=4 must be specified for type 4 and type 5 physical units on a multipoint line.

### **Multipoint Subarea Links for Secondary Stations**

To define a secondary station on a multipoint subarea link, make the following updates.

**GROUP** Code one GROUP definition statement with the MODE keyword describing NCP as secondary.

**LINE** Changed keywords:

CALINE  
CHANLA  
CHNLZ  
CLINES  
CONFIG  
CORNUM  
LPDATS  
NEWSYNC  
SDLCST  
SERVLIM  
TAILING

The new TADDR keyword defines a symbolic link station address for NCP.

**PU** Changed keywords:

ADDR  
RETRIES

The physical unit defined on this line must be type 4 or type 5 and must be coded PUTYPE=4.

## **Pause Enhancement**

You can improve performance over an SDLC link to a configurable station by defining a different polling cycle duration for primary and secondary subarea links. To do this, make the following updates.

**SDLCST** The new PAUSE keyword defines a different polling cycle duration for primary and secondary subarea links.

**LINE** Changed keyword:

PAUSE

## Parallel Transmission Group Support for Channel Links

To allow VTAM and NCP to communicate using up to 16 channel links, make the following updates.

<b>GROUP</b>	Changed keyword: LNCTL
<b>PATH</b>	Changed keywords: ER0 through ER15
<b>PU</b>	Changed keywords: PUTYPE TGN

## Enhanced Loading and Activation for Remote Controllers

This section lists keyword changes that enable an operator to load NCP into a remote communication controller over a switched subarea line or a NTRI subarea or X.25 line.

### Switched Subarea Lines (SDLC, X.21, or X.25)

To allow an operator to load NCP into a remote communication controller over a switched subarea line (SDLC, X.21, or X.25), make the following updates.

<b>SWMMT</b>	The new IDNUM keyword specifies a unique identification that verifies the sender and receiver for each line.  The new MAXOUT keyword specifies the number of PIUs to be sent before asking for a response.  The new NETID keyword specifies the network identification of the designated sender.
<b>LINE</b>	The new SWMMTID keyword specifies the name of a switched SSCP monitor mode function (SMMF) table defined by a group of SWMMT definition statements.  Changed keywords: IPL MONLINK

### NTRI Subarea Lines and X.25 Lines

To allow an operator to load NCP into a remote communication controller over a NTRI subarea line or an X.25 line, make the following updates.

<b>LINE</b>	Changed keywords: IPL MONLINK
-------------	-------------------------------------

---

## Interconnected Networks

### SNA Network Interconnection Session Limit Increase

To increase the number of sessions available on your gateway NCP, make the following updates.

**BUILD** Changed keywords:

HSBPOOL  
NETLIM

**GWNAU** Changed keyword:

NUMSESS

**NETWORK** Changed keyword:

NETLIM

### Dynamic Network Identification

You can define network resources that enable a gateway NCP to define adjacent networks dynamically. This enables the gateway NCP to conduct sessions with networks not defined to it. To do this, make the following updates.

**GROUP** Changed keyword:

NETID

**NETWORK** The new COPIES keyword defines the number of model networks available.

Changed keyword:

NETID

### Gateway Session Accounting

If you want your NCP to collect data on cross-network sessions, make the following updates:

**Note:** Gateway session accounting is available only if you have NPM R3 or a later release.

**BUILD** The new GWSESAC keyword specifies the following:

- Whether you want NCP to collect cross-network session information
- How many NPA session counters control blocks (NSCs) to generate in addition to those generated for session accounting
- How many bytes and PIUs to count before sending cross-network session accounting data to NPM
- Whether you want to defer data collection
- How to count PIU distribution length values
- How many NPM session counter extensions blocks (NSXs) to generate in addition to those generated for session accounting

## Migrating from NCP Version 5 Release 4

- Whether you want your NCP to collect data about cross-network sessions using the procedure correlation identifier (PCID) sent during session setup instead of the PCID sent during session establishment.

### Gateway Session Pacing Override

To force sessions through the gateway NCP to use session pacing, make the following updates.

<b>BUILD</b>	The new GWPACING keyword causes the gateway NCP to reject sessions that are not paced or to use session pacing by overriding the session-pacing parameters.
<b>NETWORK</b>	The new GWPACING keyword causes the gateway NCP to reject sessions that are not paced or to use session pacing by overriding the session-pacing parameters.

---

## Emulation Mode Resources

### Selection of EP Sense Codes

To select either the Intervention Required (IR) or the Command Reject (CR) sense code when a WRITE command is issued to an EP line that is not enabled, make the following update.

<b>LINE</b>	Changed keyword: CU
-------------	------------------------

---

## Teletypewriter Exchange Service

### Teletypewriter Exchange Service Auto-Speed Detection

With TWX terminals, if you are defining an NCP or EP start-stop telecommunication link that is internally clocked and you want NCP or EP to determine the speed for the link, make the following update.

<b>LINE</b>	Changed keyword: SPEED
-------------	---------------------------

---

## Customized Functions

### Maximum Load Module Size Increase

To control the location in memory of user-written and preassembled control blocks and code for IBM special products or user-written code, make the following updates.

<b>GENEND</b>	Changed keywords: INCHI ORDHI SRCHI
---------------	--

---

## Defining Diagnostic Aids

### Channel Adapter IOH Trace

The channel adapter input/output halfword (IOH) trace is a maintenance and debugging tool that traces information flowing through a single channel adapter. To use this trace, make the following update.

**BUILD** The new CAIOTRC keyword specifies whether your NCP is to include the channel adapter IOH trace.

### Link Problem Determination Aid

If you are using the link problem determination aid (LPDA), make the following updates.

**LINE** If the link uses modems that support LPDA commands, change the value of the LPDATS keyword.

If you are defining a line attached to a 586x modem operating in normal (LPDA2) mode, the validity checking of the TAILING keyword has changed.

Changed keywords:

CALINE  
CHANLA  
CLINES

To enable NCP to start an LPDA2 test from the secondary side of a link, change the following keywords:

LPDATS  
TAILING

**TERMINAL** If you code LPDATS=LPDA2 on the link for a device, do not code X'FF' or X'FD' on the ADDR or POLL keywords.

**PU** If you do not want to run LPDA for a particular physical unit on an LPDA line, code LPDA=BLOCK on the PU definition statement.

If you code LPDATS=LPDA2 on the link for a physical unit, do not code X'FD' or X'FF' on the ADDR keyword.

The new third suboperand of the SRT keyword to specify whether LPDA should be run when the total transmissions counter reaches its threshold.

Do not code the LPDA keyword for a type 4 physical unit.

### IBM 786x Modems Extended LPDA2 Capability

To support LPDA tests on all ports of a channelized modem, make the following updates.

**LINE** The new PORT keyword specifies which port of the data multiplex local modem the SDLC or BSC line is connected to.

Changed keywords:

CHANLA  
CHNLZ  
CORNUM

LPDATS  
TAILING  
PU Changed keyword:  
SRT

---

## Backup and Recovery Procedures

### Extended Recovery Facility

If you are including the extended recovery facility (XRF) in your network configuration, make the following update.

**BUILD** The new BACKUP keyword specifies the total number of logical units for which XRF support is required.

---

## Performance Characteristics

### Network Performance Data Collection

If you are using the NPM function to collect performance data on resources attached to your NCP, make the following updates.

**BUILD** Code NPA=(YES,DR) to specify that network performance data is to be collected for dynamic reconfiguration resources.

**LINE** If you are defining a link that is externally clocked, code the SPEED keyword to ensure correct calculation of the data rate for this link.

### Session Accounting

If you want your NCP to collect accounting information for boundary sessions, make the following updates.

**BUILD** The new SESSACC keyword specifies the following:

- Whether you want your NCP to collect session accounting information
- How many NPA session counters control blocks (NSCs) to generate
- How many bytes and PIUs to count before sending session accounting data to NPM
- Whether you want session accounting done on primary logical units, secondary logical units, or all logical units
- Whether you want to defer data collection
- How many PIU distribution length values to count
- How many NPM session counter extensions blocks (NSXs) to generate.



## Link Session Priority

You can specify whether NCP is to send PIUs to a physical unit in the order in which NCP received them or in order of the transmission priority of the PIUs. To do this, make the following updates.

- LINE** The new LSPRI keyword specifies the basis of the transmission order for sending PIUs to a physical unit.
- The new LINK suboperand on the LSPRI keyword to cause transmission priority to be the basis of transmission order for all PIUs across the link.

## NPM Data Collection for IBM Special Products or User-Written Code

NPM allows you to collect, store, and display performance data for selected network resources. If you want IBM special products or user-written code resources to report performance data to NPM, make the following updates.

- LINE** Changed keyword:  
NPACOLL
- CLUSTER** Changed keyword:  
NPACOLL
- TERMINAL** Changed keyword:  
NPACOLL
- PU** Changed keyword:  
NPACOLL

## NPM Session Accounting for IBM Special Products or User-Written Code

NPM allows you to collect, store, and display session accounting data for selected network sessions. If you want IBM special products or user-written code resources to report session accounting data to NPM, make the following update.

- GENEND** The new UACCTNG keyword specifies the entry points of user-written accounting notification routines.

## Adaptive Session Pacing Enhancement

To specify whether NCP is to use adaptive session pacing or fixed session pacing for data sent to a logical unit, make the following updates.

- LU** Changed keywords:  
PACING  
VPACING

### PIU Blocking Performance Improvements for Subarea Links

You can improve the performance of type 4 physical units attached to nonswitched transmission group subarea links by *blocking* PIUs, that is, by sending more than one PIU in each SDLC frame. To do this, make the following update.

**PU** Changed keyword:  
BLOCK

### NPM Data Collection by Transmission Priority

To collect performance data on a particular line or physical unit for each PIU transmission priority level, make the following updates.

**BUILD** Changed keyword:  
NPA

**LINE** The new NPATP keyword specifies whether you want network performance data to be collected by transmission priority for this line in addition to the regular network performance data.

**PU** The new NPATP keyword specifies whether you want network performance data to be collected by transmission priority for this physical unit in addition to the regular network performance data.

**LU** The new MAXTP keyword specifies the maximum number of resources for which NPM is to collect network performance data by transmission priority at one time for the session.

---

## Internet Protocol

NCP can route Internet Protocol (IP) datagrams between internet hosts over SNA networks, Ethernet-type LANs, and NTRI-attached token rings. This section describes the updates required to define the resources for these functions.

### General Internet Resources

To define resources for general internet routing support, make the following updates.

**BUILD** The new IPPOOL keyword specifies a limit on the number of NCP buffers that can be used to receive IP datagrams.

The new IPRATE keyword specifies the maximum rate at which NCP is to receive internet frames from Ethernet-type or NTRI LANs.

The new IPSNAP keyword activates the NCP snap trace for internet resources.

### Internet Routing over SNA Networks

NCP can route IP datagrams over an SNA network using an NCP connectionless SNA transport (NCST) session between an NCST logical unit in NCP and a remote NCST logical unit. To define resources for an NCST session, make the following updates.

<b>BUILD</b>	<p>The new CNLSQMAX keyword specifies the maximum size for NCST session queues when NCP is in a slowdown state.</p> <p>The new CNLSQTIM keyword specifies the maximum time that NCP is to keep a PIU on an NCST session outbound queue.</p>
<b>GROUP</b>	<p>The new NCST keyword defines a group of NCST session interfaces.</p>
<b>LU</b>	<p>The new INTFACE keyword specifies the name of the local internet interface for the NCP NCST logical unit.</p> <p>The new REMLU keyword specifies the remote NCST logical unit that will be the session partner for the NCP NCST logical unit.</p>
<b>IPOWNER</b>	<p>The new IPOWNER definition statement defines the internet address of the owning IBM TCP/IP host and a route to the host.</p> <p>The new HOSTADDR keyword specifies the internet address of the owning host.</p> <p>The new INTFACE keyword specifies the local NCST interface to the owning host.</p> <p>The new MAXHELLO keyword specifies how many <i>Hello</i> datagrams NCP is to send to the owning host without receiving an acknowledgment.</p> <p>The new NUMROUTE keyword specifies how many routes the owning host can add beyond the number defined in your generation definition.</p> <p>The new UDPPORT keyword specifies the User Datagram Protocol port address the owning host will use to communicate with NCP.</p>
<b>IPLOCAL</b>	<p>The new IPLOCAL definition statement defines a local internet interface for the NCP NCST logical unit. If the logical unit is directly attached to NCP, the IPLOCAL definition statement also defines an internet route to the logical unit.</p> <p>The new INTFACE keyword specifies the name of the NCP NCST logical unit.</p> <p>The new LADDR keyword specifies the internet address of the interface.</p> <p>The new METRIC keyword assigns a metric to the interface to enable NCP to select the most desirable route to a destination.</p> <p>The new P2PDEST keyword specifies the internet address of the host that contains the remote NCST logical unit.</p> <p>The new PROTOCOL keyword specifies whether the interface is to be managed through Routing Information Protocol (RIP).</p> <p>The new SNETMASK keyword defines a mask that identifies the subnetwork portion of the address specified by LADDR.</p>

## Internet Routing over Ethernet-Type LANs

NCP can route internet traffic to devices attached to an Ethernet-type LAN. NCP can use both Ethernet Version 2 and Institute of Electrical and Electronic Engineers (IEEE) standard 802.3 frame formats on the same Ethernet-type LAN attachment.

**Note:** For dynamic control of NCP internet routing, the Ethernet-type subsystem (ESS) adapter in your controller must have one of the following microcode levels:

- C38006 for the IBM 3745 Models 130, 150, 160, and 170
- C37967 for the IBM 3745 Models 210, 310, 410, and 610
- D39888 for the IBM 3745 Models 21A, 31A, 41A, and 61A
- D400002 for the IBM 3745 Model 17A.

To route internet traffic over an Ethernet-type LAN, make the following updates.

## Migrating from NCP Version 5 Release 4

<b>GROUP</b>	The new ETHERNET keyword defines a line group to the Ethernet-type LAN.
<b>LINE</b>	The new FRAMECNT keyword specifies thresholds for ESS line statistical counters. The new INTERFACE keyword assigns a name to the attachment and specifies the maximum frame size for the attachment. Changed keywords: ADDRESS LOCADD NPACOLL
<b>PU</b>	The new ARPTAB keyword defines the maximum number of temporary entries the ARP table for the attachment can contain at one time. The new LANTYPE keyword specifies the type of frame format the attachment is to support.
<b>IHOST</b>	The new IHOST definition statement defines an internet host on the Ethernet-type LAN. The new HDWADDR keyword specifies the hardware address of the internet host. The new IPADDR keyword specifies the internet address of the internet host. The new LANTYPE keyword specifies the type of frame format the host supports.
<b>IPLOCAL</b>	The new IPLOCAL definition statement defines the local internet interface to the Ethernet-type LAN. If the LAN is directly attached to NCP, the IPLOCAL definition statement also defines an internet route to the LAN. The new INTERFACE keyword specifies the name of the interface. The new LADDR keyword specifies the internet address of the interface. The new METRIC keyword assigns a metric to the interface to enable NCP to select the most desirable route to a destination. The new PROTOCOL keyword specifies whether the interface is to be managed through Routing Information Protocol (RIP). The new SNETMASK keyword defines a mask that identifies the subnetwork portion of the address specified by LADDR.

## Internet Routing over NTRI-Attached Token Rings

NCP can route internet traffic over token rings attached to NCP through NTRI. NCP can route both SNA and internet traffic over the same NTRI attachment. To route internet traffic over a NTRI-attached token ring, make the following updates.

<b>LINE</b>	The new INTERFACE keyword assigns a name to the NTRI attachment and specifies the maximum frame size for the attachment. Changed keywords: ADDRESS LOCADD MAXPU NPACOLL
-------------	--

- PU** The new ARPTAB keyword defines the maximum number of temporary entries the ARP table for the attachment can contain at one time.
- The new NETWORK keyword specifies whether the network represented by the PU definition statement will be used for SNA or internet traffic.
- Changed keywords:
- ADDR
  - ANS
  - PASSLIM
- IPHOST** The new IPHOST definition statement defines an internet host on the token ring.
- The new HDWADDR keyword specifies the hardware address of the internet host.
- The new IPADDR keyword specifies the internet address of the internet host.
- IPLOCAL** The new IPLOCAL definition statement defines a local internet interface to the token ring. If the token ring is directly attached to NCP, the IPLOCAL definition statement also defines an internet route to the token ring.
- The new INTFACE keyword specifies the name of the interface.
- The new LADDR keyword specifies the internet address of the interface.
- The new METRIC keyword assigns a metric to the interface to enable NCP to select the most desirable route to a destination.
- The new PROTOCOL keyword specifies whether the interface is to be managed through Routing Information Protocol (RIP).
- The new SNETMASK keyword defines a mask that identifies the subnetwork portion of the address specified by LADDR.

## Internet Routes

NCP internet routing can be dynamically controlled by NCPROUTE, a server that runs in the owning IBM Transmission Control Protocol/Internet Protocol (TCP/IP) host.<sup>1</sup> NCPROUTE receives internet routing changes through Routing Information Protocol (RIP) datagrams from other internet hosts and communicates these changes to NCP.

To define an internet route, make the following updates.

- IPROUTE** The new IPROUTE definition statement defines a route to a network, subnetwork, or internet host.
- The new DESTADDR keyword specifies the internet address of the destination network, subnetwork, or internet host.
- The new DISP keyword specifies whether NCPROUTE can dynamically delete or change the route.
- The new HOSTRT keyword specifies whether the route is to a host or to a subnetwork or network.
- The new INTFACE keyword identifies which internet router interface provides the route to the destination.

---

<sup>1</sup> For information on which IBM TCP/IP product releases and operating systems support NCPROUTE, see the IBM TCP/IP documentation for your host operating system.

The new METRIC keyword assigns a metric to the route to enable NCPROUTE to select the most desirable route to a destination.

The new NEXTADDR keyword identifies the internet address of the next internet router on the route.

---

## Frame Relay

Frame relay is a CCITT- and ANSI-standard communication protocol for high-speed local or wide area networks. A frame-relay network is composed of interconnected *frame-relay frame handlers*, which route (or *switch*) frames through the network. At the boundary of the frame-relay network, *frame-relay terminating equipment* stations transmit frames through the network to other frame-relay terminating equipment stations. Frames are transported along *permanent virtual circuits (PVCs)* on frame-relay physical lines.

NCP can function as both a frame-relay frame handler and a frame-relay terminating equipment station. When functioning as a terminating equipment station, NCP can use frame relay to communicate with SNA subarea and peripheral nodes.

This section describes the updates required to define NCP frame-relay resources.

### Frame-Relay Physical Lines

An NCP frame-relay physical line is the physical connection between NCP and another frame-relay device. A single frame-relay physical line can carry traffic for both the frame-handler and terminating-equipment functions. To define a frame-relay physical line, make the following updates.

#### **BUILD**

The new NCPTRACE keyword specifies whether the NCP snap trace is to be activated for frame-relay resources.

#### **GROUP**

The new FRELAY keyword specifies the type of frame-relay line.

#### **LINE**

The new DYNWIND keyword defines the dynamic characteristics of the frame transmission window for all logical connections on a frame-relay physical line.

The new MAXFRAME keyword specifies the maximum size for frames NCP will transmit.

The new TITIMER keyword defines the inactivity timer (TI) value for all logical connections on a frame-relay physical line.

Changed keywords:

- ADDRESS
- LSPRI
- MAXPU
- NPACOLL
- PORTADD

#### **PU**

Changed keywords:

- NPACOLL
- SRT
- XMONLNK

## Frame-Relay LMI Protocol Support

The first PU definition statement for a frame-relay physical line defines the *link-station subport*. You can define the link-station subport to support local management interface (LMI) protocol. LMI protocol provides status information for the physical line and the logical connections it supports. You can use either the CCITT or ANSI LMI standard.

NCP also provides an echo detection function for frame-relay subports that support LMI protocol. The echo detection function reduces errors in frame-relay satellite communications.

To use LMI protocol and echo detection, make the following updates.

### PU

The new **ERRORT** keyword specifies the LMI thresholds used to determine the integrity of this frame-relay physical port.

The new **LMI** keyword enables you to use CCITT or ANSI standard LMI protocol for this frame-relay physical port and to provide NCP echo detection for this LMI subport.

The new **SROLL** keyword specifies the maximum frequency at which status enquiry full messages are to be sent on this frame-relay physical port to the adjacent node.

The new **TIMERS** keyword specifies timer intervals to be used for LMI status polling and link integrity verification.

## Frame-Relay Logical Subarea Lines

You can define logical frame-relay connections between NCP and other subarea nodes. A frame-relay subarea link can connect two adjacent subareas or can pass through a frame-relay network. A frame-relay subarea link can be part of a multi-link transmission group (MLTG), along with SDLC and token-ring subarea links.

Frame-relay subarea links offer advantages over SDLC subarea links. For more information, including a description of how to convert SDLC subarea links to frame relay, see *NCP, SSP, and EP Resource Definition Guide*.

To use frame-relay subarea links, make the following updates.

### GROUP

The new **FRELAY** keyword specifies the type of frame-relay line.

The new **PHYSRSC** keyword associates a group of logical lines with a specific physical line.

Changed keyword:

**RNRLIMIT**

### LINE

The new **COMRATE** keyword specifies whether certain frames sent over this line can be discarded by the frame-relay network to facilitate the processing of higher priority frames when the network is congested.

The new **LOCALTO** keyword specifies the token-ring acknowledgement timer value when a logical connection is established with a terminal connected to a remote IBM Token-Ring Network.

The new **MAXFRAME** keyword specifies the maximum size for frames NCP will transmit.

## Migrating from NCP Version 5 Release 4

The new T2TIMER keyword specifies the acknowledgement timer (T2) values and the maximum number of I-frames that NCP can receive without sending an acknowledgement.

Changed keywords:

NPACOLL  
RETRIES  
SDLCST

### PU

Changed keywords:

ADDR  
BLOCK  
TGN

## Frame-Relay Logical Peripheral Links

You can define logical frame-relay connections between NCP and peripheral nodes (type 2 or type 2.1 physical units) that support frame relay. A frame-relay peripheral link can connect NCP to an adjacent peripheral node or can pass through a frame-relay network. Frame-relay peripheral links offer advantages over SDLC peripheral links. For more information, see *NCP, SSP, and EP Resource Definition Guide*.

To use frame-relay peripheral links, make the following updates.

### GROUP

The new FRELAY keyword specifies the type of frame-relay line.

The new PHYSRSC keyword associates a group of logical lines with a specific physical line.

Changed keyword:

AUTOGEN

### LINE

Changed keywords:

LSPRI  
PORTADD

## Frame-Relay Switching Support

NCP can function as a frame-relay frame handler, or frame-relay switch, in a frame-relay network. To use NCP as a frame-relay handler, you define logical frame handler subports (FHSPs) to connect NCP to other frame-relay nodes, and you define internal paths between the FHSPs to route frame-relay data through NCP.

To use NCP as a frame-relay switch, make the following updates.

### PUDRPOOL

The new FRSEDRPU keyword specifies how many frame-relay physical units added to NCP through dynamic reconfiguration are to be eligible for NPM performance data collection.

### LINE

Changed keyword:

MAXPU

### SERVICE

Changed keywords:

MAXLIST  
ORDER



**PU** The first PU definition statement for the physical line defines the link-station support for the line. Each subsequent PU definition statement defines an FHSP.

Changed keywords:

ADDR  
MAXOUT  
NPACOLL  
PUDR  
SRT  
XID  
XMONLNK

**FRSESET** The new FRSESET definition statement defines a PVC segment within NCP between two FHSPs.

The new SUBPORTS keyword specifies the two FHSPs at the ends of the PVC segment, and optionally defines a substitute FHSP for each end of the PVC segment.

### 3746 Model 900 Frame-Relay Support

The 3746 Model 900 supports attachment to a frame-relay network. Support for frame relay on the 3746 Model 900 is the same as support for frame relay on the 3745 with the following exception:

- The PHYSRSC, ADDRESS, and PORTADD keywords may need to be changed.

**FRSESET** The new FRSESET definition statement defines a PVC segment within NCP between two FHSPs.

The new SUBPORTS keyword specifies the two FHSPs at the ends of the PVC segment and optionally defines a substitute FHSP for each end of the PVC segment.

**GROUP** The new FRELAY keyword specifies the type of frame-relay line.

The new PHYSRSC keyword associates a frame-relay logical line with a physical station.

**LINE** The new T2TIMER keyword specifies the acknowledgement timer (T2) values and the maximum number of I-frames that NCP can receive without sending an acknowledgement.

Changed keywords:

MAXPU  
PORTADD  
SPEED

**PU** Changed keyword:

ADDR

### 3745 Frame-Relay Keywords Not Used for 3746 Model 900 Frame Relay

You can use the following keywords for 3745 frame relay, but they are ignored for 3746 Model 900 frame relay (except for SRT, which is not valid).

<b>GROUP</b>	COMPACB COMPOWN COMPSWP LEVEL2 LEVEL3 LEVEL5 LINEADD XIO XMITDLY
<b>LINE</b>	UACB
<b>PU</b>	SRT (not valid)
<b>PUDRPOOL</b>	FRSEDRPU

---

## Chapter 13. Migrating from NCP Version 4 Release 3.1

Changed Defaults	13-3
Deleted Keywords	13-3
Changes to Storage Requirements	13-4
General Updates	13-4
VTAM Updates	13-10
Program Generation Characteristics	13-12
General Considerations	13-14
NCP/EP Definition Facility	13-15
NCP Migration Aid	13-15
Reusable NEWDEFN File	13-16
Channel Addressing by Physical Position	13-16
Usage Tiers	13-16
Logical Unit Resource Pool Definition Enhancement	13-16
Variable Explicit Route Limits	13-17
Automatic Resource Definition	13-17
Dynamically Created Control Blocks	13-18
Logical Line Timer Enhancement	13-19
Type 2.1 Node Support	13-19
Type 2.1 Peripheral Node Support	13-19
Non-Native Network Attachment	13-20
Dynamic Definition of Independent Logical Units	13-20
APPN Support	13-20
Channel Attachments and Access Methods	13-21
Channel-Link Definition	13-21
Network Addressability	13-22
Subarea Channel-Link Activation	13-24
Enterprise Systems Connection Support	13-24
NCP and Link-Attached Devices	13-25
IBM 3745 Line Interface Coupler 4 Requirement for SPEED	13-25
Shared Port Identification	13-25
SSCP Monitor Mode Function	13-26
IBM 4941 Modems	13-26
Multiple Local Modem Support	13-26
IBM 3174 Group Poll	13-26
V.25 Bis	13-26
3746 Model 900 Connectivity Subsystem SDLC Lines	13-27
Spare SDLC Lines	13-27
Token-Ring Resources	13-27
NTRI Lines	13-27
Token-Ring Interface Coupler Swap	13-30
16-Megabit Token-Ring Speed	13-30
Token-Ring Serviceability Enhancement	13-31
Network Performance Data Collection for Token-Ring Resources	13-31
Counter Thresholds for NTRI Lines	13-31
NTRI Delayed Logical Link Activation	13-31
3746 Model 900 Connectivity Subsystem Token-Ring Resources	13-31
Routes between Subareas	13-33
Dynamic Path Update	13-33
Switched Subarea Support	13-34
Casual Connection	13-34

## Migrating from NCP Version 4 Release 3.1

Multilink Transmission Group Processing Enhancements	13-35
Blocked Virtual Route Alerts	13-35
Connections between Subarea Nodes	13-36
Multipoint Subarea Support	13-36
Pause Enhancement	13-37
Parallel Transmission Group Support for Channel Links	13-38
Enhanced Loading and Activation for Remote Controllers	13-38
Interconnected Networks	13-39
SNA Network Interconnection Session Limit Increase	13-39
Dynamic Network Identification	13-39
Gateway Session Accounting	13-39
Gateway Session Pacing Override	13-40
Emulation Mode Resources	13-40
Selection of EP Sense Codes	13-40
Teletypewriter Exchange Service	13-40
Teletypewriter Exchange Service Auto-Speed Detection	13-40
Customized Functions	13-40
Maximum Load Module Size Increase	13-40
Defining Diagnostic Aids	13-41
Channel Adapter IOH Trace	13-41
Link Problem Determination Aid	13-41
IBM 786x Modems Extended LPDA2 Capability	13-41
Backup and Recovery Procedures	13-42
Extended Recovery Facility	13-42
Performance Characteristics	13-42
Network Performance Data Collection	13-42
Session Accounting	13-42
Link Session Priority	13-43
NPM Data Collection for IBM Special Products or User-Written Code	13-43
NPM Session Accounting for IBM Special Products or User-Written Code	13-43
Adaptive Session Pacing Enhancement	13-43
PIU Blocking Performance Improvements for Subarea Links	13-44
NPM Data Collection by Transmission Priority	13-44
Internet Protocol	13-44
General Internet Resources	13-44
Internet Routing over SNA Networks	13-44
Internet Routing over Ethernet-Type LANs	13-45
Internet Routing over NTRI-Attached Token Rings	13-46
Internet Routes	13-47
Frame Relay	13-48
Frame-Relay Physical Lines	13-48
Frame-Relay Logical Subarea Lines	13-49
Frame-Relay Logical Peripheral Links	13-50
Frame-Relay Switching Support	13-50
3746 Model 900 Frame-Relay Support	13-51

To migrate from NCP Version 4 Release 3.1 (V4R3.1) to NCP V7R8, you need to update your NCP V4R3.1 generation definition so that it will generate NCP V7R8. In addition, you may want to change the generation definition to include functions added to NCP since NCP V4R3.1. This chapter lists the definition statements and keywords you need to change, add, or delete for either of these purposes.

**Migrating to a New Host System or Hardware:** If you are migrating to a different host operating system or communication controller model or to a type 7 channel adapter, read Chapter 2 to see which keywords you need to change for your new host system or hardware before you begin migrating to NCP V7R8.

**Using the NCP Migration Aid Function:** The NCP migration aid is an NDF function that simplifies the migration task by automatically making most of the changes required to migrate to NCP V7R8. You should consider using the migration aid before using the information in this chapter. For more information on using the migration aid, see Chapter 1.

Under each topic in this chapter, definition statements are listed in the order in which they appear in a generation definition. You can code certain keywords on more than one definition statement. This book describes each keyword on the lowest-level definition statement on which it can be coded.

After you have identified the definition statements and keywords that you need to change, add, or delete, see the *NCP, SSP, and EP Resource Definition Guide* for more information on their functions, and see the *NCP, SSP, and EP Resource Definition Reference* for information on how to code them.

---

## Changed Defaults

The defaults for the following keywords have changed.

<b>SDLCST</b>	TADDR
<b>GROUP</b>	RETRYTO
<b>LINE</b>	ADDRESS HISPEED TADDR TRANSFR
<b>PU</b>	MAXDATA MODULO PASSLIM

---

## Deleted Keywords

The following keywords have been deleted.

<b>BUILD</b>	CA CANETID DELAY DYNADMP HICHAN LENAME LOCHAN NCPCA RESOEXT TIMEOUT VRACT XITB
--------------	---

## Migrating from NCP Version 4 Release 3.1

<b>HOST</b>	All NCP keywords; HOST is now a VTAM-only definition statement.
<b>PUDRPOOL</b>	MAXLU
<b>GROUP</b>	BERPROC
<b>LINE</b>	LTRUNC
<b>PU</b>	SUBAREA
<b>LU</b>	BATCH

---

## Changes to Storage Requirements

For an estimate of the storage your NCP will require, use the HONE CF3745 Configurator storage model. For more information, see the *IBM 3745 Communication Controller Configuration Program* book.

### NCP Initialization

Generation listings include a message indicating how much storage NCP needs for initialization, beyond the storage that the load module displaces. Add this number to the size of the load module, obtained from the linkage editor output, to determine whether there is enough controller storage available for the buffer pool. For more information, see the *NCP, SSP, and EP Generation and Loading Guide*.

Beginning with SSP V4R8, another way to determine if there is enough controller storage available for the buffer pool is to add the ICNSIZE (MVS and VM) or IFUSIZE (VSE) job step after the linkage editor step. It will give you an estimate of how many NCP buffers will be created for your particular NCP. See the *NCP, SSP, and EP Generation and Loading Guide* and “Generation Steps” on page 67 for related VM information, “Generation Steps” on page 5 for related MVS information, or “Generation Steps” on page 169 for related VSE information.

---

## General Updates

Make the following general updates.

### **BUILD**

Update the VERSION keyword to generate NCP V7R8 or V7R8F.

The new ADPLIMIT keyword enables you to limit the maximum window size that NCP permits on an adaptively paced session.

A new suboperand of the BACKUP keyword specifies the number of LU sessions that support XRF with triple-DES encryption.

The CSSTIER keyword has been added to specify the usage tier level at which you are using the optional NCP Feature for 3746 Model 900 Connectivity Subsystem Support.

The GENLEVEL keyword enables a host to activate an NCP, even though the host did not generate that particular NCP.

The HPR, HPRATT, HPRMLC, HPRMPS and HPRQLIM keywords have been added to support HPR.

The HPRSNAP keyword has been added to specify whether the snap trace function is to be enabled for APPN HPR resources.

The new MINILOAD keyword facilitates the generating of a minimum-size remote load module.

The ISDNACC keyword has been added to specify whether the CSS is to include ISDN accounting information.

The NETID keyword specifies the name of the native network.

The NTUNECOL keyword has been added to specify whether collection in the NCP is active for NTuneMON.

The OWNERPL keyword has been added to enable you to specify the types of unassigned logical resources that will be managed in owner-based pools.

The PUNAME keyword specifies the name of the physical unit.

The QSZALERT keyword has been added to support monitoring for excessive NCP buffer usage by a single resource.

The RGENLEVL keyword has been added to specify that NDF is to replace the GENLEVEL keyword value with the default date and time of the NCP generation.

The new TGTIMER keyword provides enhanced hung-TG detection.

The USGTIER keyword has changed to support updates to the NCP usage tier definitions.

The VOSDEACT keyword has been added to specify whether VR (virtual route) deactivation will be initiated when a VR goes out-of-sequence.

The VSUBNETS keyword has been added to support variable subnetting via NDF and dynamic reconfiguration.

Changed keywords:

- HSBPOOL
- NEWNAME
- PRTGEN
- TRANSFR

If you are not using dynamic path update, code the following keywords with a value of 0 so that storage will not be wasted:

- PATHEXT
- TGBXTRA

The second suboperand of VRPOOL

### **CLUSTER**

There are new suboperands for the FEATURE keyword to allow NCP to ignore data from an undefined 3270 BSC device.

### **DLCI**

The DLCI definition statement is added.

The ID keyword specifies the DLCI(s) to which the DLCI statement's keyword parameters apply.

The CIR keyword specifies the bandwidth management parameters to be used for a designated DLCI.

The BALANCE keyword specifies the balancing factor to be applied to the DLCI(s) indicated by the ID keyword.

### **FRSESET**

The SUBPORTS keyword has been changed to allow internal frame switching between a 3746 Model 900 and NCP running on a 3745.

## Migrating from NCP Version 4 Release 3.1

### GROUP

If you code the CHAREC keyword, specify characters using the parallel data field (PDF) representation of characters transmitted to the terminal. Do not specify characters using reversed code. See the *NCP and EP Reference Summary and Data Areas, Volume 2* for information on character codes.

The DIAL keyword is changed to enable you to specify DIAL=YES for 3746 Model 900 frame-relay physical lines.

The new DSRTO keyword specifies how long NCP is to wait for an emulator line to become data-set-ready (DSR) before timing out on an ENABLE command.

The FRELAY keyword is changed to provide the IP value for the second suboperand to indicate IP resources.

The ISDN keyword has been added to specify that this GROUP defines an ISDN physical or logical line group.

You can now code the PHYPORT keyword on 3746 Model 900 Token-Ring logical peripheral GROUP statements to associate the logicals with one or more physicals.

The V25DIAL keyword enables you to set the V.25 dial timer, formerly a fixed 2-minute timer, for EP lines.

Changed keywords:

- REPLYTO
- RETRIES
- RETRYTO
- RNRLIMIT
- USERID
- XIO

### IPOWNER

The IPOWNER definition statement has been changed so that it is now optional.

The IPOWNER definition statement has been changed to enable NCP to send NCPROUTE information directly over an IP channel.

The INTFACE keyword has changed to enable you to define backup NCP-NCPROUTE interfaces.

### IPROUTE

The SNETMASK keyword has been added to support variable subnetting via NDF and dynamic reconfiguration.

### LINE

The new ADDIFG keyword specifies whether interframe gaps should be made larger to avoid overrun errors on adjacent adapters to which the 3746 Model 900 is transmitting.

The BALANCE keyword has been added to enable connection balancing for NTRI physical lines and the 3746 Model 900.

The new CCLID keyword specifies CCLID support for X.21 lines.

The CIR keyword is added to specify whether the Committed Information Rate (CIR) algorithms will be used for bandwidth management.

The CLLM keyword is added to specify whether Consolidated Link Layer Management (CLLM) will be used.

The COMRATE keyword has been changed to specify the relative transmit priority of a frame-relay resource, that is, TESP or FHSP. The COMRATE keyword, together with the DATBLK keyword, is used to determine a relative priority among all frame-relay resources associated with the same physical line.



The new COMRATE keyword specifies whether certain frames sent over this line can be discarded by the frame-relay network to expedite the processing of other frames when the network is congested. COMRATE also establishes the relative priority of the FRTE or the FHSP.

The CRATEDLY keyword has been added to specify the COMRATE delay threshold in seconds for the 3746 Model 900.

The new DATBLK keyword specifies the minimum guaranteed transmission bandwidth in bytes allocated to a frame-relay resource. The DATBLK keyword, together with the COMRATE keyword, is used to determine a relative priority among all frame-relay resources associated with the same physical line.

The DSCRDDLY keyword has been added to specify the discard delay threshold in seconds for the 3746 Model 900.

The new DYNWIND keyword defines the dynamic characteristics of the frame transmission window for all logical connections on a token-ring or frame-relay physical line.

In addition, the DYNWIND keyword enables you to control delays that NCP uses when manipulating the working window for 3745 FRTE stations during congestion.

By coding the second and third suboperands of the DYNWIND keyword (*dw* and *dwc*), you can now control the amount by which the working window is decreased when frame loss or congestion occurs for 3745 Token-Ring resources.

The *mww* suboperand is added to the DYNWIND keyword to provide a minimum user-specified working window value for frame relay.

The FEATURE keyword has been changed to provide LRC8 error checking for EP BSC USASCII lines running in transparent mode.

The FRRATES keyword has been added to enable setting the relative priorities for types of traffic (SNA, IP, and Frame Handler) supported by a 3745 frame-relay physical line.

The FRSPRI keyword has been added to specify the relative service priority for 3746 Model 900 attached frame-relay stations and ISDN logical stations.

The HLOQSTOP keyword has been added to specify the maximum size of the 3746 Model 900 physical line hardware queue.

The ISDNLPN and ISDNLSA keywords have been added to support ISDN.

The ISDNCALL, ISDNRPN, and ISDNRSA keywords have been added to support frame-relay dial backup over ISDN.

The new LIMRES keyword defines a line as a limited resource that should be deactivated automatically when session traffic ceases on a switched link.

The LOCADD keyword has been changed to enable you to specify the destination service access point (DSAP) and medium access control point (MAC) for 3746 Model 900 frame-relay logical connections to remote token-ring-capable type 4 physical units.

The MAXDLCI keyword has been added to enable you to limit the DLCI range supported by frame-relay physical lines, NTRI frame handler logical lines and ISDN B-channels.

MAXPU, which previously allowed a maximum of 16 ESCON stations, now allows a maximum of 32 ESCON stations.

## Migrating from NCP Version 4 Release 3.1

The MLTGPRI keyword is changed so that it can be coded for switched PUs in the VTAM switched major node, with the appropriate level of VTAM.

The QSIZE keyword has been added to specify the 3746 Model 900 software queue size threshold.

The QSIZEDE keyword has been added to specify the 3746 Model 900 software queue discard eligibility threshold

The new RCVCHAR keyword specifies whether a start-stop line receives data in burst mode or character mode.

The RETRIES keyword has been changed to enable you to indicate a consecutive error threshold for 3745 frame-relay physical lines.

The SERVLIM keyword has been changed to allow another way to specify how frequently NCP should interrupt its regular scans of the service order table to make a special scan.

The new TITIMER keyword defines the inactivity timer (TI) value for all logical connections on a token-ring or frame-relay physical line.

TAKEOVER, a new keyword on the LINE statement, enables you to force takeover of an EP line from another host.

The TRANSBUF keyword is added to specify the maximum number of frames that will be queued for a TSS or HPTSS adapter awaiting transmission over a 3745 frame-relay physical line.

Changed keywords:

DYNADMP  
INBFRS  
MAXPU  
TRANSFR

Deleted keyword:

LTRUNC

### LU

The new MAXSESS keyword specifies how many LU-LU sessions a boundary logical unit can have.

Deleted keyword:

BATCH

If the PACING keyword is coded, delete the second value on it.

Changed keyword:

MAXCOLL

### LUDRPOOL

Changed keywords:

NUMTYP1  
NUMTYP2

### NETWORK

This definition statement is valid only when HSBPOOL is coded on the BUILD definition statement.

If you are not using dynamic path update, code the PATHEXT keyword with a value of 0 so that storage will not be wasted.

If you are not using dynamic path update, code the TGBXTRA keyword with a value of 4 so that storage will not be wasted.

**OPTIONS**

The NEWDEFN keyword causes NDF to create a new generation definition as part of the NCP generation process. See the *NCP, SSP, and EP Resource Definition Guide* for more information on NDF-generated definition files.

The TUSGTIER keyword has changed to support updates to the NCP usage tier definitions.

**PU**

The ADDR keyword has been changed to enable you to specify the destination service access point (DSAP) and medium access control point (MAC) for 3746 Model 900 frame-relay logical connections to remote token-ring-capable type 4 physical units.

The FRSPRI keyword has been added to specify the relative service priority for 3746 Model 900 attached frame-relay stations and ISDN logical stations.

The new INNPOR keyword specifies whether a type 1 physical unit is to remain active when a VTAM HALT or VARY INACT command is issued.

The IPQLIM keyword has been added to specify the maximum amount of data that can be queued on a frame-relay internet outbound queue.

The ISDNCFG and ISDNDSCT keywords have been added to support ISDN.

The LLERP keyword has been added to specify whether the link station will perform link level error recovery procedures (ERP) when sending HPR data.

The LMI keyword has changed as part of the new support for switched frame-relay physical lines.

The MAXDATA keyword value for switched subarea PUs is obtained from VTAM and no longer from NCP. If you code the MAXDATA keyword for a switched subarea PU, you must code it on the PU definition statement in the VTAM switched major node because NCP no longer uses the MAXDATA value coded in the NCP generation definition.

The MODULO keyword default has changed.

The PIUCHECK keyword is added to specify whether checksum validation is performed on PIUs sent and received by the subarea station.

The RETRIES keyword has been changed to enable you to indicate a consecutive error threshold for 3745 frame-relay physical lines.

The SNETMASK keyword has been added to enable subnetwork mask specification for channel and frame-relay internet resources.

The SSAP keyword has been added to allow duplicate TIC addressing for token-ring logical subarea connections.

The TGCONF keyword is changed so that it can be coded for switched PUs in the VTAM switched major node, with the appropriate level of VTAM.

The TGCONF keyword has been changed to enable you to designate standby subarea stations for congestion relief in MLTGs.

The UNIQUE keyword has been added to specify whether a Token Ring's logical subarea station's destination MAC address is a unique locally administered address.

The XMONLNK keyword is changed so that XMONLNK=YES and DIAL=YES are compatible when FRELAY=(PHYSICAL,SUBAREA) or FRELAY=(PHYSICAL,ANY).

If VIRTUAL=NO (the default) on the GROUP definition statement for the line of this physical unit, delete the MAXLU keyword.

## Migrating from NCP Version 4 Release 3.1

Changed keywords:

ADDR  
ANS  
DATMODE  
MAXDATA  
MAXOUT  
MODULO  
PASSLIM  
SRT

### **PUDRPOOL**

Deleted keyword:

MAXLU

### **SDLCST**

The SERVLIM keyword has been changed to allow another way to specify how frequently NCP should interrupt its regular scans of the service order table to make a special scan.

### **SWMMT**

The MAXDATA keyword has been added to enable you to specify the maximum frame size.

### **TERMINAL**

The new SESSREQ keyword specifies whether a session is required with a terminal before NCP begins polling.

At line activation time, if you do not want NCP to transmit the ID defined in the TWXID keyword, code the XTWXID keyword.

If you have a device that requires special printer processing but is not a true printer, code the VPRINT keyword.

---

## VTAM Updates

For detailed explanations of VTAM-only definition statements and keywords, or for information on how to code them, see the *VTAM Resource Definition Reference*.

Make the following VTAM updates.

### **HOST**

HOST is now a VTAM-only definition statement.

### **PATH**

When defining a switched major node, the new DLCADDR keyword replaces the DIALNO keyword for specifying dial information.

### **GROUP**

The following VTAM-only keywords have been added:

CAPACITY  
CONNTYPE  
COSBYTE  
COSTTIME  
CPCP  
DYNADJCP  
DYNPU  
DYNPUPFX  
NATIVE  
NN  
PDELAY  
REGISTER  
SECURITY  
TGP

TOPO  
UPARM1  
UPARM2  
UPARM3  
VERSALID  
VNGROUP  
VNNAME

**LINE**

The following VTAM-only keywords have been added:

CAPACITY  
CONNTYPE  
COSBYTE  
COSTTIME  
CPCP  
DYNADJCP  
DYNPU  
DYNPUPFX  
NATIVE  
NN  
PDELAY  
REGISTER  
SECURITY  
TGP  
TOPO  
UPARM1  
UPARM2  
UPARM3  
VERSALID  
VNGROUP  
VNNAME

**TERMINAL**

The following VTAM-only keywords have been added:

ASLENT  
ASLTAB  
MDLENT  
MDLTAB

**PU**

The following VTAM-only keywords have been added:

DYNLU  
LIMRES  
LUGROUP  
LUSEED  
NATIVE  
REGISTER

**LU**

The following VTAM-only keywords have been added:

ASLENT  
ASLTAB  
MDLENT  
MDLTAB  
REGISTER

## Program Generation Characteristics

Table 13-1 shows the locations in the *NCP, SSP, and EP Resource Definition Guide* where you will find descriptions of the functions added in V7R8, V7R7, V7R6, V7R5, V7R4, and V7R3.

Table 13-1 (Page 1 of 3). New Functions Added in V7R8, V7R7, V7R6, V7R5, V7R4, and V7R3

Function	Location
EP Line Takeover	"Line Characteristics" on page 21-12
EP Shorten V25 BIS Dial Timer	"Timeouts" on page 20-7
Logical Line Pool Sharing for TIC3 Connections	"Unassigned Logical Line Pools" on page 6-23
Enhanced Hung TG Detection	"Monitoring Transmission Group Performance" on page 23-18
Facilitate Minimum-Sized Remote Load Module	"Defining the NCP Environment" on page 2-5
Ignore Data from Undefined 3270 BSC Device	the new function of the FEATURE keyword on page 5-28
3746 Model 900 TIC3 Connection Balancing	the description of the BALANCE keyword on page 6-8
3746 Model 900 Frame Relay BAN Connection Balancing	BALANCE keyword on the DLCI statement on page 16-14
Enhanced Control of the Dynamic Working Window for 3745 Token Ring	the description of the DYNWIND keyword on page 6-42
Enhanced Control of Adaptive Session Pacing	"Defining Session Pacing" on page 24-6
Specifying a Minimum Working Window for 3745 Frame Relay	the description of the DYNWIND keyword on page 16-15
LRC8 Error Checking for EP BSC USASCII	"Devices" on page 20-5
Specifying the number of frames queued for a TSS or HPTSS adapter	TRANSBUF keyword on the LINE definition statement on page 16-13
Committed information rate (CIR) on NCP controlled 3746 Model 900 frame-relay and ISDN lines	CIR keyword on the LINE definition statement on page 16-76 CIR keyword on the DLCI definition statement on page 16-13
Remote access to NCPROUTE in the absence of SNALINK	Exception to P2PDEST/HOSTADDR Matching on page 15-7
Connection balancing of frame-relay boundary access node (BAN) connections over 3745 frame-relay DLCIs	BALANCE keyword on the DLCI statement on page 16-14
IP supports for switched frame-relay lines	"Defining Frame-Relay Attachments for IP" on page 15-44
3746 Model 900 switched frame-relay physical lines.	Figure 16-45 on page 16-94
PIU checksum support	PIUCHECK keyword on the PU definition statement on page 24-9
Defining an ISDN backup line for a frame-relay line	"Defining Automatic Frame-Relay Backup over an ISDN"

Table 13-1 (Page 2 of 3). New Functions Added in V7R8, V7R7, V7R6, V7R5, V7R4, and V7R3

Function	Location
Defining backup NCP-NCPROUTE IP interfaces	"Backup IP Channel Interfaces"
Connection balancing for NTRI physical lines	the description of the BALANCE keyword on page 6-8
Limiting the DLCI range for an ISDN B-channel line	MAXDLCI on the LINE definition statement on page 7-7
New way that NCP determines link capacity and transmission time	SPEED keyword related to VTAM topology CAPACITY keyword on page 8-21
Allocating unassigned logical resources to owner-based pools	"Allocating Unassigned Logical Line Pools to Owners"
Defining an internal NCP to Model 900 point-to-point IP connection	"Defining an Internal NCP to Model 900 Point-to-Point IP Connection"
Defining ISDN subarea connectivity through a terminal adapter or a BAN device	"Defining ISDN Subarea Connectivity through a Terminal Adapter or BAN Device"
Defining relative priorities for the types (SNA, IP, and frame handler) of traffic supported by a 3745 frame-relay physical line	FRRATES on the LINE Definition Statement on page 16-11
New usage tier options	"Usage Tiers"
Defining variable subnetting for an IP route or an IP interface	"Defining Routes Explicitly"
Monitoring for excessive buffer usage by a peripheral resource	"Monitoring for Excessive Buffer Usage by a Peripheral Resource"
Specifying Token-Ring destination MAC address uniqueness	Reference to the UNIQUE keyword on page 6-31
Defining switched frame-relay 3745 physical lines	"Defining Switched Frame-Relay Physical Lines"
Controlling VR deactivation when a VR goes out-of-sequence	"Deactivating an Out-of-Sequence Virtual Route"
Integrated Services Digital Network (ISDN) Primary Rate Adapter	Chapter 7, "Integrated Services Digital Network (ISDN) Resources"
Duplicate TIC Addressing for Token-Ring	"Duplicate TIC Addressing"
Hot Standby for Multiple Link Transmission Groups (MLTGs)	"Multilink Transmission Groups"
Boundary Access Node (BAN) for Frame-Relay (FR) Subarea Links	"Boundary Access Node (BAN) for Frame-Relay Subarea Links"
Frame Relay Inoperative 'Error Count' Management Upgrades	"Defining Frame-Relay Physical Lines"
Enhanced Dynamic Windowing Algorithm for 3745 Frame Relay Logical Lines	"Defining Frame-Relay Physical Lines"
Port Sharing for NCP and 3746-900	"Shared 3746 Model 900 Resources between an NCP and 3746 Model 900"
Added flexibility in coding the ADDIFG keyword	"Controlling Adapter Overrun Errors"
X.25 ODLC resource definitions in an X.25 packet switching environment	"NDF-Generated Definition File"

Table 13-1 (Page 3 of 3). New Functions Added in V7R8, V7R7, V7R6, V7R5, V7R4, and V7R3

Function	Location
Frame relay internal frame switching support	"Defining Frame Handler Connections," "3746 Model 900 Frame Relay"
Direct NCPROUTE information over an IP channel	"Definition Statements for NCP Internet Resources"
Dialing out to frame-relay BAN devices using non-extended dial digits	"Defining Peripheral Device Addresses to VTAM"
Non-error recovery procedures for 3746 Model 900 token-ring logical stations	"Defining the Characteristics of HPR-Capable Links"
Frame relay IP connections in internet sub-networks	"Defining Frame-Relay Attachments for IP"
HPR snap trace diagnostic information for APPN HPR	"NCP and VTAM As a Composite Type 2.1 Node," and "Diagnostic Tests and Traces"
APPN HPR	Chapter 8, "Type 2.1 Node Support"
Frame relay over token ring	"Defining NTRI Attachments for a Frame-Relay Network" in Chapter 16, "Frame-Relay Resources"
IP over frame relay	"Defining Frame-Relay Attachments for IP" in Chapter 15, "Internet Resources"
IP over channel	"Defining 370 I/O Channels for IP" in Chapter 15, "Internet Resources"
Frame-relay BAN support	"Defining Frame-Relay Logical Peripheral Lines" in Chapter 16, "Frame-Relay Resources"
Hot standby MLTGs	"Multilink Transmission Groups" in Chapter 16, "Frame-Relay Resources"

## General Considerations

- Code HPR=NO on the BUILD definition if you do not want to use the HPR function. This will block HPR connections from being established, and will prevent the unique HPR modules from being included. This will decrease the NCP load module size.
- The DLCI keyword has been added. It allows the coding of 10-bit DLCIs. This allows frame-relay connections to use the full range of DLCIs (up to 991).
- The SPEED keyword may now be coded on the LINE definition statement for all channel types. With the exception of ESCON, NCP does not use this value. This capability was added so this value is available to NETDA/2 and NTuneMON.
- NDF will allow DYNWIND specification on the logical GROUP, LINE, and PU statements for frame-relay logical subarea and token-ring logical subarea resources. NDF will also accept DYNWIND specification on the physical GROUP, LINE, and PU statements. This will allow you to specify a unique DYNWIND value for each physical unit.



## NCP/EP Definition Facility

If your IBM support representative tells you to run a global trace, make the following updates.

### OPTIONS

The new NOTRGLOB keyword deactivates the global trace.

The new TRGLOB keyword activates the global trace.

Update the TVERSION keyword to generate NCP V7R8 or V7R8F.

### NCP/EP Definition Facility Standard Attachment Facility

The NDF standard attachment facility allows user-written generation applications to interface with NDF to define resources for user-written line control functions. To use the NDF standard attachment facility, make the following updates.

### OPTIONS

The new NEWDEFN keyword.

The new USERGEN keyword.

### NCPNAU

If you have a programmed SNA resource that is generated using the NDF standard attachment facility, code the VIROWNER keyword on the NCPNAU definition statement that generates your programmed SNA resource.

### GROUP

If this group of lines has user line control that is generated using the NDF standard attachment facility, code the LNKOWNER keyword.

If this group of lines is attached to an SNA programmed resource that is generated using the NDF standard attachment facility, code the VIROWNER keyword.

## NCP Migration Aid

The NCP migration aid is an NDF function that helps you migrate an NCP generation definition to a different NCP version or communication controller model. For a complete description of the migration aid, see Chapter 1.

To use the migration aid, make the following updates.

### OPTIONS

The new CHANNELS keyword causes 370 I/O channel definitions to be coded on the GROUP, LINE, and PU definition statements in the NEWDEFN file.

The new DPU keyword prevents the default allocation of resources for the dynamic path update function.

The new NERLIM keyword causes NDF to add the ERLIMIT keyword to all NETWORK definition statements in your generation definition. The NERLIM keyword is valid only for generation definitions that include SNA network interconnection (SNI).

The new REMOVCOM keyword specifies whether you want NDF to remove the comments added to the NEWDEFN file by the migration aid.

The new SAVEADDR keyword causes NDF to preserve device-specific values specified in the input generation definition.

The new TMODEL keyword specifies the IBM 3745 Communication Controller model to which you are migrating.

The new TUSGTIER keyword specifies the usage tier for the migrated generation definition.

## Migrating from NCP Version 4 Release 3.1

The new TVERSION keyword specifies that you are migrating to NCP V7R8 or V7R8F.

Code the TOCONV keyword if you want to consolidate the LOCALTO and REMOTTO keywords into the T1TIMER keyword.

Code the ADDRCONV keyword if you want to use the DLCI keyword instead of the ADDR keyword on your frame-relay lines. The DLCI keyword allows coding the full range of DLCIs (up to 991).

### Reusable NEWDEFN File

To direct NDF to build your NEWDEFN file so that it can be reused as the input to NDF, make the following update.

#### OPTIONS

Changed keyword:

NEWDEFN

For information about NEWDEFN, see the *NCP, SSP, and EP Generation and Loading Guide*.

### Channel Addressing by Physical Position

You can specify a physical position instead of a logical address to define a channel link and to define the channel link associated with an emulator subchannel. To specify physical position, make the following update.

#### LINE

Changed keyword:

ADDRESS

### Usage Tiers

To specify the number of line adapters, token-ring adapters, and channel adapters allowed on your controller, to specify the operating mode for an IBM 3745-410 or IBM 3745-610 Communication Controller, and to eliminate the positional restrictions on line addresses for all IBM 3745 models, make the following updates.

#### BUILD

The new USGTIER keyword specifies the number of line adapters, token-ring adapters, and channel adapters allowed on your controller and to specify the operating mode of your IBM 3745-410 or 3745-610.

#### LINE

Changed keyword:

ADDRESS

### Logical Unit Resource Pool Definition Enhancement

To allow the full exploitation of available element addresses while specifying the number of logical units for dynamic reconfiguration or switched SDLC peripheral telecommunications links, make the following updates.

#### LUDRPOOL

The new NUMILU keyword specifies the number of independent logical units to be added dynamically.

Changed keywords:

NUMTYP1

NUMTYP2

## Variable Explicit Route Limits

To optimize storage by defining the explicit route capacity of a non-native network separately from that of the native networks, make the following update.

### NETWORK

The new ERLIMIT keyword specifies whether the non-native network defined by this NETWORK definition statement is to support 8 or 16 explicit routes.

**Note:** If you are using the migration aid to migrate to NCP V7R8, you can code the NERLIM keyword on the OPTIONS definition statement to add the ERLIMIT keyword to all NETWORK definition statements in your generation definition. For a description of the NERLIM keyword, see the *NCP, SSP, and EP Resource Definition Reference*.

## Automatic Resource Definition

This section describes keyword changes for *autocopy* and *autoline*. These NDF functions simplify the coding of similar lines by creating copies of a single line definition you code. Autocopy is more powerful and flexible than autoline. It is recommended that you use autocopy instead of autoline whenever possible.

**Note:** You cannot use autocopy or autoline to define certain resources. See the *NCP, SSP, and EP Resource Definition Guide* for a list of these resources.

### Automatic Resource Copying Enhancement

If you have a large network with similar lines, you can use the autocopy function to simplify coding your generation definition. Autocopy makes copies of a LINE definition statement and its subordinate definition statements and generates a unique line address for each copy in a format you specify.

To use the autocopy function, make the following updates.

### LINE

The new AUTOCOPY keyword specifies the number of copies and the label for the next copy.

### CLUSTER

The new NEXT keyword controls the format of the labels generated for the copies of this definition statement.

### TERMINAL

The new NEXT keyword controls the format of the labels generated for the copies of this definition statement.

### COMP

The new NEXT keyword controls the format of the labels generated for the copies of this definition statement.

### PU

The new NEXT keyword controls the format of the labels generated for the copies of this definition statement.

### LU

The new NEXT keyword controls the format of the labels generated for the copies of this definition statement.

### ENDAUTO

The new ENDAUTO definition statement marks the end of a group of definition statements to be copied.

### Automatic Line Generation

If you have a large network with similar lines, you can use the autoline function to simplify coding your generation definition. Autoline makes copies of a LINE definition statement and its subordinate definition statements and generates a unique line address for each copy.

**Note:** The autocopy function, described in “Automatic Resource Copying Enhancement” on page 13-17, is more powerful and flexible than autoline. It is recommended that you use autocopy instead of autoline whenever possible.

To use the autoline function, make the following updates.

<b>OPTIONS</b>	The new NEWDEFN keyword specifies whether you want the output to be formatted.
<b>LINE</b>	<p>The new ADDRESS keyword specifies the beginning address of the series of LINE definition statements to be replicated.</p> <p>You need to embed the line address in the label of the LINE definition statement, and in the label of each subordinate statement of the LINE definition statement.</p> <p>If the line address appears more than once in a statement label, the first occurrence will be used or modified in the generation of new statements.</p> <p>The new AUTOLINE keyword specifies the ending address of the last LINE definition statement that you want to be generated.</p>
<b>ENDAUTO</b>	The new ENDAUTO definition statement after the LINE definition statement's last resource.
<b>SERVICE</b>	There is no automatic line generation capability when the ORDER keyword is coded.

### Dynamically Created Control Blocks

NCP can dynamically create certain control blocks and table entries when NCP needs more than are defined in your generation definition. This enables you to provide temporary resources for high-use situations without permanently allocating NCP storage for those resources.

**Note:** Using these dynamically created resources can degrade NCP performance, so it is recommended that you define all the resources you expect to need in your generation definition and use this function only to handle unexpected demand.

To use this function, make the following updates.

<b>BUILD</b>	<p>The new DYNNSC keyword specifies how many NPM session counter control blocks (NSCs) NCP can create dynamically.</p> <p>The new DYNNSX keyword specifies how many NSC extensions NCP can create dynamically.</p> <p>The new DYNPOOL keyword specifies how much controller buffer storage NCP can use for dynamically created control blocks, and defines a dynamic resource alert threshold.</p> <p>Changed keyword:</p> <p style="padding-left: 40px;">BFRS</p>
--------------	--

## Logical Line Timer Enhancement

NCP maintains a timer for a NTRI or frame-relay logical line only when the line is active, which improves NCP performance. You do not need to update your generation definition to use this enhancement.

**GROUP** The TIMER keyword is ignored for NTRI and frame-relay logical lines.

## Type 2.1 Node Support

### Type 2.1 Peripheral Node Support

Type 2.1 node support provides communication between logical units in an SNA subarea network without the need for a host application program to relay information between the logical units. To use type 2.1 node support for peripheral nodes, make the following updates.

- BUILD** The new ADDSESS keyword specifies the number of LU-LU boundary session control blocks available for use by any independent logical unit.
- The new AUXADDR keyword specifies the number of additional addresses that can be assigned to all peripheral logical units.
- The new MAXSESS keyword specifies the maximum number of LU-LU sessions that any single NCP boundary logical unit can have.
- The new NAMTAB keyword specifies the number of entries for the network name table.
- LUDRPOOL** The new NUMILU keyword specifies the number of independent logical units you wish to add dynamically.
- GROUP** The new XMITDLY keyword specifies the length of time that NCP delays its initial transmission after answering an incoming call.
- PU** The new XID keyword enables the physical unit to receive and respond to an XID while in normal disconnected mode.
- Note:** A type 2.1 peripheral node attached by a multipoint peripheral link must be configured as a secondary station.
- LU** The new RESSCB keyword specifies the number of reserved boundary session control blocks generated for this particular independent logical unit.
- If you are using adaptive session pacing, code the VPACING keyword to override batch mode window sizes.
- Note:** If you are not using adaptive session pacing, the VPACING keyword is a VTAM-only keyword.
- Changed keyword:
- PACING

### Non-Native Network Attachment

**PU** For non-native network attachment, NETID is a VTAM-only keyword. For more information on VTAM-only definition statements and keywords, see the *VTAM Network Implementation Guide*.

### Dynamic Definition of Independent Logical Units

You can allow VTAM V3R4.1 and later releases to dynamically define independent logical units as they are needed by defining them as cross-domain resources in the VTAMLST. To allow NCP to take advantage of this VTAM feature, make the following changes.

**BUILD** If your generation definition includes LU definition statements for independent logical units and you do not want to delete them manually, code the GENILU keyword to prevent element addresses and control blocks from being generated for independent logical units with LUDR=YES.

The new MAXSESS keyword specifies the maximum number of LU-LU sessions that any single NCP boundary logical unit can have.

**LUDRPOOL** The new NUMILU keyword specifies the number of independent logical units to be added dynamically.

**LU** If your generation definition includes independent logical units, it is recommended that you delete the LU definition statements for these logical units and define them as cross-domain resources in the VTAMLST instead.

### APPN Support

Using APPN with VTAM V4R1 or later, NCP V7R8 can appear as a composite network node. To use this enhancement, make the following updates.

**BUILD** Changed keyword:

NAMTAB

**PU** The new XID keyword enables the physical unit to receive and respond to an XID while in normal disconnected mode.

**Note:** A type 2.1 peripheral node attached by a multipoint peripheral link must be configured as a secondary station.

Changed keyword:

PUTYPE

**LU** The new NETID keyword specifies the name of the network that contains this logical unit.

Changed keyword:

LUDR

---

## Channel Attachments and Access Methods

### Channel-Link Definition

All 370 I/O channel attachments are defined as *channel links* on the GROUP and LINE definition statements. Each channel link has a Systems Network Architecture (SNA) network address. There are two types of channel links. Subarea channel links connect NCP to the subarea host node. Peripheral channel links connect NCP to a peripheral host node.

To define a 370 I/O channel attachment as a channel link, make the following updates.

#### BUILD

Deleted keywords:

CA  
CANETID  
DELAY  
DYNADMP  
HICHAN  
LOCHAN  
NCPCA  
TIMEOUT

#### HOST

HOST becomes a VTAM-only definition statement once channel links are defined.

For detailed explanations of VTAM-only definition statements and keywords, or for information on how to code them, see the *VTAM Network Implementation Guide*.

#### GROUP

On a separate GROUP definition statement, code LNCTL=CA to identify channel adapter definitions.

#### LINE

Code one LINE definition statement for each channel adapter.

Only the following keywords are valid:

ADDRESS  
AUTOLINE  
CA  
CASDL  
DELAY  
DYNADMP  
ETRATIO  
HICHAN  
INBFRS  
LOCHAN  
NCPCA  
NPACOLL  
TIMEOUT  
TRANSFR

The new ADDRESS keyword specifies the logical address of the channel adapter.

The new CA keyword specifies the channel adapter type.

The new CASDL keyword specifies how long the channel adapter can block inbound traffic before signaling that the station is inoperative.

## Migrating from NCP Version 4 Release 3.1

The new HICHAN keyword specifies the highest subchannel address on the channel adapter associated with any line operating in emulation mode, or the address of the subchannel used for the dynamic dump operation.

The new LOCHAN keyword specifies the lowest subchannel address on the channel adapter associated with any line operating in emulation mode.

The new NCPKA keyword specifies the status of the channel adapter operating in network control mode.

The new TIMEOUT keyword specifies the interval NCP is to wait for a response to an attention signal it sent to the host before initiating channel discontact.

Changed keywords:

NPACOLL  
TRANSFR

### PU

This definition statement is invalid if LNCTL=CA on the GROUP definition statement and NCPKA=INACTIVE on the LINE definition statement. Only one PU definition statement is allowed for each line if LNCTL=CA on the GROUP definition statement and NCPKA=ACTIVE on the LINE definition statement.

The new NETID keyword specifies the name of the native network.

If you are defining a peripheral channel link, code PUTYPE=2. If you are defining a subarea channel link, code PUTYPE=5.

Only the following keywords are valid:

ANS  
NETID  
NPACOLL  
PUTYPE  
TGN

Changed keyword:

NPACOLL

### LU

This definition statement is invalid if PUTYPE=5 on the PU definition statement.

Only the following keywords are valid:

LOCADDR  
LUDR  
NPACOLL  
NUMSESS  
PACING  
RESSCB

Changed keyword:

NPACOLL

## Network Addressability

This section describes the updates you need to make if you want to add the following to your NCP:

- *Extended subarea addressing*, which allows you to use subarea addresses up to 16 bits long
- *Increased explicit route capability*, which allows either 8 or 16 explicit routes between subarea pairs.



### Extended Subarea Addressing

To allow subarea addresses to range up to 16 bits, make the following updates.

<b>BUILD</b>	<p>The new SALIMIT keyword defines the largest subarea address supported by this node in the native network.</p> <p>The new PATHEXT keyword specifies the number of extra transit-routing-table rows and explicit-route-to-virtual-route mapping list rows the NDF should generate for the native network after the PATH definition statements are processed.</p> <p>The new TGBXTRA keyword specifies the number of extra transmission group control blocks that must be generated for the native network after the PATH definition statements are processed.</p> <p>Changed keywords:</p> <ul style="list-style-type: none"> <li>NUMHSAS</li> <li>SUBAREA</li> <li>VRPOOL</li> </ul>
<b>HOST</b>	<p>Changed keyword:</p> <ul style="list-style-type: none"> <li>SUBAREA</li> </ul>
<b>PATH</b>	<p>Changed keywords:</p> <ul style="list-style-type: none"> <li>DESTSA</li> <li>ER0 through ER7</li> </ul>
<b>SDLCST</b>	<p>Changed default:</p> <ul style="list-style-type: none"> <li>TADDR</li> </ul>
<b>LINE</b>	<p>Changed keyword:</p> <ul style="list-style-type: none"> <li>TADDR</li> </ul>
<b>PU</b>	<p>Deleted keyword:</p> <ul style="list-style-type: none"> <li>SUBAREA</li> </ul>
<b>NETWORK</b>	<p>The new SALIMIT keyword defines the largest subarea address supported by this node in this non-native network.</p> <p>The new TGBXTRA keyword specifies the number of extra transmission group control blocks needed in this non-native network.</p> <p>Changed keywords:</p> <ul style="list-style-type: none"> <li>NUMHSAS</li> <li>PATHEXT</li> <li>SUBAREA</li> </ul>

### Increased Explicit Route Capability

To allow support for either 8 or 16 explicit routes between subarea pairs, make the following updates.

<b>BUILD</b>	<p>The new ERLIMIT keyword specifies whether you want your NCP to support 8 or 16 explicit routes.</p>
<b>PATH</b>	<p>The new ER8 through ER15 keywords specifies the adjacent subarea and transmission group number for each explicit route.</p>

## Migrating from NCP Version 4 Release 3.1

Changed keywords:

VR0 through VR7 keywords

### Subarea Channel-Link Activation

To support activation and deactivation of subarea channel links by a system services control point (SSCP), make the following updates.

**LINE** Changed keyword:

MONLINK

**PU** Changed keyword:

ANS

### Enterprise Systems Connection Support

An Enterprise Systems Connection (ESCON) link provides multiple logical connections through an ESCON adapter to another host in your network over a single physical line.

ESCON links also take advantage of the 3746 Model 900 connectivity subsystem, which improves NCP performance by performing NCP data link control processing. To use ESCON links, you must have the 3746 Model 900 installed in your communication controller and you must obtain the NCP V7R8 feature from IBM.

The 3745 Model 900 comes with the 3745 ESCON Generation Assistant, which is an IBM PS/2 tool that helps you define ESCON links to NCP, the I/O Configuration Program (IOCP), and the maintenance and operator subsystem extended (MOSS-E). The 3745 ESCON Generation Assistant is provided on a diskette contained in *3745 Model A Migration and Planning Guide*.

To use ESCON links, make the following updates.

**BUILD** The new CSSTIER keyword specifies the usage tier for the optional NCP feature for 3746 Model 900 support.

The new TRCPIU keyword specifies the size of the line trace and scanner interface trace PIUs.

**GROUP** The new PHYSRSC keyword associates a NTRI logical line with a physical station and is used to delay the activation of the line until the station is activated.

Changed keyword:

LNCTL

**LINE** The new AUTOLINE keyword specifies the ending address of the last LINE definition statement that you want to be generated.

The new CASDL keyword specifies how long the channel adapter can block inbound traffic

The new HOSTLINK keyword associates a logical line with the host link to a peripheral or subarea node.

Changed keywords:

ADDRESS

DELAY

MAXPU  
 MONLINK  
 NPACOLL  
 SPEED  
 TIMEOUT  
 TRANSFR

**PU**

The new CASDL keyword specifies how long the link can block inbound data before signaling that the station is inoperative.

The new DELAY keyword specifies the minimum interval that NCP is to delay from the time data is available to the host to the time an attention signal is presented to the link.

The new MONLINK keyword causes SMMF to activate the logical link whenever this station is activated.

The new TIMEOUT keyword defines how long NCP is to wait for a response from the host.

The new TRANSFR keyword specifies how much data NCP can receive from this station during a single data transfer operation.

Changed keywords:

ADDR  
 ANS  
 MAXBFRU  
 NETID  
 NPACOLL  
 PUDR  
 PUTYPE  
 SRT  
 TGN  
 XMONLNK

## NCP and Link-Attached Devices

### IBM 3745 Line Interface Coupler 4 Requirement for SPEED

If you are using the X.21 interface, make the following updates.

**LINE**

Changed keywords:

CLOCKNG  
 SPEED

### Shared Port Identification

You can assign more than one node that can communicate with NCP to the same NCP port. In this configuration, the shared port identification function can reduce the amount of VTAM processing required to determine whether a node can communicate with NCP. It does this by allowing VTAM to identify the port through which the node communicates rather than the node itself; since there are fewer ports than nodes, less processing is required.

To use the shared port identification function, make the following update.

## Migrating from NCP Version 4 Release 3.1

**LINE** The new ID keyword specifies the hexadecimal representation of the node identification field to be returned to the host in the request contact response/request unit (RU) when a dial connection is made.

### SSCP Monitor Mode Function

To cause NCP to use the SSCP monitor mode function (SMMF) to activate SDLC peripheral links, make the following update.

**PU** The new XMONLNK keyword specifies that NCP can activate nonswitched SDLC links for physical units other than type 4.

### IBM 4941 Modems

To use IBM 4941 modems, make the following updates.

**LINE** The new AUTO keyword.

The new LPDA2DL keyword specifies whether the line uses modems that support the LPDA2 modem dial facility but are not LPDA2 modems.

The new RING keyword specifies that the modem has the ring-indicator interface.

### Multiple Local Modem Support

Multiple local modem support allows LPDA2 tests to be run on lines that use multiple local modems. Multiple local modems may exist on both segments of a tailed line. To create addressability and direct LPDA2 testing to a specific modem, make the following updates.

**TERMINAL** The new LMODADR keyword specifies the modem address and segment.

**LINE** Code LPDATS=LPDA2 on the line associated with this station.

**PU** The new LMODADR keyword specifies the modem address and segment.

### IBM 3174 Group Poll

When an IBM 3174 controller acts as a gateway between NCP and an IBM Token-Ring Network, NCP can determine whether any station on the token ring has data to send by polling the controller rather than by polling each station on the token ring, which improves NCP performance. To enable NCP to use the group poll function, make the following update.

**PU** The new GP3174 keyword indicates that a poll to an IBM 3174 gateway controller can be a group poll for any station.

### V.25 Bis

The V.25 bis protocol uses a single line to establish a call and to send and receive data. This can be more efficient than using a separate line for each of these functions.

To use the V.25 bis protocol for NCP or EP lines, make the following updates.

**GROUP** The new PRODID keyword as PRODID=*label*, where *label* is the address label to a user-defined subvector X'11' that contains the product identifier for IBM special products or user-written code. This identifier is used in a generic alert in the event of a V.25 bis modem dial failure.

**LINE** The new V25BIS keyword specifies that the modem for this line supports the V.25 bis protocol.

### 3746 Model 900 Connectivity Subsystem SDLC Lines

You can attach switched and nonswitched Synchronous Data Link Control (SDLC) lines to NCP through the 3746 Model 900 connectivity subsystem using a communication line adapter (CLA). The 3746 Model 900 improves NCP performance by performing NCP data link control processing. To use the 3746 Model 900, you must obtain the NCP V7R8 feature from IBM.

To define a 3746 Model 900 SDLC connection, make the following updates.

**BUILD** The new CSSTIER keyword specifies the usage tier for the optional NCP feature for 3746 Model 900 support.

**GROUP** Changed keyword:  
X21NTWK

**LINE** The new LPDA2DL keyword specifies whether the line uses modems that support the LPDA2 modem dial facility but are not LPDA2 modems.  
Changed keywords:  
ADDRESS  
AUTO  
LPDATS  
SPEED

### Spare SDLC Lines

3745-attached SDLC peripheral lines can be generated as spare lines, redefinable lines, or as neither. By generating spare and redefinable lines, you can use NTuneMON with NTuneNCP to enable and disable the activation of physical lines from your communication controller without regenerating and reloading NCP.

**Note:** To be spare or redefinable, a line must be the only line in its group.

To use this function, make the following updates.

**LINE** Changed keyword:  
USE

---

## Token-Ring Resources

### NTRI Lines

You can use NCP/Token-Ring interconnection (NTRI) to enable NCP to communicate with subarea or peripheral nodes on a token ring. To include NTRI resources in your network configuration, make the following updates.

**Note:** To generate NTRI resources, you need to define at least one physical line and at least one logical line.

**OPTIONS** Code YES as the first suboperand of the NEWDEFN keyword.

## Migrating from NCP Version 4 Release 3.1

### BUILD

The new LOCALTO keyword specifies the NTRI acknowledgment timer value when a logical connection is established with a terminal connected to a local IBM Token-Ring Network.

The new REMOTTO keyword specifies the NTRI acknowledgment timer value when a logical connection is established with a terminal connected to a remote IBM Token-Ring Network.

The new T2TIMER keyword specifies the maximum number of I-frames you want NTRI to receive over all logical subarea lines before sending a receive-ready (RR) or receive-not-ready (RNR) acknowledgment.

### NTRI Subarea Lines

You can use NTRI to allow NCP to communicate with subarea nodes on physical subarea lines and logical subarea lines on the token ring. The following sections describe the coding for physical subarea lines and logical subarea lines.

**NTRI Physical Subarea Lines:** To define a NTRI physical subarea line, update the following keywords.

### LUDRPOOL

The new NUMTYP2 keyword specifies the number of logical units included in the logical unit pool.

### GROUP

The new ECLTYPE keyword specifies that this group defines a physical connection to the IBM Token-Ring Network.

**Note:** Coding ECLTYPE causes certain definition statements and keywords to be added automatically to the generation definition. You can also code these definition statements and keywords manually.

The new second suboperand on the ECLTYPE keyword specifies that this group of lines communicates with subarea nodes.

### LINE

Update the relative line number on the ADDRESS keyword.

Code FULL as the data transfer mode on the ADDRESS keyword.

The new BEACTO keyword specifies a beacon time-out value.

The new LOCADD keyword specifies the locally administered address for the token-ring interface coupler (TIC).

The new MAXTSL keyword specifies the maximum transmit segment length.

The new PORTADD keyword specifies the port address associated with the TIC.

The new RCVBUFC keyword specifies the receive buffer capacity.

### PU

Changed keyword:

ANS

**NTRI Logical Subarea Lines:** To define a NTRI logical subarea line, update the following keywords.

### GROUP

The new ECLTYPE keyword specifies that this group defines a logical connection to the IBM Token-Ring Network.

**Note:** Coding ECLTYPE causes certain definition statements and keywords to be added automatically to the generation definition. You can also code these definition statements and keywords manually.

The new second suboperand on the ECLTYPE keyword specifies this group of lines communicates with subarea nodes.

The new PHYPORT keyword specifies the physical port address or TIC with which the lines in this group will be associated.

**Note:** Ensure that the second suboperand on the ECLTYPE keyword matches between physical and logical line definitions that have the same values coded for PORTADD and PHYPORT.

This keyword is not valid:

XMITDLY

**LINE**

The new LOCALTO keyword specifies the NTRI acknowledgment timer value for a single line when a logical connection is established with a terminal connected to a local IBM Token-Ring Network.

The new REMOTTO keyword specifies the NTRI acknowledgment timer value for a single line when a logical connection is established with a terminal connected to a remote IBM Token-Ring Network.

The new RETRIES keyword specifies the number of attempts to recover from errors occurring during transmission over the logical line.

The new SDLCST keyword defines the values used when NCP is in a primary or secondary state.

The new T2TIMER keyword specifies the maximum number of I-frames you want NTRI to receive over a particular logical subarea line before sending a receive-ready (RR) or receive-not-ready (RNR) acknowledgment.

**PU**

Changed keyword:

ADDR

**NTRI Peripheral Lines**

You can use NTRI to allow NCP to communicate with peripheral nodes on physical peripheral lines and logical peripheral lines on the token ring. The following two sections describe the coding for physical peripheral lines and logical peripheral lines.

***NTRI Physical Peripheral Lines:*** To define a NTRI physical peripheral line, update the following keywords.

**LUDRPOOL**

The new NUMTYP2 keyword specifies the number of logical units included in the logical unit pool.

**GROUP**

The new ECLTYPE keyword specifies that this group defines a physical connection to the IBM Token-Ring Network.

**Note:** Coding ECLTYPE causes certain definition statements and keywords to be added automatically to the generation definition. You can also manually code these definition statements and keywords.

The new second suboperand on the ECLTYPE keyword specifies that this group of lines communicates with peripheral nodes.

**Note:** Peripheral is the default for the second suboperand.

Changed keyword:

LSPRI

## Migrating from NCP Version 4 Release 3.1

**LINE** Update the relative line number on the ADDRESS keyword.  
Code FULL as the data transfer mode on the ADDRESS keyword.  
The new BEACTO keyword specifies a beacon time-out value.  
The new LOCADD keyword specifies the locally administered address for the TIC.  
The new MAXTSL keyword specifies the maximum transmit segment length.  
The new PORTADD keyword specifies the port address associated with the TIC.  
The new RCVBUFC keyword specifies the receive buffer capacity.

**PU** Changed keyword:  
ANS

***NTRI Logical Peripheral Lines:*** To define a NTRI logical peripheral line, update the following keywords.

**GROUP** The new AUTOGEN keyword specifies the number of LINE and PU definition statement pairs that you want NDF to automatically add to the GROUP definition statement.  
The new ECLTYPE keyword specifies that this group defines a logical connection to the IBM Token-Ring Network.  
**Note:** Coding ECLTYPE causes certain definition statements and keywords to be added automatically to the generation definition. You can also manually code these definition statements and keywords.  
The new second suboperand on the ECLTYPE keyword specifies that this group of lines communicates with peripheral nodes.  
**Note:** Peripheral is the default for the second suboperand.  
The new PHYPORT keyword specifies the physical port address or TIC with which the lines in this group will be associated.  
**Note:** Ensure that the second suboperand on the ECLTYPE keyword matches between physical and logical line definitions that have the same values for PORTADD and PHYPORT.

**LINE** The new RETRIES keyword specifies the number of attempts to recover from errors occurring during transmission over the logical line.

### Token-Ring Interface Coupler Swap

To define a spare TIC, make the following update.

**GROUP** Changed keyword:  
COMPSWP

### 16-Megabit Token-Ring Speed

To support 4 Mbps and 16 Mbps token-ring speed or early token release at 16 Mbps, or to support subarea and peripheral nodes through the same adapter, make the following updates.



**GROUP** The new ECLTYPE keyword allows support for a mixture of subarea and peripheral nodes on the same adapter.

**LINE** The new ADAPTER keyword specifies the type of adapter you are using.

The new TRSPEED keyword specifies whether you want your NCP to function at 4 Mbps or 16 Mbps.

Changed keywords:

MAXTSL  
RCVBUFC

## Token-Ring Serviceability Enhancement

To activate the NCP snap trace for token-ring resources, make the following update.

**BUILD** The new NCPTRACE keyword specifies whether the NCP snap trace is to be activated for token-ring resources.

## Network Performance Data Collection for Token-Ring Resources

To allow NetView Performance Monitor (NPM) to collect performance data for designated token-ring resources, make the following update.

**LINE** Changed keyword:

NPACOLL

## Counter Thresholds for NTRI Lines

You can define a threshold for the number of transmissions and for the number of retries associated with a physical unit. When either of these thresholds is reached, NCP sends a PIU to notify the host of the condition. To define these thresholds for a NTRI logical line, make the following update.

**PU** Changed keyword:

SRT

## NTRI Delayed Logical Link Activation

To cause VTAM 4.3.1 and later releases to delay the activation of an NCP/Token-Ring interconnection (NTRI) logical line associated with a physical station until the station is activated, make the following update.

**GROUP** The new PHYSRSC keyword associates a NTRI logical line with a physical station and to delay the activation of the line until the station is activated.

## 3746 Model 900 Connectivity Subsystem Token-Ring Resources

You can connect a token ring to NCP through the 3746 Model 900 connectivity subsystem using the type 3 token-ring interface coupler. The 3746 Model 900 improves NCP performance by performing NCP data link control processing. To use the 3746 Model 900, you must obtain the NCP V7R8 feature from IBM.

## Migrating from NCP Version 4 Release 3.1

To define a 3746 Model 900 token-ring connection, make the following updates.

### **BUILD**

The new CSSTIER keyword specifies the usage tier for the optional NCP feature for 3746 Model 900 support.

Changed keyword:

TRCPIU

### **GROUP**

The new ADAPTER keyword specifies which type of token-ring interface coupler is attached to the token-ring physical lines in this group.

The new AUTOGEN keyword specifies the number of LINE and PU definition statement pairs that you want NDF to automatically add to the GROUP definition statement.

The new PHYSRSC keyword associates a NTRI logical line with a physical station and to delay the activation of the line until the station is activated.

Changed keyword:

ECLTYPE

### **LINE**

The new ADAPTER keyword specifies the type of adapter you are using.

The new BEACTO keyword specifies beacon time-out value.

The new LOCADD keyword specifies the locally administered address for the token-ring interface coupler (TIC).

The new LOCALTO keyword specifies the NTRI acknowledgment timer value when a logical connection is established with a terminal connected to a local IBM Token-Ring Network.

The new LSPRI keyword specifies the basis of the transmission order for sending PIUs to a physical unit.

The new PORTADD keyword specifies the port address associated with the token-ring interface coupler (TIC).

The new TRSPEED keyword specifies whether you want your NCP to function at 4 Mbps or 16 Mbps.

Changed keywords:

ADDRESS  
SPEED

### **PU**

Changed keywords:

ADDR  
PUTYPE  
TGN  
XMONLNK

### **NTRI Keywords Not Used for 3746 Model 900 Token Ring**

The following keywords, which define resources for NTRI, are ignored (or invalid, as indicated) for 3746 Model 900 token ring. For a step-by-step description of how to convert a NTRI definition to a 3746 Model 900 token-ring definition, see the *NCP, SSP, and EP Resource Definition Guide*.

### **GROUP**

COMPACB  
COMPOWN  
COMPSWP

	COMPTAD
	LEVEL2
	LEVEL3
	LEVEL5
	LINEADD
	TIMER
	USERID
	XIO
	XMITDLY
<b>LINE</b>	RCVBUFC
	UACB
<b>PU</b>	SRT (invalid)
<b>LU</b>	Entire definition statement (invalid)

---

## Routes between Subareas

### Dynamic Path Update

Dynamic path update enables you to update an NCP routing table without interrupting network operation. With dynamic path update, you can:

- Define a transmission group dynamically
- Change the transmission priority thresholds of a transmission group
- Change the mapping of explicit routes to virtual routes
- Change the size of virtual route pacing windows.

To use dynamic path update, make the following updates.

**PCCU** PCCU is a VTAM-only definition statement. The new NEWPATH keyword represents the path table update members.

For detailed explanations of VTAM-only definition statements and keywords, or for information on how to code them, see the *VTAM Network Implementation Guide*.

**BUILD** The new PATHEXT keyword specifies the number of extra transit-routing-table rows and explicit-route-to-virtual-route mapping list rows that NDF should generate for the native network after the PATH definition statements are processed.

The new TGBXTRA keyword specifies the number of extra transmission group control blocks that must be generated for the native network after the PATH definition statements are processed.

The new second suboperand of the VRPOOL keyword to specify the number of window size specifications that you are adding to those already defined by the PATH definition statements.

**NETWORK** The new PATHEXT keyword specifies the number of extra transit-routing-table rows and explicit-route-to-virtual-route mapping list rows that NDF should generate for each non-native network after the PATH definition statements are processed.

The new TGBXTRA keyword specifies the number of extra transmission group control blocks that must be generated for each non-native network after the PATH definition statements are processed.

### Switched Subarea Support

Switched subarea support increases network flexibility by providing subarea-to-subarea communication over switched subarea links. To use switched subarea support, make the following updates.

#### GROUP

Changed keyword:

ACTIVTO

The new DIAL keyword specifies whether the lines in the group require switched line control procedures.

Code NETID=(name, ANY) if different values for NETID are to be specified on one PU definition statement for this group.

The new PUTYPE keyword specifies a switched subarea group.

#### LINE

The ID keyword is invalid.

#### PU

The new BRKCON keyword specifies that NCP can break the switched connection if the line has been idle for the period of time specified by the ACTIVTO keyword on the configurable GROUP definition statement.

On all PU definition statements in each group, code the same value for the NETID keyword, unless NETID=(name, ANY) is coded on the GROUP definition statement.

The following keywords are invalid:

ANS  
MAXOUT  
TGN

### Casual Connection

To allow NCP to appear as a type 2.1 physical unit in a local environment, make the following updates.

#### GROUP

Changed keywords:

DIAL  
MODE

#### LINE

The new SRETRY keyword specifies the number of retries that you want a secondary physical unit to attempt.

Changed keywords:

CALINE  
CHANLA  
CHNLZ  
CLINES  
CORNUM  
DUPLEX  
HDXSP  
LPDATS  
MAXPU  
NEWSYNC  
RETRIES  
SERVLIM  
TADDR  
TAILING

**SERVICE** This definition statement may be omitted when MODE=SECONDARY is specified on the GROUP definition statement.

Changed keywords:

MAXLIST  
ORDER

**PU** The new ROLE keyword specifies switched SDLC lines as negotiable or primary.  
The new XID keyword enables the physical unit to receive and respond to an XID while in normal disconnected mode.

**Note:** A type 2.1 peripheral node attached by a multipoint peripheral link must be configured as a secondary station.

Changed keywords:

IRETRY  
PUDR  
RETRIES

Changed default:

PASSLIM

## Multilink Transmission Group Processing Enhancements

### Line Selection Order

NCP can select individual lines in a multilink transmission group (MLTG) either in the order in which they are activated or in order of user-defined line priority. To specify line selection order, make the following updates.

**BUILD** The new MLTGORDR keyword specifies whether lines are to be selected in order of activation or order of priority.

**LINE** The new MLTGPRI keyword assigns a priority to a line.

### Mixed-Media Multilink Transmission Groups

An MLTG can contain more than one token-ring or frame-relay line, and can contain a combination of SDLC, token-ring, and frame-relay lines. To take advantage of this enhancement, make the following updates.

**PU** The new TGCONF keyword specifies whether a subarea link station is in a single-link or multilink transmission group.

Changed keywords:

MAXDATA  
TGN

## Blocked Virtual Route Alerts

To cause NCP to generate generic alerts for a blocked virtual route, make the following updates.

**BUILD** The new VRTIMER $n$  keyword specifies, for all of NCP, the length of time a virtual route can be congested before NCP sends an alert, and the length of time a virtual route can be held before NCP deactivates the route and sends an alert.

**NETWORK** The new `VRTIMER $n$`  keyword specifies, for a single non-native network, the length of time a virtual route can be congested before NCP sends an alert, and the length of time a virtual route can be held before NCP deactivates the route and sends an alert.

---

## Connections between Subarea Nodes

### Multipoint Subarea Support

You can define a single SDLC line as a multipoint subarea link to connect a single *primary* NCP to multiple *secondary* nodes (VTAM hosts or other NCPs) in a network. In this configuration, the primary NCP can exchange data with all the secondary nodes, but the secondary nodes cannot exchange data among themselves.

To define a multipoint subarea link, you need to define:

- A point-to-point subarea link between the primary NCP and each of the secondary nodes
- A multipoint subarea link connecting the primary NCP to all the secondary nodes.

#### Predefined Subarea Links for Primary Stations

To define the primary station on a point-to-point subarea link, make the following updates.

**GROUP** Code two GROUP definition statements, the first with the MODE keyword describing NCP as primary and the second describing NCP before the controllers are contacted.

**LINE** The new SDLCST keyword specifies which SDLC selection table entry NCP uses.

#### Predefined Subarea Links for Secondary Stations

To define a secondary station on a point-to-point subarea link, make the following updates.

**GROUP** Code two GROUP definition statements, the first with the MODE keyword describing NCP as secondary and the second describing NCP before the controllers are contacted.

**LINE** The new SDLCST keyword specifies which SDLC selection table entry NCP uses.

Changed keyword:

LPDATS

#### Multipoint Subarea Links for Primary Stations

To define the primary station on a multipoint subarea link, make the following updates.

**GROUP** Code one GROUP definition statement with the MODE keyword describing NCP as primary.

**LINE** These keywords are not valid:

CONFIG  
IPL  
SDLCST  
TADDR

**SERVICE** This keyword is not valid:

MAXLIST

**PU** Code the new ADDR keyword on all PU definition statements.

Any valid PUTYPE value (1, 2, or 4) may be specified if at least one PU statement has PUTYPE coded as 4.

**Note:** PUTYPE=4 must be specified for type 4 and type 5 physical units on a multipoint line.

### **Multipoint Subarea Links for Secondary Stations**

To define a secondary station on a multipoint subarea link, make the following updates.

**GROUP** Code one GROUP definition statement with the MODE keyword describing NCP as secondary.

**LINE** Changed keywords:

CALINE  
CHANLA  
CHNLZ  
CLINES  
CONFIG  
CORNUM  
LPDATS  
NEWSYNC  
SDLCST  
SERVLIM  
TAILING

The new TADDR keyword defines a symbolic link station address for NCP.

**PU** Changed keywords:

ADDR  
RETRIES

The physical unit defined on this line must be type 4 or type 5 and must be coded PUTYPE=4.

## **Pause Enhancement**

You can improve performance over an SDLC link to a configurable station by defining a different polling cycle duration for primary and secondary subarea links. To do this, make the following updates.

**SDLCST** The new PAUSE keyword defines a different polling cycle duration for primary and secondary subarea links.

## Migrating from NCP Version 4 Release 3.1

**LINE** Changed keyword:  
PAUSE

### Parallel Transmission Group Support for Channel Links

To allow VTAM and NCP to communicate using up to 16 channel links, make the following updates.

**GROUP** Changed keyword:  
LNCTL

**PATH** Changed keywords:  
ERn (now supports ER8 through ER15)

**PU** Changed keywords:  
PUTYPE  
TGN

### Enhanced Loading and Activation for Remote Controllers

This section lists keyword changes that enable an operator to load NCP into a remote communication controller over a switched subarea line or a NTRI subarea or X.25 line.

#### Switched Subarea Lines (SDLC, X.21, or X.25)

To allow an operator to load NCP into a remote communication controller over a switched subarea line (SDLC, X.21, or X.25), make the following updates.

**SWMMT** The new IDNUM keyword specifies a unique identification that verifies the sender and receiver for each line.  
The new MAXOUT keyword specifies the number of PIUs to be sent before asking for a response.  
The new NETID keyword specifies the network identification of the designated sender.

**LINE** The new SWMMTID keyword specifies the name of a switched SSCP monitor mode function (SMMF) table defined by a group of SWMMT definition statements.  
Changed keywords:  
IPL  
MONLINK

#### NTRI Subarea Lines and X.25 Lines

To allow an operator to load NCP into a remote communication controller over a NTRI subarea line or an X.25 line, make the following updates.

**LINE** Changed keywords:  
IPL  
MONLINK



---

## Interconnected Networks

### SNA Network Interconnection Session Limit Increase

To increase the number of sessions available on your gateway NCP, make the following updates.

**BUILD** Changed keywords:

HSBPOOL  
NETLIM

**GWNAU** Changed keyword:

NUMSESS

**NETWORK** Changed keyword:

NETLIM

### Dynamic Network Identification

You can define network resources that enable a gateway NCP to define adjacent networks dynamically. This enables the gateway NCP to conduct sessions with networks not defined to it. To do this, make the following updates.

**GROUP** Changed keyword:

NETID

**NETWORK** The new COPIES keyword defines the number of model networks available.

Changed keyword:

NETID

### Gateway Session Accounting

If you want your NCP to collect data on cross-network sessions, make the following updates:

**Note:** Gateway session accounting is available only if you have NPM R3 or a later release.

**BUILD** The new GWSESAC keyword specifies the following:

- Whether you want NCP to collect cross-network session information
- How many NPA session counters control blocks (NSCs) to generate in addition to those generated for session accounting
- How many bytes and PIUs to count before sending cross-network session accounting data to NPM
- Whether you want to defer data collection
- How to count PIU distribution length values
- How many NPM session counter extensions blocks (NSXs) to generate in addition to those generated for session accounting

## Migrating from NCP Version 4 Release 3.1

- Whether you want your NCP to collect data about cross-network sessions using the procedure correlation identifier (PCID) sent during session setup instead of the PCID sent during session establishment.

### Gateway Session Pacing Override

To force sessions through the gateway NCP to use session pacing, make the following updates.

<b>BUILD</b>	The new GWPACING keyword causes the gateway NCP to reject sessions that are not paced or to use session pacing by overriding the session-pacing parameters.
<b>NETWORK</b>	The new GWPACING keyword causes the gateway NCP to reject sessions that are not paced or to use session pacing by overriding the session-pacing parameters.

---

## Emulation Mode Resources

### Selection of EP Sense Codes

To select either the Intervention Required (IR) or the Command Reject (CR) sense code when a WRITE command is issued to an EP line that is not enabled, make the following update.

<b>LINE</b>	Changed keyword: CU
-------------	------------------------

---

## Teletypewriter Exchange Service

### Teletypewriter Exchange Service Auto-Speed Detection

With TWX terminals, if you are defining an NCP or EP start-stop telecommunication link that is internally clocked and you want NCP or EP to determine the speed for the link, make the following update.

<b>LINE</b>	Changed keyword: SPEED
-------------	---------------------------

---

## Customized Functions

### Maximum Load Module Size Increase

To control the location in memory of user-written and preassembled control blocks and code for IBM special products or user-written code, make the following updates.

<b>GENEND</b>	Changed keywords: INCHI ORDHI SRCHI
---------------	--

---

## Defining Diagnostic Aids

### Channel Adapter IOH Trace

The channel adapter input/output halfword (IOH) trace is a maintenance and debugging tool that traces information flowing through a single channel adapter. To use this trace, make the following update.

**BUILD** The new CAIOTRC keyword specifies whether your NCP is to include the channel adapter IOH trace.

### Link Problem Determination Aid

If you are using the link problem determination aid (LPDA), make the following updates.

**LINE** If the link uses modems that support LPDA commands, change the value of the LPDATS keyword.

If you are defining a line attached to a 586x modem operating in normal (LPDA2) mode, the validity checking of the TAILING keyword has changed.

Changed keywords:

CALINE  
CHANLA  
CLINES

To enable NCP to start an LPDA2 test from the secondary side of a link, change the following keywords:

LPDATS  
TAILING

**TERMINAL** If you code LPDATS=LPDA2 on the link for a device, do not code X'FF' or X'FD' on the ADDR or POLL keywords.

**PU** If you do not want to run LPDA for a particular physical unit on an LPDA line, code LPDA=BLOCK on the PU definition statement.

If you code LPDATS=LPDA2 on the link for a physical unit, do not code X'FD' or X'FF' on the ADDR keyword.

The new third suboperand of the SRT keyword to specify whether LPDA should be run when the total transmissions counter reaches its threshold.

Do not code the LPDA keyword for a type 4 physical unit.

### IBM 786x Modems Extended LPDA2 Capability

To support LPDA tests on all ports of a channelized modem, make the following updates.

**LINE** The new PORT keyword specifies which port of the data multiplex local modem the SDLC or BSC line is connected to.

Changed keywords:

CHANLA  
CHNLZ  
CORNUM  
LPDATS  
TAILING

**PU**

Changed keyword:

SRT

---

## Backup and Recovery Procedures

### Extended Recovery Facility

If you are including the extended recovery facility (XRF) in your network configuration, make the following update.

**BUILD**

The new BACKUP keyword specifies the total number of logical units for which XRF support is required.

---

## Performance Characteristics

### Network Performance Data Collection

If you are using the NPM function to collect performance data on resources attached to your NCP, make the following updates.

**BUILD**

Code NPA=(YES,DR) to specify that network performance data is to be collected for dynamic reconfiguration resources.

**LINE**

If you are defining a link that is externally clocked, code the SPEED keyword to ensure correct calculation of the data rate for this link.

### Session Accounting

If you want your NCP to collect accounting information for boundary sessions, make the following updates.

**BUILD**

The new SESSACC keyword specifies the following:

- Whether you want your NCP to collect session accounting information
- How many NPA session counters control blocks (NSCs) to generate
- How many bytes and PIUs to count before sending session accounting data to NPM
- Whether you want session accounting done on primary logical units, secondary logical units, or all logical units
- Whether you want to defer data collection
- How many PIU distribution length values to count
- How many NPM session counter extensions blocks (NSXs) to generate.

## Link Session Priority

You can specify whether NCP is to send PIUs to a physical unit in the order in which NCP received them or in order of the transmission priority of the PIUs. To do this, make the following updates.

- LINE** The new LSPRI keyword specifies the basis of the transmission order for sending PIUs to a physical unit.
- The new LINK suboperand on the LSPRI keyword to cause transmission priority to be the basis of transmission order for all PIUs across the link.

## NPM Data Collection for IBM Special Products or User-Written Code

NPM allows you to collect, store, and display performance data for selected network resources. If you want IBM special products or user-written code resources to report performance data to NPM, make the following updates.

- LINE** Changed keyword:  
NPACOLL
- CLUSTER** Changed keyword:  
NPACOLL
- TERMINAL** Changed keyword:  
NPACOLL
- PU** Changed keyword:  
NPACOLL

## NPM Session Accounting for IBM Special Products or User-Written Code

NPM allows you to collect, store, and display session accounting data for selected network sessions. If you want IBM special products or user-written code resources to report session accounting data to NPM, make the following update.

- GENEND** The new UACCTNG keyword specifies the entry points of user-written accounting notification routines.

## Adaptive Session Pacing Enhancement

To specify whether NCP is to use adaptive session pacing or fixed session pacing for data sent to a logical unit, make the following updates.

- LU** The new VPACING keyword controls session paging for the subarea side of an LU-LU session.
- Changed keyword:  
PACING

### PIU Blocking Performance Improvements for Subarea Links

You can improve the performance of type 4 physical units attached to nonswitched transmission group subarea links by *blocking* PIUs, that is, by sending more than one PIU in each SDLC frame. To do this, make the following update.

**PU** The new BLOCK keyword specifies maximum size for frames transmitted over this subarea link and the maximum number of PIUs.

### NPM Data Collection by Transmission Priority

To collect performance data on a particular line or physical unit for each PIU transmission priority level, make the following updates.

**BUILD** Changed keyword:

NPA

**LINE** The new NPATP keyword specifies whether you want network performance data to be collected by transmission priority for this line in addition to the regular network performance data.

**PU** The new NPATP keyword specifies whether you want network performance data to be collected by transmission priority for this physical unit in addition to the regular network performance data.

**LU** The new MAXTP keyword specifies the maximum number of resources for which NPM is to collect network performance data by transmission priority at one time for the session.

---

## Internet Protocol

NCP can route Internet Protocol (IP) datagrams between internet hosts over SNA networks, Ethernet-type LANs, and NTRI-attached token rings. This section describes the updates required to define the resources for these functions.

### General Internet Resources

To define resources for general internet routing support, make the following updates.

**BUILD** The new IPPOOL keyword specifies a limit on the number of NCP buffers that can be used to receive IP datagrams.

The new IPRATE keyword specifies the maximum rate at which NCP is to receive internet frames from Ethernet-type or NTRI LANs.

The new IPSNAP keyword activates the NCP snap trace for internet resources.

### Internet Routing over SNA Networks

NCP can route IP datagrams over an SNA network using an NCP connectionless SNA transport (NCST) session between an NCST logical unit in NCP and a remote NCST logical unit. To define resources for an NCST session, make the following updates.

<b>BUILD</b>	<p>The new CNLSQMAX keyword specifies the maximum size for NCST session queues when NCP is in a slowdown state.</p> <p>The new CNLSQTIM keyword specifies the maximum time that NCP is to keep a PIU on an NCST session outbound queue.</p>
<b>GROUP</b>	<p>The new NCST keyword defines a group of NCST session interfaces.</p>
<b>LU</b>	<p>The new INTFACE keyword specifies the name of the local internet interface for the NCP NCST logical unit.</p> <p>The new REMLU keyword specifies the remote NCST logical unit that will be the session partner for the NCP NCST logical unit.</p>
<b>IPOWNER</b>	<p>The new IPOWNER definition statement defines the internet address of the owning IBM TCP/IP host and a route to the host.</p> <p>The new HOSTADDR keyword specifies the internet address of the owning host.</p> <p>The new INTFACE keyword specifies the local NCST interface to the owning host.</p> <p>The new MAXHELLO keyword specifies how many <i>Hello</i> datagrams NCP is to send to the owning host without receiving an acknowledgment.</p> <p>The new NUMROUTE keyword specifies how many routes the owning host can add beyond the number defined in your generation definition.</p> <p>The new UDPPORT keyword specifies the User Datagram Protocol port address the owning host will use to communicate with NCP.</p>
<b>IPLOCAL</b>	<p>The new IPLOCAL definition statement defines a local internet interface for the NCP NCST logical unit. If the logical unit is directly attached to NCP, the IPLOCAL definition statement also defines an internet route to the logical unit.</p> <p>The new INTFACE keyword specifies the name of the NCP NCST logical unit.</p> <p>The new LADDR keyword specifies the internet address of the interface.</p> <p>The new METRIC keyword assigns a metric to the interface to enable NCP to select the most desirable route to a destination.</p> <p>The new P2PDEST keyword specifies the internet address of the host that contains the remote NCST logical unit.</p> <p>The new PROTOCOL keyword specifies whether the interface is to be managed through Routing Information Protocol (RIP).</p> <p>The new SNETMASK keyword defines a mask that identifies the subnetwork portion of the address specified by LADDR.</p>

### Internet Routing over Ethernet-Type LANs

NCP can route internet traffic to devices attached to an Ethernet-type LAN. NCP can use both Ethernet Version 2 and Institute of Electrical and Electronic Engineers (IEEE) standard 802.3 frame formats on the same Ethernet-type LAN attachment.

**Note:** For dynamic control of NCP internet routing, the Ethernet-type subsystem (ESS) adapter in your controller must have one of the following microcode levels:

- C38006 for the IBM 3745 Models 130, 150, 160, and 170
- C37967 for the IBM 3745 Models 210, 310, 410, and 610
- D39888 for the IBM 3745 Models 21A, 31A, 41A, and 61A
- D400002 for the IBM 3745 Model 17A.

## Migrating from NCP Version 4 Release 3.1

To route internet traffic over an Ethernet-type LAN, make the following updates.

### **GROUP**

The new ETHERNET keyword defines a line group to the Ethernet-type LAN.

### **LINE**

The new FRAMECNT keyword specifies thresholds for ESS line statistical counters.

The new INTFACE keyword assigns a name to the attachment and specifies the maximum frame size for the attachment.

The new LOCADD keyword specifies the locally administered address for the token-ring interface coupler (TIC).

Changed keywords:

ADDRESS  
NPACOLL

### **PU**

The new ARPTAB keyword defines the maximum number of temporary entries the ARP table for the attachment can contain at one time.

The new LANTYPE keyword specifies the type of frame format the attachment is to support.

### **IPHOST**

The new IPHOST definition statement defines an internet host on the Ethernet-type LAN.

The new HDWADDR keyword specifies the hardware address of the internet host.

The new IPADDR keyword specifies the internet address of the internet host.

The new LANTYPE keyword specifies the type of frame format the host supports.

### **IPLOCAL**

The new IPLOCAL definition statement defines the local internet interface to the Ethernet-type LAN. If the LAN is directly attached to NCP, the IPLOCAL definition statement also defines an internet route to the LAN.

The new INTFACE keyword specifies the name of the interface.

The new LADDR keyword specifies the internet address of the interface.

The new METRIC keyword assigns a metric to the interface to enable NCP to select the most desirable route to a destination.

The new PROTOCOL keyword specifies whether the interface is to be managed through Routing Information Protocol (RIP).

The new SNETMASK keyword defines a mask that identifies the subnetwork portion of the address specified by LADDR.

## **Internet Routing over NTRI-Attached Token Rings**

NCP can route internet traffic over token rings attached to NCP through NTRI. NCP can route both SNA and internet traffic over the same NTRI attachment. To route internet traffic over a NTRI-attached token ring, make the following updates.

### **LINE**

The new INTFACE keyword assigns a name to the NTRI attachment and specifies the maximum frame size for the attachment.

The new LOCADD keyword specifies the locally administered address for the token-ring interface coupler (TIC).



Changed keywords:

ADDRESS  
MAXPU  
NPACOLL

**PU**

The new ARPTAB keyword defines the maximum number of temporary entries the ARP table for the attachment can contain at one time.

The new NETWORK keyword specifies whether the network represented by the PU definition statement will be used for SNA or internet traffic.

Changed keywords:

ADDR  
ANS  
PASSLIM

**IPHOST**

The new IPHOST definition statement defines an internet host on the token ring.

The new HDWADDR keyword specifies the hardware address of the internet host.

The new IPADDR keyword specifies the internet address of the internet host.

**IPLOCAL**

The new IPLOCAL definition statement defines a local internet interface to the token ring. If the token ring is directly attached to NCP, the IPLOCAL definition statement also defines an internet route to the token ring.

The new INTFACE keyword specifies the name of the interface.

The new LADDR keyword specifies the internet address of the interface.

The new METRIC keyword assigns a metric to the interface to enable NCP to select the most desirable route to a destination.

The new PROTOCOL keyword specifies whether the interface is to be managed through Routing Information Protocol (RIP).

The new SNETMASK keyword defines a mask that identifies the subnetwork portion of the address specified by LADDR.

## Internet Routes

NCP internet routing can be dynamically controlled by NCPROUTE, a server that runs in the owning IBM Transmission Control Protocol/Internet Protocol (TCP/IP) host.<sup>1</sup> NCPROUTE receives internet routing changes through Routing Information Protocol (RIP) datagrams from other internet hosts and communicates these changes to NCP.

To define an internet route, make the following updates.

**IPROUTE**

The new IPROUTE definition statement defines a route to a network, subnetwork, or internet host.

The new DESTADDR keyword specifies the internet address of the destination network, subnetwork, or internet host.

The new DISP keyword specifies whether NCPROUTE can dynamically delete or change the route.

---

<sup>1</sup> For information on which IBM TCP/IP product releases and operating systems support NCPROUTE, see the IBM TCP/IP documentation for your host operating system.

The new HOSTRT keyword specifies whether the route is to a host or to a subnet-work or network.

The new INTERFACE keyword identifies which internet router interface provides the route to the destination.

The new METRIC keyword assigns a metric to the route to enable NCPROUTE to select the most desirable route to a destination.

The new NEXTADDR keyword identifies the internet address of the next internet router on the route.

---

## Frame Relay

Frame relay is a CCITT- and ANSI-standard communication protocol for high-speed local or wide area networks. A frame-relay network is composed of interconnected *frame-relay frame handlers*, which route (or *switch*) frames through the network. At the boundary of the frame-relay network, *frame-relay terminating equipment* stations transmit frames through the network to other frame-relay terminating equipment stations. Frames are transported along *permanent virtual circuits (PVCs)* on frame-relay physical lines.

NCP can function as both a frame-relay frame handler and a frame-relay terminating equipment station. When functioning as a terminating equipment station, NCP can use frame relay to communicate with SNA subarea and peripheral nodes.

This section describes the updates required to define NCP frame-relay resources.

## Frame-Relay Physical Lines

An NCP frame-relay physical line is the physical connection between NCP and another frame-relay device. A single frame-relay physical line can carry traffic for both the frame-handler and terminating-equipment functions. To define a frame-relay physical line, make the following updates.

**BUILD** The new NCPTRACE keyword specifies whether the NCP snap trace is to be activated for frame-relay resources.

**GROUP** The new FRELAY keyword specifies the type of frame-relay line.

**LINE** The new DYNWIND keyword defines the dynamic characteristics of the frame transmission window for all logical connections on a frame-relay physical line.

The new LSPRI keyword specifies the basis of the transmission order for sending PIUs to a physical unit.

The new MAXFRAME keyword specifies the maximum size for frames NCP will transmit.

The new PORTADD keyword specifies the port address associated with the token-ring interface coupler (TIC).

The new TITIMER keyword defines the inactivity timer (TI) value for all logical connections on a frame-relay physical line.

Changed keywords:

ADDRESS  
MAXPU  
NPACOLL

**PU** Changed keywords:

- NPACOLL
- SRT
- XMONLNK

### Frame-Relay LMI Protocol Support

The first PU definition statement for a frame-relay physical line defines the *link-station subport*. You can define the link-station subport to support local management interface (LMI) protocol. LMI protocol provides status information for the physical line and the logical connections it supports. You can use either the CCITT or ANSI LMI standard.

NCP also provides an echo detection function for frame-relay subports that support LMI protocol. The echo detection function reduces errors in frame-relay satellite communications.

To use LMI protocol and echo detection, make the following updates.

**PU** The new ERRORT keyword specifies the LMI thresholds used to determine the integrity of this frame-relay physical port.

The new LMI keyword enables you to use CCITT or ANSI standard LMI protocol for this frame-relay physical port and to provide NCP echo detection for this LMI subport.

The new SPOLL keyword specifies the maximum frequency at which status enquiry full messages are to be sent on this frame-relay physical port to the adjacent node.

The new TIMERS keyword specifies timer intervals to be used for LMI status polling and link integrity verification.

### Frame-Relay Logical Subarea Lines

You can define logical frame-relay connections between NCP and other subarea nodes. A frame-relay subarea link can connect two adjacent subareas or can pass through a frame-relay network. A frame-relay subarea link can be part of a multi-link transmission group (MLTG), along with SDLC and token-ring subarea links.

Frame-relay subarea links offer advantages over SDLC subarea links. For more information, including a description of how to convert SDLC subarea links to frame relay, see *NCP, SSP, and EP Resource Definition Guide*.

To use frame-relay subarea links, make the following updates.

**GROUP** The new FRELAY keyword specifies the type of frame-relay line.

The new PHYSRSC keyword associates a group of logical lines with a specific physical line.

Changed keyword:

- RNRLIMIT

**LINE** The new COMRATE keyword specifies whether certain frames sent over this line can be discarded by the frame-relay network to facilitate the processing of higher priority frames when the network is congested.

## Migrating from NCP Version 4 Release 3.1

The new LOCALTO keyword specifies the NTRI acknowledgment timer value when a logical connection is established with a terminal connected to a local IBM Token-Ring Network.

The new MAXFRAME keyword specifies the maximum size for frames NCP will transmit.

The new T2TIMER keyword specifies the maximum number of I-frames you want NTRI to receive over all logical subarea lines before sending a receive-ready (RR) or receive-not-ready (RNR) acknowledgment.

Changed keywords:

NPACOLL  
RETRIES  
SDLCST

### PU

The new BLOCK keyword specifies maximum size for frames transmitted over this subarea link and the maximum number of PIUs.

Changed keywords:

ADDR  
TGN

## Frame-Relay Logical Peripheral Links

You can define logical frame-relay connections between NCP and peripheral nodes (type 2 or type 2.1 physical units) that support frame relay. A frame-relay peripheral link can connect NCP to an adjacent peripheral node or can pass through a frame-relay network. Frame-relay peripheral links offer advantages over SDLC peripheral links. For more information, see *NCP, SSP, and EP Resource Definition Guide*.

To use frame-relay peripheral links, make the following updates.

### GROUP

The new AUTOGEN keyword specifies the number of LINE and PU definition statement pairs that you want NDF to automatically add to the GROUP definition statement.

The new FRELAY keyword specifies the type of frame-relay line.

The new PHYSRSC keyword associates a frame-relay logical line with a physical station.

### LINE

The new LSPRI keyword specifies the basis of the transmission order for sending PIUs to a physical unit.

The new PORTADD keyword specifies the port address associated with the physical line.

## Frame-Relay Switching Support

NCP can function as a frame-relay frame handler, or frame-relay switch, in a frame-relay network. To use NCP as a frame-relay handler, you define logical frame handler subports (FHSPs) to connect NCP to other frame-relay nodes, and you define internal paths between the FHSPs to route frame-relay data through NCP.

To use NCP as a frame-relay switch, make the following updates.

<b>PUDRPOOL</b>	The new FRSEDRPU keyword specifies how many frame-relay physical units added to NCP through dynamic reconfiguration are to be eligible for NPM performance data collection.
<b>LINE</b>	Changed keyword: MAXPU
<b>SERVICE</b>	Changed keywords: MAXLIST ORDER
<b>PU</b>	The first PU definition statement for the physical line defines the link-station support for the line. Each subsequent PU definition statement defines an FHSP.  The new XID keyword enables the physical unit to receive and respond to an XID while in normal disconnected mode.  <b>Note:</b> A type 2.1 peripheral node attached by a multipoint peripheral link must be configured as a secondary station.  Changed keywords: ADDR MAXOUT NPACOLL PUDR SRT XMONLNK
<b>FRSESET</b>	The new FRSESET definition statement defines a PVC segment within NCP between two FHSPs.  The new SUBPORTS keyword specifies the two FHSPs at the ends of the PVC segment, and optionally defines a substitute FHSP for each end of the PVC segment.

## 3746 Model 900 Frame-Relay Support

The 3746 Model 900 supports attachment to a frame-relay network. Support for frame relay on the 3746 Model 900 is the same as support for frame relay on the 3745 with the following exception:

- The PHYSRSC, ADDRESS, and PORTADD keywords may need to be changed.

<b>FRSESET</b>	The new FRSESET definition statement defines a PVC segment within NCP between two FHSPs.  The new SUBPORTS keyword specifies the two FHSPs at the ends of the PVC segment and optionally defines a substitute FHSP for each end of the PVC segment.
<b>GROUP</b>	The new FRELAY keyword specifies the type of frame-relay line.  The new PHYSRSC keyword associates a frame-relay logical line with a physical station.

## Migrating from NCP Version 4 Release 3.1

**LINE** The new PORTADD keyword specifies the port address associated with the physical line.

The new T2TIMER keyword specifies the acknowledgement timer (T2) values and the maximum number of I-frames that NCP can receive without sending an acknowledgement.

Changed keywords:

MAXPU  
SPEED

**PU** Changed keywords:

ADDR

### **3745 Frame-Relay Keywords Not Used for 3746 Model 900 Frame Relay**

You can use the following keywords for 3745 frame relay, but they are ignored for 3746 Model 900 frame relay (except for SRT, which is not valid).

**GROUP** COMPACB  
COMPOWN  
COMPSWP  
LEVEL2  
LEVEL3  
LEVEL5  
LINEADD  
XIO  
XMITDLY

**LINE** UACB

**PU** SRT (not valid)

**PUDRPOOL** FRSEDRPU

## Appendix A. Quick Reference of Keyword Changes

This appendix shows the changes to NCP definition statements and keywords for the NCP enhancements described in this book. To see what changes were made to a particular definition statement or keyword for any enhancement, find the definition statement or keyword in the left-hand column and read across. Definition statements are listed alphabetically, and keywords are listed alphabetically under each definition statement.

The “NCP” column in the table shows the NCP version and release in which the enhancement was introduced. “Pre-V5” indicates that the enhancement was introduced before NCP V5 or NCP V4R2.

*Table A-1 (Page 1 of 25). Changes to Definition Statements and Keywords by NCP Enhancement*

Definition Statement or Keyword	Enhancement	Change	NCP
<b>BUILD</b>			
ABEND	General updates	D	Pre-V5
ADDSSESS	General updates	C	V6R1
	Type 2.1 peripheral node support	A	V5R2
ADPLIMIT	Adaptive session pacing	A	V7R8
ASMXREF	General updates	D	Pre-V5
AUXADDR	General updates	C	V6R1
	Type 2.1 peripheral node support	A	V5R2
BACKUP	Triple-DES encryption for XRF	C	V7R8
	Dynamically created control blocks	C	V7R1
	Extended recovery facility	A	V5R1
BFRS	General updates	C	V7R3
	Dynamically created control blocks	C	V7R1
	Partitioned emulation program	C	V5R1
BRANCH	General updates	A	Pre-V5
CA	General updates	D	V6R1
	Channel-link definition	C <sup>1</sup>	V5R2
CAIOTRC	Channel adapter IOH trace	A <sup>1</sup>	V5R2
CANETID	General updates	D	V6R1
	Channel-link definition	C <sup>1</sup>	V5R2
	Gateway NCP	A	Pre-V5
CATRACE	General updates	C X	V5R3
	General updates	C	V5R2.1
CNLSQMAX	Internet routing support	A	V6R1
CNLSQTIM	Internet routing support	A	V6R1
CONDASM	General updates	D	Pre-V5
CSSTIER	New operand for usage tiers	C	V7R4
	3746 Model 900 usage tiers	A	V6R3
CWALL	General updates	C	Pre-V5
DELAY	General updates	D	V6R1
	Channel-link definition	C <sup>1</sup>	V5R2
DSABLTO	General updates	C	V7R3

<sup>1</sup> Applies when migrating from any V4 release. Does not apply when migrating from any V5 release.

**Legend:** A=Added, D=Deleted, C=Changed, X=Changed default

## Quick Reference of Keyword Changes

Table A-1 (Page 2 of 25). Changes to Definition Statements and Keywords by NCP Enhancement

Definition Statement or Keyword	Enhancement	Change	NCP
DUPADDR	General updates	A	V7R3
DYNADMP	General updates Channel-link definition	D C <sup>1</sup>	V6R1 V5R2
DYNNSC	Dynamically created control blocks	A	V7R1
DYNN SX	Dynamically created control blocks	A	V7R1
DYNPOOL	Dynamically created control blocks	A	V7R1
ERASE	General updates	D	Pre-V5
ERLIMIT	Network addressability	A	V5R2.1
GENILU	Dynamic definition of independent logical units	A	V6R1
GENLEVEL	General updates	A <sup>1</sup>	V5R2
GWAEXIT	Gateway NCP	A	Pre-V5
GWPACING	Gateway session pacing override	A	V5R4
GWSESAC	Dynamically created control blocks Gateway session accounting enhancement Gateway session accounting	C C A	V7R1 V5R4 V5R2.1
HICHAN	General updates Channel-link definition	D C <sup>1</sup>	V6R1 V5R2
HPR	APPN HPR support	A	V7R3
HPRATT	APPN HPR support	A	V7R3
HPRMLC	APPN HPR support	A	V7R3
HPRMPS	APPN HPR support	A	V7R3
HPRQLIM	APPN HPR support	A	V7R3
HPRSNAP	APPN HPR snap trace support	A	V7R4
HSBPOOL	SNA network interconnection session limit increase General updates Gateway NCP	C C <sup>1</sup> A	V5R3.1 V5R2 Pre-V5
IPPOOL	IP over frame-relay support Internet routing support	C A	V7R3 V6R1
IPRATE	IP over frame-relay support Internet routing support	C A	V7R3 V6R1
IPSNAP	Dynamic internet routing	A	V7R1
ISDNACC	ISDN Accounting support	A	V7R5
JOBCARD	General updates	D	Pre-V5
LENAME	Generating NCP under VSE General updates	A D	V7R1 V6R1
LESIZE	General updates	D	Pre-V5
LINETRC	Partitioned emulation program	A	Pre-V5
LOCALTO	General updates NTRI lines	C A	V7R3 V5R1
LOCHAN	General updates Channel-link definition	D C <sup>1</sup>	V6R1 V5R2
LTRACE	General updates	A	Pre-V5

<sup>1</sup> Applies when migrating from any V4 release. Does not apply when migrating from any V5 release.

**Legend:** A=Added, D=Deleted, C=Changed, X=Changed default



## Quick Reference of Keyword Changes

Table A-1 (Page 3 of 25). Changes to Definition Statements and Keywords by NCP Enhancement

Definition Statement or Keyword	Enhancement	Change	NCP
MACLIB	General updates	D	Pre-V5
MAXSESS	General updates	X	V6R1
	Dynamic definition of independent logical units	C	V6R1
	Type 2.1 peripheral node support	A	V5R2
MAXSSCP	General updates	C	V5R3
MAXSUBA	General updates	C	V7R3
	Network addressability	C	Pre-V5
MEMSIZE	CCU enhancement for increased storage	C	V6R2
MLTGORDR	General updates	C	V7R3
	MLTG line selection order	A	V6R1
MINILOAD	Remote load	A	V7R8
MODEL	IBM 3745-17A	C	V7R1
	IBM 3745-x1A	C	V6R2
	IBM 3745-160, -310, and -610	C	V6R1
	IBM 3745-130, -150, and -170	C	V5R2.1
	IBM 3745	C	V5R1
MXRLINEL	General updates	D	V5R3
	NTRI lines	A	V5R1
MXVLINE	General updates	D	V5R3
	NTRI lines	A	V5R1
NAMTAB	Dynamically created control blocks	C	V7R1
	APPN support	C	V6R2
	Type 2.1 peripheral node support	A	V5R2
NCPCA	General updates	D	V6R1
	Channel-link definition	C <sup>1</sup>	V5R2
NCPTRACE	Frame-relay subarea links	C	V6R1
	Token-ring serviceability enhancement	A	V5R3.1
NETID	Dynamic network identification	C	V5R4
	Gateway NCP	A	Pre-V5
NETLIM	General updates	C	V7R3
	SNA network interconnection session limit increase	C	V5R3.1
	Gateway NCP	A	Pre-V5
NEWNAME	General updates	C	V5R1
	General updates	A	Pre-V5
NPA	NPM data collection by transmission priority	C	V6R1
	Network performance data collection	C	V5R2
NTRISNAP	NTRI serviceability enhancements	A	V5R3.1
NTUNECOL	Optional statistical counts	C	V7R4
	General Update	C	V7R3
	General Update	A	V7R2
NUMHSAS	Network addressability	C X	V5R2.1
	Gateway NCP	A	Pre-V5
OBJLIB	General updates	D	Pre-V5
OBJQUAL	General updates	D	Pre-V5
OPCSB2	Partitioned emulation program	D <sup>1</sup>	Pre-V5
OUTPUT	General updates	D	Pre-V5

<sup>1</sup> Applies when migrating from any V4 release. Does not apply when migrating from any V5 release.

**Legend:** A=Added, D=Deleted, C=Changed, X=Changed default

## Quick Reference of Keyword Changes

Table A-1 (Page 4 of 25). Changes to Definition Statements and Keywords by NCP Enhancement

Definition Statement or Keyword	Enhancement	Change	NCP
OWNERPL	Allocation of unassigned logical resources to owner-based pools	A	V7R6
PARTIAL	General updates	D	Pre-V5
PATHEXT	Network addressability	C	V5R2.1
	Dynamic path update	A	V5R2
PRTGEN	General updates	C	Pre-V5
PUNAME	General updates	A	V5R1
QSZALERT	Monitoring for excessive buffer usage	A	V7R6
RGENLEVL	NDF replace GENLEVEL values	A	V7R4
REMLOAD	General updates	D	Pre-V5
REMOTTO	General updates	C	V7R3
	NTRI lines	A	V5R1
RESOEXT	General updates	D	Pre-V5
SALIMIT	Network addressability	A	V5R2.1
SESSACC	Dynamically created control blocks	C	V7R1
	General updates	X	V6R1
	General updates	C	V5R2.1
	Session accounting	A	V5R2
SESSLIM	Gateway NCP	A	Pre-V5
SLODOWN	CCU enhancement for increased storage	C	V6R2
SUBAREA	Network addressability	C	V5R2.1
TGBXTRA	Network addressability	C	V5R2.1
	Dynamic path update	A	V5R2
TGTIMER	General updates	A	V7R8
TRCPIU	3746 Model 900 token-ring resources	C	V6R2
	Enterprise Systems Connection support	C	V6R2
	General updates	A <sup>1</sup>	V5R2
TIME	General updates	D	Pre-V5
TIMEOUT	General updates	D	V6R1
	Channel-link definition	C <sup>1</sup>	V5R2
TRACE	General updates	C X	V5R3
TRANSFR	General updates	C <sup>1</sup>	V5R2
	General updates	C	Pre-V5
TYPGEN	General updates	A	Pre-V5
T1TIMER	Communications rate enhancement for dynamic reconfiguration	A	V7R3
T2TIMER	General updates	C	V7R3
	Acknowledgment timer enhancement for NTRI	A	V5R4
UNIT	General updates	D	Pre-V5
USERLIB	General updates	D	Pre-V5
USGTIER	New configuration options	C	V7R6
	Tier C available	C	V7R5
	Usage tier improvements	C	V5R4
	General updates	C <sup>1</sup>	V5R2.1

<sup>1</sup> Applies when migrating from any V4 release. Does not apply when migrating from any V5 release.

**Legend:** A=Added, D=Deleted, C=Changed, X=Changed default

Table A-1 (Page 5 of 25). Changes to Definition Statements and Keywords by NCP Enhancement

Definition Statement or Keyword	Enhancement	Change	NCP
UT1	General updates	D	Pre-V5
UT2	General updates	D	Pre-V5
UT3	General updates	D	Pre-V5
VERSION	General updates	C	V7R8
	General updates	C	V7R7
	General updates	C	V7R6
	General updates	C	V7R5
	General updates	C	V7R4
	General updates	C	V7R3
	General updates	C	V7R2
	General updates	C	V7R1
	General updates	C	V6R3
	General updates	C	V6R2
	General updates	C	V6R1
	General updates	C	V5R4
	General updates	C	V5R3.1
	General updates	C	V5R3
	General updates	C	V5R2.1
	General updates	C	V5R2
	General updates	C	V5R1
General updates	C	Pre-V5	
VOSDEACT	Control of VR deactivation when a VR goes out-of-sequence	A	V7R6
VRACT	General updates	D	Pre-V5
VRPOOL	Network addressability	C X	V5R2.1
	Dynamic path update	C	V5R2
	Gateway NCP	A	Pre-V5
VRTIMER $n$	Blocked virtual route alerts	A	V6R1
VSUBNETS	Variable subnetting	A	V7R6
XITB	General updates	D	Pre-V5
<b>CLUSTER</b>			
CDATA	General updates	D	Pre-V5
CUTYPE	General updates	C	Pre-V5
FEATURE	General updates	C	V7R8
	General updates	C	V5R1
NEXT	Automatic resource copying enhancement	A	V5R4
NPACOLL	NPM data collection for IBM special products or user-written code	C	V5R4
SEGMENT	Link problem determination aid	A	Pre-V5
XMITLIM	General updates	D	Pre-V5
<b>COMP</b>			
CDATA	General updates	D	Pre-V5
NEXT	Automatic resource copying enhancement	A	V5R4
XMITLIM	General updates	D	Pre-V5
CSB	General updates	D	Pre-V5
DLCI	DLCI management	A	V7R7
ID	Frame-relay support	A	V7R7

<sup>1</sup> Applies when migrating from any V4 release. Does not apply when migrating from any V5 release.

**Legend:** A=Added, D=Deleted, C=Changed, X=Changed default

## Quick Reference of Keyword Changes

Table A-1 (Page 6 of 25). Changes to Definition Statements and Keywords by NCP Enhancement

Definition Statement or Keyword	Enhancement	Change	NCP
CIR	3746 Model 900 frame-relay support	A	V7R7
BALANCE	3746 Model 900 frame-relay BAN connection balancing	C	V7R8
	3745 frame-relay BAN Connection Balancing	A	V7R7
<b>ENDAUTO</b>	Automatic line generation	A	V5R2.1
<b>FRSESET</b>	Frame-relay switching support	A	V6R2
SUBPORTS	Frame-relay internal frame switching support	C	V7R4
	Frame-relay over token-ring support	C	V7R3
	3746 Model 900 frame-relay support	C	V7R2
	Frame-relay switching support	A	V6R2
<b>GENEND</b>			
HSPDSEL	General updates	D <sup>1</sup>	V5R1
INCHI	Maximum load module size increase	C	V5R4
INIT	3746 Model 900 frame relay not supported	C	V7R2
KEY0INC	General updates	A	Pre-V5
KEY0ORD	General updates	A	Pre-V5
ORDHI	Maximum load module size increase	C	V5R4
SCANCTL	General updates	D <sup>1</sup>	V5R1
SRCHI	Maximum load module size increase	C	V5R4
TMRTICK	3746 Model 900 frame relay not supported	C	V7R2
UACCTNG	NPM session accounting for IBM special products or user-written code	A	V5R4
UGLOBAL	3746 Model 900 frame relay not supported	C	V7R2
<b>GROUP</b>			
ACTIVTO	Switched subarea support	C X	V5R2
ADAPTER	3746 Model 900 token-ring resources	A	V6R2
AUTOGEN	Frame-relay over token-ring support	C	V7R3
	Frame-relay peripheral nodes	C	V7R1
	3746 Model 900 token-ring resources	C	V6R2
	NTRI lines	C	V5R2.1
	NTRI lines	A	V5R1
BERPROC	General updates	D	V6R1
	General updates	A	Pre-V5
CAPACITY (VTAM)	VTAM updates	A	V6R2
COMPACB	3746 Model 900 frame relay support	C	V7R2
	General updates	A	Pre-V5
COMPOWN	3746 Model 900 frame relay support	A	V7R2
COMPSWP	3746 Model 900 frame relay support	C	V7R2
	Frame-relay subarea links	C	V6R1
	Token-ring interface coupler swap	C	V5R3
COMPTAD	Frame-relay subarea links	C	V6R1
CONNTYPE (VTAM)	VTAM updates	A	V6R2
COSBYTE (VTAM)	VTAM updates	A	V6R2
COSTTIME (VTAM)	VTAM updates	A	V6R2

<sup>1</sup> Applies when migrating from any V4 release. Does not apply when migrating from any V5 release.

**Legend:** A=Added, D=Deleted, C=Changed, X=Changed default

## Quick Reference of Keyword Changes

Table A-1 (Page 7 of 25). Changes to Definition Statements and Keywords by NCP Enhancement

Definition Statement or Keyword	Enhancement	Change	NCP
CPCP (VTAM)	VTAM updates	A	V6R2
DIAL	Frame-relay physical lines	C	V7R7
	ISDN	C	V7R5
	Frame-relay over token-ring support	C	V7R3
	Frame-relay subarea links	C	V6R1
	Internet routing support	C	V6R1
	Casual connection	C	V5R3
	NTRI lines	C	V5R2.1
	Switched subarea support	C	V5R2
DYNADJCP (VTAM)	VTAM updates	A	V6R2
DYNPU (VTAM)	VTAM updates	A	V6R2
DYNPUPFX (VTAM)	VTAM updates	A	V6R2
ECLTYPE	Frame-relay over token-ring support	C	V7R3
	Spare SDLC line support	C	V7R2
	3746 Model 900 token-ring resources	C	V6R2
	16-megabit token-ring speed	C	V5R3
	NTRI lines	C	V5R2.1
	NTRI lines	A	V5R1
ETHERNET	Spare SDLC line support	C	V7R2
	Internet routing support	A	V6R1
FRELAY	IP over switched frame-relay support	C	V7R7
	IP over frame-relay support	C	V7R3
	Spare SDLC line support	C	V7R2
	Frame-relay peripheral nodes	C	V7R1
	Frame-relay subarea links	A	V6R1
ISDN	ISDN line type	A	V7R5
LEVEL2	Frame-relay subarea links	C	V6R1
	NTRI	A	V5R1
LEVEL3	Frame-relay subarea links	C	V6R1
	NTRI	A	V5R1
LEVEL5	Frame-relay subarea links	C	V6R1
	NTRI	A	V5R1
LINEADD	Frame-relay subarea links	C	V6R1
	NTRI	A	V5R1
LINEAUT	Frame-relay over token-ring support	C	V7R3
LNCTL	Spare SDLC line support	C	V7R2
	Enterprise Systems Connection support	C	V6R2
	Internet routing support	C	V6R1
	Parallel transmission group support for channel links	C	V5R3
	Channel-link definition	C <sup>1</sup>	V5R2
LNKOWNER	NCP/EP definition facility	A	V5R1
LSPRI	NTRI link station priority	C	V6R2
MODE	Frame-relay over token-ring support	C	V7R3
	General update	C	V7R2
	Casual connection	C	V5R3
NATIVE (VTAM)	VTAM updates	A	V7R1
NCST	Spare SDLC line support	C	V7R2
	Internet routing support	A	V6R1

<sup>1</sup> Applies when migrating from any V4 release. Does not apply when migrating from any V5 release.

**Legend:** A=Added, D=Deleted, C=Changed, X=Changed default

## Quick Reference of Keyword Changes

Table A-1 (Page 8 of 25). Changes to Definition Statements and Keywords by NCP Enhancement

Definition Statement or Keyword	Enhancement	Change	NCP
NETID	Dynamic network identification	C	V5R4
	Switched subarea support	C	V5R2
NN (VTAM)	VTAM updates	A	V6R2
NPARSC	Spare SDLC line support	A	V7R2
PDELAY (VTAM)	VTAM updates	A	V6R2
PHYSPORT	Logical line pool sharing for TIC3 connections	C	V7R8
	Frame-relay over token-ring support	C	V7R3
	Frame-relay subarea links	C	V6R1
	NTRI lines	A	V5R1
PHYSRSC	ISDN	C	V7R5
	Frame-relay over token-ring support	C	V7R3
	3746 Model 900 frame-relay support	C	V7R2
	Frame-relay peripheral nodes	C	V7R1
	Enterprise Systems Connection support	C	V6R2
	3746 Model 900 token-ring resources	C	V6R2
	Frame-relay subarea links	A	V6R1
	NTRI delayed logical link activation	A	V6R1
PRODID	V.25 bis	A	V5R3
PUTYPE	Frame-relay over token-ring support	C	V7R3
	Spare SDLC line support	A	V7R2
REGISTER (VTAM)	VTAM updates	A	V6R2
REPLYTO	General updates	C X	V5R2
RETRIES	New default and maximum	A	V7R5
RETRYTO	General updates	X	V6R1
	General updates	C	V5R2.1
RNRLIMIT	Frame-relay over token-ring support	C	V7R3
	General updates	C	V6R1
SECURITY (VTAM)	VTAM updates	A	V6R2
SYNDLAY	General updates	D	V5R1
TGCONF	Code congestion threshold value	A	V7R5
TGP (VTAM)	VTAM updates	A	V6R2
TIMER	Logical line timer enhancement	C	V7R1
TOPO (VTAM)	VTAM updates	A	V6R2
TYPE	Spare SDLC line support	A	V7R2
UPARM1 (VTAM)	VTAM updates	A	V6R2
UPARM2 (VTAM)	VTAM updates	A	V6R2
UPARM3 (VTAM)	VTAM updates	A	V6R2
USERID	Frame-relay over token-ring support	C	V7R3
	Frame-relay subarea links	C	V6R1
	General updates	C	V5R2
	General updates	C	V5R1
VERSALID (VTAM)	VTAM updates	A	V6R2
VIOWNER	NCP/EP definition facility	A	V5R1
VIRTUAL	Spare SDLC line support	C	V7R2
	Internet routing support	C	V6R1

<sup>1</sup> Applies when migrating from any V4 release. Does not apply when migrating from any V5 release.

**Legend:** A=Added, D=Deleted, C=Changed, X=Changed default

Table A-1 (Page 9 of 25). Changes to Definition Statements and Keywords by NCP Enhancement

Definition Statement or Keyword	Enhancement	Change	NCP
VNGROUP (VTAM)	VTAM updates	A	V7R1
VNNAME (VTAM)	VTAM updates	A	V7R1
V25DIAL	Setting the V.25 Dial Timer	A	V7R8
XIO	3746 Model 900 frame relay support General updates	C C	V7R2 Pre-V5
XMITDLY	Frame-relay over token-ring support 3746 Model 900 frame relay support Type 2.1 peripheral node support NTRI lines	C C C A	V7R2 V5R2.1 V5R2 V5R1
X21NTWK	3746 Model 900 SDLC lines	C	V6R3
<b>GWNAU</b>	Gateway NCP	A	Pre-V5
NUMSESS	SNA network interconnection session limit increase	C	V5R3.1
<b>HOST (VTAM)</b>	General updates Channel-link definition	C C <sup>1</sup>	V6R1 V5R2
INBFRS (VTAM)	General updates	D	V6R1
SUBAREA (VTAM)	Network addressability	C	V5R2.1
<b>IPGATE</b>	Dynamic internet routing Internet routing support	D A	V7R1 V6R1
DESTADDR	Dynamic internet routing Internet routing support	D A	V7R1 V6R1
INTERFACE	Dynamic internet routing Internet routing support	D A	V7R1 V6R1
NEXTADDR	Dynamic internet routing Internet routing support	D A	V7R1 V6R1
<b>IPHOST</b>	Internet routing support	A	V6R1
HDWADDR	Internet routing support	A	V6R1
IPADDR	Internet routing support	A	V6R1
LANTYPE	Internet routing support	A	V6R1
<b>IPLOCAL</b>	Dynamic internet routing Internet routing support	C A	V7R1 V6R1
INTERFACE	IP over frame-relay support Dynamic internet routing Internet routing support	C C A	V7R3 V7R1 V6R1
LADDR	Dynamic internet routing Internet routing support	C A	V7R1 V6R1
METRIC	IP over frame-relay support	C	V7R3
PROTOCOL	Dynamic internet routing	A	V7R1
P2PDEST	Communications rate enhancement for dynamic reconfiguration IP over frame-relay support Dynamic internet routing	C C A	V7R3 V7R3 V7R1
SNETMASK	Variable subnetting enhancement Dynamic internet routing	C A	V7R6 V7R1

<sup>1</sup> Applies when migrating from any V4 release. Does not apply when migrating from any V5 release.

**Legend:** A=Added, D=Deleted, C=Changed, X=Changed default

## Quick Reference of Keyword Changes

Table A-1 (Page 10 of 25). Changes to Definition Statements and Keywords by NCP Enhancement

Definition Statement or Keyword	Enhancement	Change	NCP
<b>IPOWNER</b>	Now optional for IP static routing	C	V7R5
	NCPROUTE over IP channel	C	V7R4
	Dynamic internet routing	A	V7R1
HOSTADDR	Dynamic internet routing	A	V7R1
INTERFACE	Backup NCP-NCPROUTE interfaces	C	V7R6
	Dynamic internet routing	A	V7R1
MAXHELLO	Dynamic internet routing	A	V7R1
NUMDRIF	IP over frame-relay support	A	V7R3
NUMROUTE	Dynamic internet routing	A	V7R1
UDPPORT	Dynamic internet routing	A	V7R1
<b>IPROUTE</b>	Dynamic internet routing	A	V7R1
DESTADDR	General updates	C	V7R3
	Dynamic internet routing	A	V7R1
DISP	Dynamic internet routing	A	V7R1
HOSTRT	Dynamic internet routing	A	V7R1
INTERFACE	Dynamic internet routing	A	V7R1
METRIC	Dynamic internet routing	A	V7R1
NEXTADDR	Dynamic internet routing	A	V7R1
SNETMASK	Variable subnetting	A	V7R6
<b>IPSUB</b>	Dynamic internet routing	D	V7R1
	Internet routing support	A	V6R1
INTERFACE	Dynamic internet routing	D	V7R1
	Internet routing support	A	V6R1
NETADDR	Dynamic internet routing	D	V7R1
	Internet routing support	A	V6R1
SNETMASK	Dynamic internet routing	D	V7R1
	Internet routing support	A	V6R1
<b>LINE</b>			
ADAPTER	3746 Model 900 token-ring resources	C	V6R2
	16-megabit token-ring speed	A	V5R3
ADDIFG	General updates	C	V7R5
	General updates	A	V7R2
ADDRESS	ISDN	C	V7R5
	Spare SDLC line support	C	V7R2
	3746 Model 900 frame-relay support	C	V7R2
	3746 Model 900 SDLC lines	C	V6R3
	Enterprise Systems Connection support	C	V6R2
	3746 Model 900 token-ring resources	C	V6R2
	General updates	X	V6R1
	Frame-relay subarea links	C	V6R1
	Internet routing support	C	V6R1
	NDF usability enhancements	C	V5R3.1
	General updates	C	V5R2.1
	Channel-link definition	C <sup>1</sup>	V5R2
ARPTAB	IP over frame-relay support	A	V7R3
ATTACH	General updates	D <sup>1</sup>	V5R2

<sup>1</sup> Applies when migrating from any V4 release. Does not apply when migrating from any V5 release.

**Legend:** A=Added, D=Deleted, C=Changed, X=Changed default



## Quick Reference of Keyword Changes

Table A-1 (Page 11 of 25). Changes to Definition Statements and Keywords by NCP Enhancement

Definition Statement or Keyword	Enhancement	Change	NCP
AUTO	3746 Model 900 SDLC lines	C	V6R3
	IBM 4941 modems	C	V5R2
	General updates	C	V5R1
	General updates	C	Pre-V5
AUTOCOPY	Frame-relay over token-ring support	C	V7R3
	Spare SDLC line support	C	V7R2
	Automatic resource copying enhancement	A	V5R4
AUTOLINE	Spare SDLC line support	C	V7R2
	Enterprise Systems Connection support	C	V6R2
	Automatic line generation	A	V5R2.1
BALANCE	3746 Model 900 TIC3 connection balancing	C	V7R8
	Connection balancing for NTRI physical lines	A	V7R6
BEACTO	3746 Model 900 token-ring resources	C	V6R2
	NTRI lines	A	V5R2
BUFSIZE	General updates	C	Pre-V5
CA	General updates	X	V6R3
	Buffer-chaining channel adapter	C	V5R3.1
	Channel-link definition	A <sup>1</sup>	V5R2
CALINE	Casual connection	C	V5R3
	Multipoint subarea support	C	V5R2
	General updates	C	V5R1
	Link problem determination aid	A	Pre-V5
CAPACITY (VTAM)	APPN HPR Support	C	V7R6
	VTAM updates	A	V6R2
CASDL	Enterprise Systems Connection support	C	V6R2
	Channel-link definition	A <sup>1</sup>	V5R2
CCLID	General updates	C	V7R4
	General updates	A	Pre-V5
CHANLA	Internet routing support	C	V6R1
	IBM 786x modems extended LPDA2 capability	C	V5R3
	Casual connection	C	V5R3
	Multipoint subarea support	C	V5R2
	General updates	C	V5R1
	Link problem determination aid	A	Pre-V5
CHNLZ	Internet routing support	C	V6R1
	IBM 786x modems extended LPDA2 capability	C	V5R3
	Casual connection	C	V5R3
	Multipoint subarea support	C	V5R2
	Link problem determination aid	A	Pre-V5
CIR	Committed information rate algorithms	A	V7R7
CLINES	IBM 786x modems extended LPDA2 capability	C	V5R3
	Casual connection	C	V5R3
	Multipoint subarea support	C	V5R2
	Link problem determination aid	A	Pre-V5
CLLM	Consolidated Link Layer Management	A	V7R7

<sup>1</sup> Applies when migrating from any V4 release. Does not apply when migrating from any V5 release.

**Legend:** A=Added, D=Deleted, C=Changed, X=Changed default

## Quick Reference of Keyword Changes

Table A-1 (Page 12 of 25). Changes to Definition Statements and Keywords by NCP Enhancement

Definition Statement or Keyword	Enhancement	Change	NCP
CLOCKNG	APPN HPR support	C	V7R3
	Internet routing support	C	V6R1
	General updates	C <sup>1</sup>	V5R2
	General updates	C	V5R1
	IBM 3745 line interface coupler 4 requirement for SPEED	C	Pre-V5
COMRATE	ISDN	C	V7R5
	Frame-relay over token-ring support	C	V7R3
	Frame-relay subarea links	A	V6R1
CONFIG	Multipoint subarea support	C	V5R2
CONNTYPE (VTAM)	VTAM updates	A	V6R2
CORNUM	IBM 786x modems extended LPDA2 capability	C	V5R3
	Casual connection	C	V5R3
	Multipoint subarea support	C	V5R2
	General updates	C	V5R1
	Link problem determination aid	A	Pre-V5
COSBYTE (VTAM)	VTAM updates	A	V6R2
COSTTIME (VTAM)	VTAM updates	A	V6R2
CPCP (VTAM)	VTAM updates	A	V6R2
CRATEDLY	COMRATE delay threshold in seconds	A	V7R6
CSPMODE	General updates	A	Pre-V5
CU	Selection of EP sense codes	C	V5R4
CUTYPE	General updates	C	Pre-V5
DATBLK	Frame-relay over token-ring support	C	V7R3
	General Update	A	V7R2
DATRATE	General updates	C	Pre-V5
DELAY	Enterprise Systems Connection support	C	V6R2
DSCRDDL	Discard delay threshold in seconds	A	V7R6
DUALCOM	General updates	C	V5R1
	General updates	C	Pre-V5
DUPLEX	Casual connection	C	V5R3
DYNADJCP (VTAM)	VTAM updates	A	V6R2
DYNADMP	Buffer-chaining channel adapter	C	V5R3.1
DYNPU (VTAM)	VTAM updates	A	V6R2
DYNPUPFX (VTAM)	VTAM updates	A	V6R2
DYNWIND	General updates	C	V7R8
	General updates	C	V7R6
	FRTE congestion relief	C	V7R5
	General updates	A	V7R1
FEATURE	General updates	C	V7R8
	General updates	C	Pre-V5
FGSLTRS	General updates	D	Pre-V5
FRAMECNT	Internet routing support	A	V6R1
FRRATES	Relative priorities for supported traffic on 3745 frame-relay physical lines	A	V7R6

<sup>1</sup> Applies when migrating from any V4 release. Does not apply when migrating from any V5 release.

**Legend:** A=Added, D=Deleted, C=Changed, X=Changed default

Table A-1 (Page 13 of 25). Changes to Definition Statements and Keywords by NCP Enhancement

Definition Statement or Keyword	Enhancement	Change	NCP
FRSPRI	Relative service priority for 3746 Model 900 attached frame-relay stations and ISDN logical stations	A	V7R6
HDXSP	Casual connection	C	V5R3
HICHAN	Buffer-chaining channel adapter Channel-link definition	C A <sup>1</sup>	V5R3.1 V5R2
HISPEED	General updates General updates General updates	X C A	V6R1 V5R1 Pre-V5
HLOQSTOP	Determines the maximum size of the 3746 Model 900 physical line hardware queue	A	V7R6
HOSTLINK	General updates Enterprise Systems Connection support	C A	V6R3 V6R2
ID	Switched subarea support	C	V5R2
INBFRS	Buffer-chaining channel adapter	C	V5R3.1
INTERFACE	IP over frame-relay support Internet routing over NTRI LANs Internet routing support	C C A	V7R3 V7R1 V6R1
INTPRI	General updates	D	V5R1
IPL	Internet routing support Enhanced loading and activating remote controllers Multipoint subarea support	C C C	V6R1 V5R3 V5R2
ISDNCALL	Indicates ISDN backup information	A	V7R6
ISDNCFG	ISDN channel configuration	A	V7R5
ISDNDSCCT	ISDN delayed disconnect timer	A	V7R5
ISDNLPN	ISDN Local party number	A	V7R5
ISDNLSA	Specifies ISDN subaddress	A	V7R5
ISDNRPN	ISDN remote party number	A	V7R6
ISDNRSA	ISDN remote subaddress	A	V7R6
LIMRES	General updates	A	V5R3
LOCADD	ISDN Frame-relay subarea links support Frame-relay over token-ring support Internet routing over NTRI LANs 3746 Model 900 token-ring resources Internet routing support Duplicate token-ring interface coupler addressing NTRI lines	C C C C C C C A	V7R5 V7R5 V7R3 V7R1 V6R2 V6R1 V5R2.1 V5R1
LOCALTO	General updates 3746 Model 900 token-ring resources Frame-relay subarea links Reply timer enhancement for NTRI	C C C A	V7R3 V6R2 V6R1 V5R4
LOCHAN	Buffer-chaining channel adapter Channel-link definition	C A <sup>1</sup>	V5R3.1 V5R2

<sup>1</sup> Applies when migrating from any V4 release. Does not apply when migrating from any V5 release.

**Legend:** A=Added, D=Deleted, C=Changed, X=Changed default

## Quick Reference of Keyword Changes

Table A-1 (Page 14 of 25). Changes to Definition Statements and Keywords by NCP Enhancement

Definition Statement or Keyword	Enhancement	Change	NCP
LPDATS	3746 Model 900 SDLC lines	C	V6R3
	Internet routing support	C	V6R1
	Initiation of LPDA2 testing by secondary side of the link	C	V5R4
	IBM 786x modems extended LPDA2 capability	C	V5R3
	Casual connection	C	V5R3
	Multipoint subarea support	C	V5R2
	Link problem determination aid	C	V5R1
	Link problem determination aid	A	Pre-V5
LPDA2DL	3746 Model 900 SDLC lines	C	V6R3
	Internet routing support	C	V6R1
	IBM 4941 modems	A	V5R2
LSPRI	ISDN	C	V7R5
	3746 Model 900 token-ring resources	C	V7R2
	Frame-relay peripheral nodes	C	V7R1
	3746 Model 900 token-ring resources	C	V6R2
	Internet routing support	C	V6R1
	Link session priority	C	V5R2.1
	Link session priority	A	V5R2
LTRUNC	General updates	C <sup>1</sup>	V5R1
MAXDLCI	ISDN Physical lines	C	V7R6
	Communications rate enhancement for dynamic reconfiguration	A	V7R3
MAXFRAME	ISDN	C	V7R5
	Frame-relay over token-ring support	C	V7R3
	Frame-relay subarea links	A	V6R1
MAXPU	Defining up to 32 ESCON stations	C	V7R8
	Communications rate enhancement for dynamic reconfiguration	C	V7R3
	Frame-relay over token-ring support	C	V7R3
	Internet routing over NTRI LANs	C	V7R1
	General updates	C	V6R3
	Enterprise Systems Connection support	C	V6R2
	Frame-relay switching support	C	V6R2
	Casual connection	C	V5R3
MAXTSL	Frame-relay over token-ring support	C	V7R3
	16-megabit token-ring speed	C	V5R3
	NTRI lines	A	V5R1
MLTGPRI	General updates	C	V7R7
	General updates	C	V7R3
	Multilink transmission group line selection order	A	V6R1
MODULO	General updates	C	V5R1
	General updates	A	Pre-V5
MONLINK	Enterprise Systems Connection support	C	V6R2
	Subarea channel-link activation	C	V5R3
	Enhanced loading and activation for remote controllers	C	V5R3
NATIVE (VTAM)	VTAM updates	A	V7R1
NCPCA	Buffer-chaining channel adapter	C	V5R3.1
	Channel-link definition	A <sup>1</sup>	V5R2

<sup>1</sup> Applies when migrating from any V4 release. Does not apply when migrating from any V5 release.

**Legend:** A=Added, D=Deleted, C=Changed, X=Changed default

## Quick Reference of Keyword Changes

Table A-1 (Page 15 of 25). Changes to Definition Statements and Keywords by NCP Enhancement

Definition Statement or Keyword	Enhancement	Change	NCP
NEWSYNC	Internet routing support	C	V6R1
	Casual connection	C	V5R3
	Multipoint subarea support	C	V5R2
	General updates	C	Pre-V5
NN (VTAM)	VTAM updates	A	V6R2
NPACOLL	ISDN	C	V7R5
	General updates	C	V7R3
	Enterprise Systems Connection support	C	V6R2
	NPM data collection for Ethernet-type LANs	C	V6R2
	Frame-relay subarea links	C	V6R1
	Internet routing support	C	V6R1
	NPM data collection for IBM special products or user-written code	C	V5R4
	Network performance data collection for token-ring resources	C	V5R3.1
	Channel-link definition	C	V5R2
	NPATP	NPM data collection by transmission priority	A
NRZI	ISDN	C	V7R5
	3746 Model 900 frame relay support	C	V7R2
	Internet routing support	C	V6R1
PAUSE	General updates	C	V7R3
	Internet routing support	C	V6R1
	Frame-relay subarea links	C	V6R1
	Pause enhancement	C	V5R3
	Modulo 128 links	C	Pre-V5
PDELAY (VTAM)	VTAM updates	A	V6R2
PORT	IBM 786x modems extended LPDA2 capability	A	V5R3
PORTADD	ISDN	C	V7R5
	General updates	C	V7R3
	3746 Model 900 frame-relay support	C	V7R2
	Frame-relay peripheral nodes	C	V7R1
	3746 Model 900 token-ring resources	C	V6R2
	Frame-relay subarea links	C	V6R1
	Duplicate token-ring interface coupler addressing	C	V5R2.1
	NTRI lines	A	V5R1
QSIZE	3746 Model 900 software queue size threshold	A	V7R6
QSIZEDE	3746 Model 900 software queue discard eligibility threshold	A	V7R6
RCVBUFC	Frame-relay over token-ring support	C	V7R3
	16-megabit token-ring speed	C	V5R3
	NTRI lines	A	V5R1
RCVCHAR	General updates	A	Pre-V5
REGISTER (VTAM)	VTAM updates	A	V6R2
REMOTTO	Frame-relay over token-ring support	C	V7R3
	Reply timer enhancement for NTRI	A	V5R4

<sup>1</sup> Applies when migrating from any V4 release. Does not apply when migrating from any V5 release.

**Legend:** A=Added, D=Deleted, C=Changed, X=Changed default

## Quick Reference of Keyword Changes

Table A-1 (Page 16 of 25). Changes to Definition Statements and Keywords by NCP Enhancement

Definition Statement or Keyword	Enhancement	Change	NCP
RETRIES	ISDN	C	V7R5
	New default and maximum	C	V7R5
	Communications rate enhancement for dynamic reconfiguration	C	V7R3
	Frame-relay over token-ring support	C	V7R3
	Frame-relay subarea links	C	V6R1
	Internet routing support	C	V6R1
	Casual connection	C	V5R3
	NTRI lines	C	V5R1
RING	IBM 4941 modems	C	V5R2
SCLSET	General updates	D	V5R1
SDLCST	ISDN subarea links	C	V7R5
	Frame-relay subarea links	C	V6R1
	NTRI lines	C	V5R2.1
	Multipoint subarea support	C	V5R2
SECNET (VTAM)	VTAM updates	A	Pre-V5
SECURITY (VTAM)	VTAM updates	A	V6R2
SERVLIM	Service order table scan support	C	V7R4
	Casual connection	C	V5R3
	Multipoint subarea support	C	V5R2
SPEED	ISDN	C	V7R5
	APPN HPR support	C	V7R3
	3746 Model 900 frame relay support	C	V7R2
	3746 Model 900 SDLC lines	C	V6R3
	Enterprise Systems Connection support	C	V6R2
	3746 Model 900 token-ring resources	C	V6R2
	Teletypewriter exchange service auto-baud detection	C	V5R4
	Auto-speed detect	C <sup>1</sup>	V5R1
	IBM 3745 line interface coupler 4 requirement for SPEED	C	Pre-V5
	SRETRY	Casual connection	A
SWMMTID	Enhanced loading and activation for remote controllers	A	V5R3
TADDR	Casual connection	C	V5R3
	Network addressability	C	V5R2.1
	Multipoint subarea support	C	V5R2
TAILING	Frame-relay subarea links	C	V6R1
	Initiation of LPDA2 testing by secondary side of the link	C	V5R4
	IBM 786x modems extended LPDA2 capability	C	V5R3
	Casual connection	C	V5R3
	Multipoint subarea support	C	V5R2
	General updates	C	V5R1
	Link problem determination aid	A	Pre-V5
TAKEOVER	General updates	A	V7R8
TERM	General updates	C	Pre-V5
TGCONF	Code congestion threshold value	A	V7R5
TGP (VTAM)	VTAM updates	A	V6R2

<sup>1</sup> Applies when migrating from any V4 release. Does not apply when migrating from any V5 release.

**Legend:** A=Added, D=Deleted, C=Changed, X=Changed default

## Quick Reference of Keyword Changes

Table A-1 (Page 17 of 25). Changes to Definition Statements and Keywords by NCP Enhancement

Definition Statement or Keyword	Enhancement	Change	NCP
TIMEOUT	Enterprise Systems Connection support Channel-link definition	C A <sup>1</sup> C	V6R2 V5R2
TITIMER	General updates	A	V7R1
TOPO (VTAM)	VTAM updates	A	V6R2
TRANSBUF	TSS/HPTSS queue management	A	V7R7
TRANSFR	Enterprise Systems Connection support Channel-link definition General updates	C C X	V6R2 V5R2 Pre-V5
TRSPEED	3746 Model 900 token-ring resources 16-megabit token-ring speed	C A	V6R2 V5R3
TYPE	Spare SDLC line support	A	V7R2
T2TIMER	ISDN Communications rate enhancement for dynamic reconfiguration 3746 Model 900 frame-relay support Frame-relay subarea links Acknowledgment timer enhancement for NTRI	C C C C A	V7R5 V7R3 V7R2 V6R1 V5R4
UPARM1 (VTAM)	VTAM updates	A	V6R2
UPARM2 (VTAM)	VTAM updates	A	V6R2
UPARM3 (VTAM)	VTAM updates	A	V6R2
USE	Spare SDLC lines	C	V7R2
VERSALID (VTAM)	VTAM updates	A	V6R2
VNGROUP (VTAM)	VTAM updates	C A	V7R6 V7R1
VNNAME (VTAM)	VTAM updates	C A	V7R6 V7R1
V25BIS	V.25 bis support for EP lines V.25 bis	C A	V5R4 V5R3
LU	Dynamic definition of independent logical units Channel-link definition	C C	V6R1 V5R2
ASLENT (VTAM)	VTAM updates	A	V5R3
ASLTAB (VTAM)	VTAM updates	A	V5R3
BATCH	General updates	D <sup>1</sup>	V5R2
INTFACE	Internet routing support	A	V6R1
LOCADDR	Type 2.1 peripheral node support	C	V5R2
LUDR	APPN support	C	V6R2
MAXSESS	General updates	A	V6R2
MAXTP	NPM data collection by transmission priority	A	V6R1
MDLENT (VTAM)	VTAM updates	A	V5R3
MDLTAB (VTAM)	VTAM updates	A	V5R3
NETID	APPN support	A	V6R2
NEXT	Automatic resource copying enhancement	A	V5R4
NPACOLL	Channel-link definition	C <sup>1</sup>	V5R2

<sup>1</sup> Applies when migrating from any V4 release. Does not apply when migrating from any V5 release.

**Legend:** A=Added, D=Deleted, C=Changed, X=Changed default

## Quick Reference of Keyword Changes

Table A-1 (Page 18 of 25). Changes to Definition Statements and Keywords by NCP Enhancement

Definition Statement or Keyword	Enhancement	Change	NCP
PACING	Adaptive session pacing enhancement	C	V5R4
	General updates	C <sup>1</sup>	V5R2
REGISTER (VTAM)	VTAM updates	A	V6R2
REMLU	Internet routing support	A	V6R1
RESSCB	Type 2.1 peripheral node support	A	V5R2
VPACING	Adaptive session pacing enhancement	C	V5R4
	Type 2.1 peripheral node support	A	V5R2
<b>LU DRPOOL</b>			
NUMILU	Dynamic definition of independent logical units	C	V6R1
	Logical unit resource pool definition enhancement	C	V5R4
	Type 2.1 peripheral node support	A	V5R2
NUMTYP1	Logical unit resource pool definition enhancement	C	V5R4
NUMTYP2	Logical unit resource pool definition enhancement	C	V5R4
<b>MTALCST</b>			
INTPRI	General updates	D	V5R1
<b>NCPNAU</b>			
VIOWNER	NCP/EP definition facility	A	V5R1
<b>NETWORK</b>	General updates	C	V5R2
	Gateway NCP	A	Pre-V5
COPIES	Dynamic network identification	A	V5R4
ERLIMIT	Variable explicit route limits	A	V5R4
GWPACING	Gateway session pacing override	A	V5R4
NETID	Dynamic network identification	C	V5R4
NETLIM	General updates	C	V7R3
	SNA network interconnection session limit increase	C	V5R3.1
NUMHSAS	Network addressability	C	V5R2.1
PATHEXT	Network addressability	C	V5R2.1
	Dynamic path update	A	V5R2
SALIMIT	Network addressability	A	V5R2.1
SUBAREA	Network addressability	C	V5R2.1
TGBEXTRA	Network addressability	A	V5R2.1
	Dynamic path update	A	V5R2.1
VRTIMER <sub>n</sub>	Blocked virtual route alerts	A	V6R1
<b>OPTIONS</b>			
ADDRCONV	General updates	A	V7R3
CHANNELS	NCP migration aid	C	V6R1
	NCP migration aid	A	V5R3.1
DPU	NCP migration aid	A	V5R3.1
FASTRUN	NCP/EP definition facility	A	Pre-V5

<sup>1</sup> Applies when migrating from any V4 release. Does not apply when migrating from any V5 release.

**Legend:** A=Added, D=Deleted, C=Changed, X=Changed default



Table A-1 (Page 19 of 25). Changes to Definition Statements and Keywords by NCP Enhancement

Definition Statement or Keyword	Enhancement	Change	NCP
NDNAME	Generating NCP under VSE	A	V7R1
	General updates	D	V6R1
NERLIM	NCP migration aid	A	V5R4
NEWDEFN	General updates	X	V6R1
	NDF usability enhancements	C X	V5R3.1
	General updates	C	V5R2
	General updates	A	V5R1
NOTRDATA	NCP/EP definition facility	A	Pre-V5
NOTRGLOB	NCP/EP definition facility	A	V5R3
NOTRPARM	NCP/EP definition facility	A	Pre-V5
NOTRPROC	NCP/EP definition facility	A	Pre-V5
REMOVCOM	NCP migration aid	A	V5R3.1
SAVEADDR	NCP migration aid	A	V5R3.1
TMODEL	IBM 3745-17A	C	V7R1
	IBM 3745-x1A	C	V6R2
	IBM 3745-160, -310, and -610	C	V6R1
	NCP migration aid	A	V5R3.1
TOCONV	General updates	A	V7R3
TRDATA	NCP/EP definition facility	A	Pre-V5
TRGLOB	NCP/EP definition facility	A	V5R3
TRPARM	NCP/EP definition facility	A	Pre-V5
TRPROC	NCP/EP definition facility	A	Pre-V5
TRSNAP	NCP/EP definition facility	A	Pre-V5
TUSGTIER	NCP migration aid	C	V7R6
	NCP migration aid	C	V5R4
	NCP migration aid	A	V5R3.1
TVERSION	NCP migration aid	C	V7R3
	NCP migration aid	C	V7R2
	NCP migration aid	C	V7R1
	NCP migration aid	C	V6R3
	NCP migration aid	C	V6R2
	NCP migration aid	C	V6R1
	NCP migration aid	C	V5R4
	NCP migration aid	A	V5R3.1
<b>PATH</b>			
DESTSA	Network addressability	C	V5R2.1
DLCADDR (VTAM)	VTAM updates	A	V7R1
ER0n	APPN HPR support	C	V7R3
	General update	C	V7R2
	Parallel transmission group support for channel links	C	V5R3
	Network addressability	C	V5R2.1
VRn	Network addressability	C	V5R2.1
<b>PCCU (VTAM)</b>			
CDUMPDS (VTAM)	VTAM updates	A	Pre-V5
MDUMPDS (VTAM)	VTAM updates	A	Pre-V5

<sup>1</sup> Applies when migrating from any V4 release. Does not apply when migrating from any V5 release.

**Legend:** A=Added, D=Deleted, C=Changed, X=Changed default

## Quick Reference of Keyword Changes

Table A-1 (Page 20 of 25). Changes to Definition Statements and Keywords by NCP Enhancement

Definition Statement or Keyword	Enhancement	Change	NCP
<b>PU</b>	Channel-link definition	C <sup>1</sup>	V5R2
ADDR	ISDN	C	V7R5
	Frame-relay subarea links support	C	V7R5
	Frame-relay over token-ring support	C	V7R3
	Communications rate enhancement for dynamic reconfiguration	C	V7R3
	3746 Model 900 frame relay support	C	V7R2
	Internet routing over NTRI LANs	C	V7R1
	General updates	C	V6R3
	Enterprise Systems Connection support	C	V6R2
	3746 Model 900 token-ring resources	C	V6R2
	Frame-relay switching support	C	V6R2
	Frame-relay subarea links	C	V6R1
	NTRI lines	C	V5R2.1
	Multipoint subarea support	C	V5R2
	Link problem determination aid	C	V5R1
ANS	ISDN	C	V7R5
	IP over frame-relay support	C	V7R3
	Frame-relay over token-ring support	C	V7R3
	Internet routing over NTRI LANs	C	V7R1
	Enterprise Systems Connection support	C	V6R2
	Subarea channel-link activation	C	V5R3
	Switched subarea support	C	V5R2
ARPTAB	IP over frame-relay support	C	V7R3
	Internet routing over NTRI LANs	C	V7R1
	Internet routing support	A	V6R1
BLOCK	ISDN	C	V7R5
	Frame-relay subarea link enhancement	C	V6R2
	Frame-relay subarea links	C	V6R1
	PIU blocking performance improvements for subarea links	C	V5R4
	General updates	A	V5R3
BRKCON	General updates	C	V5R3
	Switched subarea support	A <sup>1</sup>	V5R2
CASDL	Enterprise Systems Connection support	A	V6R2
COMRATE	Communications rate enhancement for dynamic reconfiguration	C	V7R3
	IP over frame-relay support	C	V7R3
	Frame-relay over token-ring support	C	V7R3
	General Update	A	V7R2
DATMODE	General updates	C	V5R2
DELAY	Enterprise Systems Connection support	A	V6R2
DLCI	Communications rate enhancement for dynamic reconfiguration	A	V7R3
DYNWIND	General updates	C	V7R8
	General updates	C	V7R6
	NCP FRTE congestion relief	C	V7R5
	Communications rate enhancement for dynamic reconfiguration	A	V7R3
ERRORT	Frame-relay over token-ring support	C	V7R3
	Frame-relay LMI protocol support	A	V6R2

<sup>1</sup> Applies when migrating from any V4 release. Does not apply when migrating from any V5 release.

**Legend:** A=Added, D=Deleted, C=Changed, X=Changed default

## Quick Reference of Keyword Changes

Table A-1 (Page 21 of 25). Changes to Definition Statements and Keywords by NCP Enhancement

Definition Statement or Keyword	Enhancement	Change	NCP
FRSPRI	Relative service priority for 3746 Model 900 attached frame-relay stations and ISDN logical stations	A	V7R6
GP3174	IBM 3174 group poll	A	V5R2.1
HPRQLIM	APPN HPR support	A	V7R3
	Communications rate enhancement for dynamic reconfiguration	A	V7R3
INNPORT	General updates	C	V7R1
	Internet routing support	C	V6R1
	VTAM updates	A	V5R3
INTFACE	IP over frame-relay support	A	V7R3
IPQLIM	General updates	X	V7R7
	IP over frame-relay support	A	V7R3
IRETRY	Internet routing support	C	V6R1
	Casual connection	C	V5R3
ISDNCFG	ISDN channel configuration	A	V7R5
ISDNDSCT	ISDN delayed disconnect timer	A	V7R5
LANTYPE	Internet routing support	A	V6R1
LLERP	Non-error recovery procedures for 3746 Model 900 token-ring logical stations	A	V7R4
	APPN HPR support	A	V7R3
	Communications rate enhancement for dynamic reconfiguration	A	V7R3
LMI	Switched frame-relay physical lines	C	V7R6
	Frame-relay over token-ring support	C	V7R3
	Frame-relay LMI protocol support	A	V6R2
LPDA	Internet routing support	C	V6R1
	Secondary blocked or allowed LPDA2 tests	C	V5R4
	Casual connection	C	V5R3
	Link problem determination aid	A	Pre-V5
MAXBFRU	Enterprise Systems Connection support	C	V6R2
	Buffer-chaining channel adapter	A	V5R3.1
MAXDATA	Value from VTAM for switched subarea PUs	C	V7R5
	Mixed-media multilink transmission groups	C X	V6R2
	Internet routing support	C	V6R1
	General updates	C	V5R2
MAXLU	General updates	C <sup>1</sup>	V5R2
MAXOUT	Frame-relay over token-ring support	C	V7R3
	General update	C	V7R2
	Frame-relay switching support	C	V6R2
	Switched subarea support	C	V5R2
	Modulo 128 links	C	Pre-V5
MODULO	Token ring and frame relay only	X	V7R8
	General updates	C	V7R3
	General updates	A <sup>1</sup> C	V5R2
MONLINK	Enterprise Systems Connection support	A	V6R2
NATIVE (VTAM)	VTAM updates	A	V7R1

<sup>1</sup> Applies when migrating from any V4 release. Does not apply when migrating from any V5 release.

**Legend:** A=Added, D=Deleted, C=Changed, X=Changed default

## Quick Reference of Keyword Changes

Table A-1 (Page 22 of 25). Changes to Definition Statements and Keywords by NCP Enhancement

Definition Statement or Keyword	Enhancement	Change	NCP
NETID	General updates	C	V7R3
	Frame-relay over token-ring support	C	V7R3
	Enterprise Systems Connection support	C	V6R2
	Non-native network attachment	C	V5R3
	Switched subarea support	C	V5R2
	Channel-link definition	C	V5R2
	Gateway NCP	A	Pre-V5
NETWORK	Frame-relay over token-ring support	C	V7R3
	Internet routing over NTRI LANs	A	V7R1
NEXT	Automatic resource copying enhancement	A	V5R4
NPACOLL	General updates	C	V7R3
	Enterprise Systems Connection support	C	V6R2
	Frame-relay switching support	C	V6R2
	Internet routing support	C	V6R1
	NPM data collection for IBM special products or user-written code	C	V5R4
	Channel-link definition	C	V5R2
	General updates	C	V5R1
NPATP	NPM data collection by transmission priority	A	V6R1
PASSLIM	Frame-relay over token-ring support	C	V7R3
	Internet routing over NTRI LANs	C	V7R1
	Casual connection	X	V5R3
	General updates	C	V5R2
PIUCHECK	Subarea checksum validation	A	V7R7
PUDR	Frame-relay over token-ring support	C	V7R3
	Enterprise Systems Connection support	C	V6R2
	Frame-relay switching support	C	V6R2
	Frame-relay subarea links	C	V6R1
	Internet routing support	C	V6R1
	Casual connection	C	V5R3
	General updates	C	V5R2
PUTYPE	Frame-relay over token-ring support	C	V7R3
	Spare SDLC line support	C	V7R2
	APPN support	C	V6R2
	Enterprise Systems Connection support	C	V6R2
	3746 Model 900 token-ring resources	C	V6R2
	Parallel transmission group support for channel links	C	V5R3
	General updates	C	V5R2.1
	Channel-link definition	C	V5R2
	Multipoint subarea support	C	V5R2
REGISTER (VTAM)	VTAM updates	A	V6R2
RETRIES	New default and maximum	C	V7R5
	Casual connection	C	V5R3
ROLE	Casual connection	A	V5R3
SECTNET (VTAM)	VTAM updates	A	Pre-V5
SEGMENT	Link problem determination aid	A	Pre-V5
SNETMASK	Variable subnetting enhancement	C	V7R6
	Subnetwork mask specification	A	V7R4
SPOLL	Frame-relay over token-ring support	C	V7R3
	Frame-relay LMI protocol support	A	V6R2

<sup>1</sup> Applies when migrating from any V4 release. Does not apply when migrating from any V5 release.

**Legend:** A=Added, D=Deleted, C=Changed, X=Changed default

Table A-1 (Page 23 of 25). Changes to Definition Statements and Keywords by NCP Enhancement

Definition Statement or Keyword	Enhancement	Change	NCP
SRT	Frame-relay over token-ring support	C	V7R3
	3746 Model 900 frame relay support	D	V7R2
	Enterprise Systems Connection support	C	V6R2
	Frame-relay switching support	C	V6R2
	General updates	C	V6R1
	NetView counter thresholds for NTRI	C	V5R4
	IBM 786x modems extended LPDA2 capability	C	V5R3
	Link problem determination aid	C	V5R2.1
SSAP	Duplicate TIC addresses for token-ring	A	V7R5
SUBAREA	General updates	D	Pre-V5
TGCONF	General updates	C	V7R7
	Code congestion threshold value	C	V7R5
	General updates	C	V7R3
	Mixed-media multilink transmission groups	A	V6R2
TGN	Enterprise Systems Connection support	C	V6R2
	3746 Model 900 token-ring resources	C	V6R2
	Mixed-media multilink transmission groups	C	V6R2
	Frame-relay subarea links	C	V6R1
	Parallel transmission group support for channel links	C	V5R3
	Switched subarea support	C	V5R2
TIMEOUT	Enterprise Systems Connection support	A	V6R2
TIMERS	Frame-relay over token-ring support	C	V7R3
	Frame-relay LMI protocol support	A	V6R2
TRANSFR	Enterprise Systems Connection support	A	V6R2
T1TIMER	Communications rate enhancement for dynamic reconfiguration	A	V7R3
UNIQUE	Specifying Token Ring logical subarea station's destination MAC address uniqueness	A	V7R6
XID	APPN support	C	V6R2
	Frame-relay switching support	C	V6R2
	Internet routing support	C	V6R1
	Casual connection	C	V5R3
	Type 2.1 peripheral node support	A	V5R2
XMONLNK	General updates	C	V7R7
	ISDN	C	V7R5
	Frame-relay over token-ring support	C	V7R3
	Spare SDLC line support	C	V7R2
	Enterprise Systems Connection support	C	V6R2
	3746 Model 900 token-ring resources	C	V6R2
	Frame-relay switching support	C	V6R2
	Internet routing support	C	V6R1
	General updates	C	V5R3
	SSCP monitor mode function	C	V5R2
	<b>PUDRPOOL</b>		

<sup>1</sup> Applies when migrating from any V4 release. Does not apply when migrating from any V5 release.

**Legend:** A=Added, D=Deleted, C=Changed, X=Changed default

## Quick Reference of Keyword Changes

Table A-1 (Page 24 of 25). Changes to Definition Statements and Keywords by NCP Enhancement

Definition Statement or Keyword	Enhancement	Change	NCP
FRSEDRPU	Communications rate enhancement for dynamic reconfiguration	C	V7R3
	Frame-relay over token-ring support	C	V7R3
	3746 Model 900 frame relay support	C	V7R2
	General updates	C	V6R3
	Frame-relay switching	A	V6R2
MAXLU	General updates	D <sup>1</sup>	V5R2
<b>SDLCST</b>			
IRETRY	General updates	D	Pre-V5
MAXOUT	General updates	C	V7R2
	Modulo 128 links	C	Pre-V5
PAUSE	Configurable station PAUSE default	X	V5R4
	Pause enhancement	A	V5R3
SERVLIM	Service order table scan support	C	V7R4
TADDR	Network addressability	X	V5R2.1
TRANSFR	General updates	D	Pre-V5
<b>SERVICE</b>	Casual connection	C	V5R3
	General updates	C	Pre-V5
MAXLIST	Frame-relay switching support	C	V6R2
	Internet routing support	C	V6R1
	Casual connection	C	V5R3
	Multipoint subarea support	C	V5R2
ORDER	Frame-relay over token-ring support	C	V7R3
	Frame-relay switching support	C	V6R2
	Internet routing support	C	V6R1
	Casual connection	C	V5R3
	General updates	C	Pre-V5
<b>SWMMT</b>	Enhanced loading and activation for remote controllers	A	V5R3
IDNUM	Enhanced loading and activation for remote controllers	A	V5R3
MAXDATA	General updates	A	V7R5
MAXOUT	General Updates	C	V7R2
	Enhanced loading and activation for remote controllers	A	V5R3
NETID	Enhanced loading and activation for remote controllers	A	V5R3
<b>TERMINAL</b>			
ADDR	Link problem determination aid	C	V5R1
ASLENT (VTAM)	VTAM updates	A	V5R3
ASLTAB (VTAM)	VTAM updates	A	V5R3
CDATA	General updates	D	Pre-V5
DIRECTN	General updates	D	Pre-V5
MDLENT (VTAM)	VTAM updates	A	V5R3
MDLTAB (VTAM)	VTAM updates	A	V5R3
NEXT	Automatic resource copying enhancement	A	V5R4

<sup>1</sup> Applies when migrating from any V4 release. Does not apply when migrating from any V5 release.

**Legend:** A=Added, D=Deleted, C=Changed, X=Changed default

Table A-1 (Page 25 of 25). Changes to Definition Statements and Keywords by NCP Enhancement

Definition Statement or Keyword	Enhancement	Change	NCP
NPACOLL	NPM data collection for IBM special products or user-written code	C	V5R4
POLL	Link problem determination aid	C	V5R1
SEGMENT	Link problem determination aid	A	Pre-V5
SESSREQ	General updates	A	V5R2.1
TERM	General updates	C	V5R1
VPRINT	General updates	A	Pre-V5
XMITLIM	General updates	D	Pre-V5
XTWXID	General updates	A	Pre-V5

<sup>1</sup> Applies when migrating from any V4 release. Does not apply when migrating from any V5 release.

**Legend:** A=Added, D=Deleted, C=Changed, X=Changed default





## Appendix B. Migration Aid Modifications

Modification Summary	B-1
Deletions	B-6
Definition Statements That May Be Deleted	B-6
Keywords That May Be Deleted	B-6
Changes	B-9
Moves	B-13
Additions	B-14
Definition Statements That May Be Added	B-14
Keywords That May Be Added	B-14

The NCP migration aid function deletes, changes, moves, or adds definition statements or keywords to meet the requirements of the target NCP version. This appendix lists these definition statements and keywords and describes how they are modified.

Refer to *NCP, SSP, and EP Resource Definition Reference* for more information on specific definition statement and keywords. Some of the deleted definition statements and keywords are not described in *NCP, SSP, and EP Resource Definition Reference* for NCP V7R8 because they are no longer needed for any supported NCP release.

### Modification Summary

Table B-1 lists the definition statements and keywords the migration aid deletes, changes, moves, or adds.

Table B-1 (Page 1 of 5). Statements and Keywords That May Be Modified by the Migration Aid

Statement	Keyword	Delete	Change	Move	Add
BUILD	ABEND	■			
	ANS	■			
	ASMXREF	■			
	CA	■	■		
	CANETID	■			
	CONDASM	■			
	CWALL			■	
	DELAY	■			
	DYNADMP	■		■	
	ERASE	■			
	HICHAN	■		■	
	JOBCARD	■			
	LESIZE	■			
	LINETRC			■	
	LOCHAN	■		■	
	MACLIB	■			
	MEMSIZE	■		■	

## Migration Aid Modifications

Table B-1 (Page 2 of 5). Statements and Keywords That May Be Modified by the Migration Aid

Statement	Keyword	Delete	Change	Move	Add	
BUILD (cont.)	MODEL		■			
	MXRLINE	■				
	MXVLINE	■				
	NCPCA	■				
	NCPTRACE				■	
	NETID				■	
	OBJLIB	■				
	OBJQUAL	■				
	OLDNAME	■				
	OPCSB2	■				
	OUTPUT	■				
	PARTIAL	■				
	PATHEXT					■
	PNLTEST	■				
	PRTGEN			■		
	REMLoad	■				
	RESOEXT	■				
	ROUND	■				
	SECCHAN	■				
	SUBAREA					■
	TGBXTRA					■
	TIME	■				
	TIMEOUT	■				
	TRANSFR			■		■
	TYPGEN			■		■
	UNIT	■				
	USERLIB	■				
	USGTIER			■		■
	UT1	■				
	UT2	■				
	UT3	■				
	VERSION			■		■
	VRACT	■				
	VRPOOL			■		■
XITB	■					
CLUSTER	ADDR	■				
	CDATA	■				
	CUTYPE			■		
	DIRECTN	■				
	FEATURE			■		
	PU	■				
	TERM			■		
XMITLIM	■					

Table B-1 (Page 3 of 5). Statements and Keywords That May Be Modified by the Migration Aid

Statement	Keyword	Delete	Change	Move	Add	
COMP	CDATA	■				
	XMITLIM	■				
CSB		■				
GENEND	HSPDSEL	■				
	SCANCTL	■				
GROUP					■	
	ACTIVTO		■			
	ADAPTER	■				
	ATTACH	■				
	BATCH	■				
	BUFLIM	■				
	CDATA	■				
	CHAREC			■		
	COMPOWN	■				
	COMPTAD	■				
	CSPMODE			■		
	CUTYPE			■		
	FEATURE			■		
	INTPRI	■				
	LNCTL				■	■
	LPDATS			■		
	LTRUNC	■				
	MAXLU	■				
	PACING			■		
	REPLYTO	■		■		
	SCLSET	■				
	SYNDLAY	■				
	TERM			■		
	TEXTTO	■				
	TYPE					■
	VPACING			■		
	X21NTWK	■				■
IPGATE		■				
IPOWNER					■	
	HOSTADDR				■	
	INTFACE				■	
IPLOCAL			■			
	INTFACE		■			
	LADDR		■			
	METRIC				■	
	P2PDEST				■	

## Migration Aid Modifications

Table B-1 (Page 4 of 5). Statements and Keywords That May Be Modified by the Migration Aid

Statement	Keyword	Delete	Change	Move	Add	
IPROUTE					■	
	DESTADDR		■			
	METRIC				■	
IPSUB		■				
HOST					■	
	INBFRS	■			■	
	MAXBFRU				■	
	STATMOD	■				
	UNITSZ				■	
LINE					■	
	ADAPTER	■				
	ADDRESS		■	■		
	ATTACH	■				
	AUTO		■			
	BATCH	■				
	BUFLIM	■				
	CA		■	■	■	
	CDATA	■				
	CLOCKNG			■		
	CSPMODE			■		
	CUTYPE			■		
	DATRATE			■		
	DELAY				■	■
	DYNADMP			■	■	■
	DUALCOM			■		
	DUPLEX			■		
	FEATURE			■		
	FGSLTRS	■				
	HICHAN			■	■	■
	INTPRI	■				
	LOCHAN			■	■	■
	LPDATS			■		
	LTRUNC	■				
	MAXLU	■				
	NCPCA				■	■
	NEWSYNC			■		
	PACING			■		
	SCLSET	■				
	SPEED			■		■
	TERM			■		
	TIMEOUT				■	■
	TRANSFR			■		

Table B-1 (Page 5 of 5). Statements and Keywords That May Be Modified by the Migration Aid

Statement	Keyword	Delete	Change	Move	Add
LINE(cont.)	TRSPEED		■		
	VPACING		■		
LU	BATCH	■			
	BUFLIM	■			
	LOCADDR		■		
	PACING		■		
	VPACING		■		
MTALCST	INTPRI	■			
NETWORK	BATCH	■			
	ERLIMIT				■
PATH					■
	ADJSUB	■			
	DESTSA				■
	DESTSUB	■			
	ERn				■
PCCU	INITEST	■			
PU					■
	BATCH	■			
	BUFLIM	■			
	MAXLU	■			
	NETID			■	■
	PACING			■	
	PASSLIM	■			
	VPACING			■	
PUDRPOOL	MAXLU	■			
SDLCST	ADDR	■			
	IRETRY	■			
	TADDR		■		
	TRANSFR	■			
SYSCNTRL					■
	OPTIONS				■
TERMINAL	BFRDLAY		■		
	CDATA	■			
	DIRECTN	■			
	TERM		■		
	XMITLIM	■			
VIDLIST		■			
VTERM		■			

---

### Deletions

This section describes the definition statements and keywords that the migration aid deletes.

### Definition Statements That May Be Deleted

The migration aid deletes the following definition statements.

CSB  
IPGATE  
IPSUB  
VIDLIST  
VTERM

If you define more token-ring adapter (TRA) lines, Ethernet-type subsystem (ESS) lines, high-performance transmission subsystem (HPTSS) lines, or channels than your communication controller model or usage tier supports, the migration aid converts the extra line or channel definitions (LINE, PU, and LU definition statements) to comments. The migration aid also issues a message stating (1) how many line or channel definitions were converted to comments and (2) the minimum usage tier required for the number of lines or channels you defined (if your controller supports that many).

### Keywords That May Be Deleted

The migration aid deletes keywords that are not used in NCP V7R8. The migration aid also deletes keywords that are no longer appropriate on a particular definition statement (for example, CA on the BUILD definition statement).

Table B-2 shows the keywords the migration aid deletes.

*Table B-2 (Page 1 of 4). Keywords the Migration Aid Deletes*

---

Definition Statement	Keyword	Remarks
BUILD	ABEND	
	ANS	
	ASMXREF	
	CA	
	CANETID	
	CONDASM	
	DELAY	
	DYNADMP	
	ERASE	
	HICHAN	
	JOBCARD	
	LESIZE	
	LOCHAN	
	MACLIB	

Table B-2 (Page 2 of 4). Keywords the Migration Aid Deletes

Definition Statement	Keyword	Remarks
	MAXSUBA	Not deleted, but flagged as potentially removable if all network nodes support extended network addressing, and then only if the keyword is removed from all NCP generation definitions in the network.
	MXRLINE	
	MXVLINE	
	NPCCA	
	OBJLIB	
	OBJQUAL	
	OLDNAME	
	OPCSB2	
	OUTPUT	
	PARTIAL	
	PNLTEST	
	REMLoad	
	RESOEXT	
	ROUND	
	SECCHAN	
	TIME	
	TIMEOUT	
	UNIT	
	USERLIB	
	UT1	
	UT2	
	UT3	
	VRACT	
	XITB	
CLUSTER	ADDR	
	CDATA	
	DIRECTN	
	PU	
	XMITLIM	
COMP	CDATA	
	XMITLIM	
GENEND	HSPDSEL	
	SCANCTL	

## Migration Aid Modifications

Table B-2 (Page 3 of 4). Keywords the Migration Aid Deletes

Definition Statement	Keyword	Remarks
GROUP	ATTACH	
	BATCH	
	BUFLIM	
	CDATA	
	INTPRI	
	LTRUNC	
	MAXLU	Deleted when VIRTUAL=NO on GROUP.
	REPLYTO	Deleted when MODE=SEC.
	SCLSET	
	SYNDLAY	
	TEXTTO	Deleted when MODE=SEC.
HOST	INBFRS	
	STATMOD	
LINE	ATTACH	
	BATCH	
	BUFLIM	
	CDATA	
	FGSLTRS	
	INTPRI	
	LTRUNC	
	MAXLU	Deleted when VIRTUAL=NO on the GROUP definition statement.
	SCLSET	
LU	BATCH	
	BUFLIM	
MTALCST	INTPRI	
NETWORK	BATCH	
PATH	ADJSUB	
	DESTSUB	
PCCU	INITEST	
PU	BATCH	
	BUFLIM	



Table B-2 (Page 4 of 4). Keywords the Migration Aid Deletes

Definition Statement	Keyword	Remarks
	MAXLU	Deleted when VIRTUAL=NO on the GROUP definition statement.
PUDRPOOL	MAXLU	
SDLCST	ADDR IRETRY TRANSFR	
TERMINAL	CDATA DIRECTN XMITLIM	

## Changes

When you migrate from one communication controller or NCP version to another, the values of some keywords must be changed in order to remain valid. When there is only one valid value for the target version or controller model, the migration aid uses that value. When there is more than one valid value, the migration aid changes the keyword value to ????. After the migration, edit the NEWDEFN file to change all occurrences of ??? to valid values. For more information, see “Step 8. Modify the NEWDEFN File” on page 1-15.

The migration aid changes some keywords only if they are specified in the input generation definition. In these cases this book says “Becomes....” In contrast, the migration aid writes other keywords to the output generation definition regardless of whether they are specified in the input generation definition. In these cases this book says “The migration aid specifies....”

Table B-3 shows the keywords the migration aid changes.

Table B-3 (Page 1 of 4). Keywords the Migration Aid Changes

Definition Statement	Keyword	Remarks
BUILD	CWALL	Becomes CWALL=26 if less than 26 (less than 26 is valid in NCP V2).
	LINETRC	The migration aid inserts a comment describing the changed defaults for LINETRC. When you are migrating from an IBM 3705 and LINETRC is specified, it becomes LINETRC=???.
	MEMSIZE	Becomes MEMSIZE=??? when you are migrating to a different communication controller model.
	MODEL	Changes to the value of TMODEL.
	PRTGEN	The migration aid deletes the second suboperand.
	TRANSFR	Flagged if you code TRANSFR=255 because the new maximum is 254.

## Migration Aid Modifications

Table B-3 (Page 2 of 4). Keywords the Migration Aid Changes

Definition Statement	Keyword	Remarks												
	TYPGEN	Changes as follows: <table border="0" style="margin-left: 20px;"> <thead> <tr> <th style="text-align: left;">Input Value</th> <th style="text-align: left;">Output Value</th> </tr> </thead> <tbody> <tr> <td>TYPGEN=EP</td> <td>TYPGEN=PEP</td> </tr> <tr> <td>TYPGEN=EP</td> <td>TYPGEN=EP (refer to EP R8 documentation, or to <i>NCP, SSP, and EP Resource Definition Reference</i> for EP R14)</td> </tr> <tr> <td>TYPGEN=SNCP</td> <td>TYPGEN=NCP</td> </tr> <tr> <td>TYPGEN=SNCP-R</td> <td>TYPGEN=NCP-R (no change if TMODEL=3745-150)</td> </tr> <tr> <td>TYPGEN=SPEP</td> <td>TYPGEN=PEP</td> </tr> </tbody> </table>	Input Value	Output Value	TYPGEN=EP	TYPGEN=PEP	TYPGEN=EP	TYPGEN=EP (refer to EP R8 documentation, or to <i>NCP, SSP, and EP Resource Definition Reference</i> for EP R14)	TYPGEN=SNCP	TYPGEN=NCP	TYPGEN=SNCP-R	TYPGEN=NCP-R (no change if TMODEL=3745-150)	TYPGEN=SPEP	TYPGEN=PEP
Input Value	Output Value													
TYPGEN=EP	TYPGEN=PEP													
TYPGEN=EP	TYPGEN=EP (refer to EP R8 documentation, or to <i>NCP, SSP, and EP Resource Definition Reference</i> for EP R14)													
TYPGEN=SNCP	TYPGEN=NCP													
TYPGEN=SNCP-R	TYPGEN=NCP-R (no change if TMODEL=3745-150)													
TYPGEN=SPEP	TYPGEN=PEP													
	USGTIER	Changes to the value of TUSGTIER. <b>Note:</b> USGTIER is not required for EP standalone.												
	VERSION	Changes to the value of TVERSION.												
	VRPOOL	If the input generation definition is for a version earlier than NCP V4R3.1 or V5R2.1 and VRPOOL is not specified, the migration aid inserts a comment describing the change to the first suboperand of the VRPOOL default.												
CLUSTER	CUTYPE	CUTYPE=2972 becomes CUTYPE=???												
	FEATURE	The migration aid deletes BATCH or NOBATCH if specified as one of the suboperands.												
	TERM	TERM=2980 becomes TERM=???												
GROUP	ACTIVTO	If not specified for nonswitched subarea lines when the input generation definition is for an IBM 3705, the migration aid inserts a comment indicating that the default is changed from 420.0 to 60.0.												
	CHAREC	When the input generation definition is for an IBM 3705 running EP, the migration aid replaces the <i>chars</i> value, which is specified in line format for 3705 EP, with the parallel data field (PDF) format. This is done by reversing the bit pattern of the specification (for example, X'0001' becomes X'8000').												
	CSPMODE	CSPMODE=EMULATE becomes CSPMODE=NORMAL for BSC lines.												
	CUTYPE	CUTYPE=2972 becomes CUTYPE=???												
	FEATURE	The migration aid deletes BATCH or NOBATCH if specified as one of the suboperands.												
	LPDATS	When the input generation definition is for a version earlier than NCP V4R2 and LPDATS is specified, the migration aid changes the value as follows: <table border="0" style="margin-left: 20px;"> <thead> <tr> <th style="text-align: left;">Input Value</th> <th style="text-align: left;">Output Value</th> </tr> </thead> <tbody> <tr> <td>YES (NCP V2)</td> <td>LPDA1</td> </tr> <tr> <td>YES,38xx (V3 or V4)</td> <td>LPDA1</td> </tr> <tr> <td>YES,3867 (V3 or V4)</td> <td>LPDA1,3867</td> </tr> </tbody> </table>	Input Value	Output Value	YES (NCP V2)	LPDA1	YES,38xx (V3 or V4)	LPDA1	YES,3867 (V3 or V4)	LPDA1,3867				
	Input Value	Output Value												
	YES (NCP V2)	LPDA1												
	YES,38xx (V3 or V4)	LPDA1												
	YES,3867 (V3 or V4)	LPDA1,3867												
PACING	The migration aid deletes the second suboperand.													
REPLYTO	If two values are specified, the migration aid uses the second value. If the specified value is greater than 60, the migration aid changes it to 60.													
TERM	TERM=2703, 2980, 115A, 83B3, 3940, or 3980 becomes TERM=???													
VPACING	The migration aid deletes the second suboperand.													

Table B-3 (Page 3 of 4). Keywords the Migration Aid Changes

Definition Statement	Keyword	Remarks
IPLOCAL	INTFACE	The migration aid adds INTFACE=???.
	LADDR	When the same LADDR value is specified on two IPLOCAL statements, the migration aid uses only the first value. The second value is changed to ???.
IROUTE	DESTADDR	The migration aid specifies DESTADDR=??? when DESTADDR=0. For multiple IROUTE definition statements with the same DESTADDR value, the migration aid indicates in a comment block that DISP=PERM needs to be coded on the first IROUTE, and adds DISP=PERM to all subsequent IROUTES.
LINE	ADDRESS	The migration aid specifies ADDRESS=??? when SAVEADDR=NO or when ADDRESS specifies a line address and one or more subchannel addresses (for example, ADDRESS=(02C,3F-0)). The migration aid specifies ADDRESS=(???,FULL) when the source model is an IBM 3705 and two line interface addresses (LIAs) are specified.
	AUTO	The migration aid specifies AUTO=??? when SAVEADDR=NO.
	CA	Becomes CA=TYPE6 when CA is specified and you are migrating from a different communication controller model.  The migration aid adds CA when this LINE definition statement represents a channel link definition moved from the BUILD definition statement. The -TPS designation for a two-processor switch (as in CA=TYPE6-TPS) is not preserved when you are changing controller model.
	CLOCKNG	CLOCKNG=EXT becomes CLOCKNG=DIRECT when ATTACH=DIRECT. When two values other than (EXT,LIC) are specified for CLOCKNG, the migration aid uses only the first value.
	CSPMODE	CSPMODE=EMULATE becomes CSPMODE=NORMAL for BSC lines.
	CUTYPE	CUTYPE=2972 becomes CUTYPE=???.
	DATRATE	When two values are specified for DATRATE, the migration aid uses only the first value.
	DYNADMP	The migration aid specifies DYNADMP=??? when SAVEADDR=NO.
	DUALCOM	The migration aid specifies DUALCOM=??? when SAVEADDR=NO.
	DUPLEX	When two values are specified for DUPLEX, the migration aid uses only the first value.
	FEATURE	The migration aid deletes BATCH or NOBATCH if specified as one of the suboperands.
	HICHAN	The migration aid specifies HICHAN=??? when SAVEADDR=NO.
	LOCHAN	The migration aid specifies LOCHAN=??? when SAVEADDR=NO.
LPDATS	When the input generation definition is for a version earlier than NCP V4R2 and LPDATS is specified, the migration aid changes the value as shown for LPDATS on GROUP.	
LSPRI	When the input generation definition is for a version earlier than NCP V4R3 or NCP V5R2 and LEVEL2 is not specified, the migration aid inserts a comment stating that the LSPRI=PU default causes the priority of sessions across the physical unit to be based on the transmission priority of virtual routes associated with the sessions.	

## Migration Aid Modifications

Table B-3 (Page 4 of 4). Keywords the Migration Aid Changes

Definition Statement	Keyword	Remarks
	NEWSYNC	When two values are specified for NEWSYNC, the migration aid uses only the first value.
	PACING	The migration aid deletes the second suboperand.
	SPEED	When two values are specified for SPEED, the migration aid uses only the first value.  When CLOCKNG=INT or CLOCKNG=DIRECT is specified, the SPEED value must be one of a certain set of values. When the SPEED value is numeric and does not match any members of the set, the migration aid specifies SPEED=???.
	TERM	TERM=2703, 2980, 115A, 83B3, 3940, or 3980 becomes TERM=???.
	TRANSFR	If TRANSFR*BFRS is less than 559, the migration aid changes the TRANSFR value so that the product equals or exceeds 559. If TRANSFR*BFRS is less than 1050 and the SDLCST keyword is specified (indicating that this is a subarea line), the migration aid changes TRANSFR so that the product equals or exceeds 1050. Otherwise, the migration aid inserts a comment stating that TRANSFR must be increased if there is a type 4 PU on this line.  TRANSFR is flagged if you code the maximum as 255 because the new maximum is 254.
	VPACING	The migration aid deletes the second suboperand.
LU	LOCADDR	If this LU statement is in a line group on which CHANLNK=YES is specified, LOCADDR indicates the subchannel address used by the user-written code. In this case, the migration aid specifies LOCADDR=??? when you are migrating to a different communication controller.
	PACING	The migration aid deletes the second suboperand.
	VPACING	The migration aid deletes the second suboperand.
PU	PACING	The migration aid deletes the second suboperand.
	PASSLIM	The migration aid deletes PASSLIM from NTRI physical PU statements, beginning with NCP V7R3.
	VPACING	The migration aid deletes the second suboperand.
SDLCST	TADDR	No change in value; however, when the input generation definition is for a version earlier than NCP V4R3.1 or V5R2.1 and TADDR is not specified, the migration aid inserts a comment describing the change to the TADDR default.
TERMINAL	TERM	TERM=2703, 2980, 115A, 83B3, 3940, or 3980 becomes TERM=???.

## Moves

NCP 370 I/O channel definitions must be on the GROUP, LINE, and PU definition statements. When you migrate to the IBM 3745, the migration aid moves any channel definitions from the BUILD definition statement to the GROUP, LINE, and PU definition statements.

The migration aid moves the channel definitions by creating a GROUP definition statement and associated LINE and PU definition statements at the end of the NEWDEFN file. One LINE definition statement is created for each CA suboperand on the BUILD definition statement. One PU statement is created for each ACTIVE suboperand on the NCPKA keyword on the BUILD definition statement.

The migration aid adds the ADDRESS keyword to each LINE definition statement. When SAVEADDR=NO, the migration aid specifies ADDRESS=???. When SAVEADDR=YES, the value of ADDRESS may be the channel adapter physical position (*Pn*), which is described in *NCP, SSP, and EP Resource Definition Reference*.

The migration aid creates labels beginning with NDFCA for the new keywords. The GROUP label is NDFCAG1. The LINE labels are NDFCAL1–NDFCAL6 and the PU labels are NDFCAP1–NDFCAP6. You may change these labels to conform to your naming conventions.

Table B-4 shows the keywords the migration aid moves from the BUILD definition statement. For details, see “Changes” on page B-9 for ADDRESS and CA, and see “Additions” on page B-14 for the other keywords.

Table B-4. Keywords the Migration Aid Moves from the BUILD Definition Statement

Definition Statement	Keyword	Remarks
GROUP	LNCTL	
LINE	ADDRESS CA DELAY DYNADMP HICHAN LOCHAN NCPKA TIMEOUT	
PU	NETID	The migration aid uses the CANETID value.

## Additions

The migration aid adds a definition statement or keyword required for NCP V7R8 or the IBM 3745 if (1) it is not coded and (2) it is required or its default is inappropriate. When a keyword is added and there is only one valid value for NCP V7R8 or the IBM 3745, the migration aid uses that value. When there is more than one valid value, the migration aid uses the value ????. After the migration, edit the NEWDEFN file to change all occurrences of ??? to valid values. For more information, see “Step 8. Modify the NEWDEFN File” on page 1-15.

## Definition Statements That May Be Added

When the migration involves moving the 370 I/O channel connections from the BUILD definition statement to the GROUP, LINE, and PU definition statements, the migration aid generates the definition statements and adds the channel keywords to them. For more information, see “Moves” on page B-13.

The migration aid also adds the following definition statements.

IPOWNER  
 IPROUTE  
 HOST  
 PATH  
 SYSCNTRL

## Keywords That May Be Added

Table B-5 shows the keywords the migration aid adds to the generation definition if you do not specify them.

Table B-5 (Page 1 of 3). Keywords the Migration Aid Adds

Definition Statement	Keyword	Remarks
BUILD	BFRS	The migration aid does not add this keyword, but if it is not coded, the migration aid inserts a comment to inform you of the change in default from 88 to 240 when you are migrating from the IBM 3705, 3725, or 3720.
	NCPTRACE	If NTRISNAP is specified and NCPTRACE is not specified, the migration aid replaces NTRISNAP with NCPTRACE.
	NETID	The migration aid adds NETID=???.
	SUBAREA	The migration aid adds SUBAREA=???.
	TYPGEN	The migration aid adds TYPGEN=PEP. For EP standalone, the migration aid leaves TYPGEN=EP.
	USGTIER	The migration aid uses the value of TUSGTIER. <b>Note:</b> USGTIER is not required for EP standalone.
	VERSION	The migration aid uses the value of TVERSION.
	VRPOOL	The migration aid adds VRPOOL=(,0) when DPU=YES is specified and VRPOOL is not specified.
GROUP	LNCTL	The migration aid adds LNCTL=CA.
	TYPE	The migration aid adds TYPE=EP when the input generation definition is for EP.

Table B-5 (Page 2 of 3). Keywords the Migration Aid Adds

Definition Statement	Keyword	Remarks
	X21NTWK	The migration aid adds X21NTWK=??? when X21SW=YES.
IPOWNER	HOSTADDR INTFACE	The migration aid adds HOSTADDR=???. The migration aid adds INTFACE=???
IPLOCAL	METRIC P2PDEST	The migration aid adds METRIC=???. The migration aid adds P2PDEST=??? for NCST interfaces.
IPROUTE	METRIC	The migration aid adds METRIC=???
HOST	MAXBFRU UNITSZ	The migration aid adds MAXBFRU=???. The migration aid adds UNITSZ=???
LINE	DELAY	When this LINE definition statement represents a moved channel link definition, the migration aid adds DELAY if DELAY is specified on the BUILD definition statement for this channel. On BUILD, the range for DELAY is 0–6553.5 (default 0); on LINE, the range is 0 to half the TIMEOUT value (default 0.1). If the value of DELAY on the BUILD definition statement exceeds the maximum value for DELAY on the LINE definition statement, it is reduced to half the TIMEOUT value.
	DYNADMP	When this LINE definition statement represents a moved channel link definition, the migration aid adds DYNADMP if DYNADMP is specified on the BUILD definition statement for this channel. If NSC is specified as the second or third suboperand or SAVEADDR=NO, the migration aid adds DYNADMP=???. Otherwise the migration aid uses the values from DYNADMP on the BUILD definition statement.
	HICHAN	When this LINE definition statement represents a moved channel link definition, the migration aid adds HICHAN if HICHAN is specified on the BUILD definition statement for this channel. When SAVEADDR=NO, the migration aid adds HICHAN=???. When SAVEADDR=YES, the migration aid uses the values from HICHAN on the BUILD definition statement.
	LOCHAN	When this LINE definition statement represents a moved channel link definition, the migration aid adds LOCHAN if LOCHAN is specified on the BUILD definition statement for this channel. When SAVEADDR=NO, the migration aid adds LOCHAN=???. When SAVEADDR=YES, the migration aid uses the values from LOCHAN on the BUILD definition statement.
	NCPCA	When this LINE definition statement represents a moved channel link definition, the migration aid adds NCPCA if NCPCA is specified on the BUILD definition statement for this channel. The migration aid uses the values from NCPCA on the BUILD definition statement.
	NETWORK	Starting with NCP V5R4, the migration aid adds ERLIMIT=8 or 16 when NERLIM=8 or 16 is specified on the OPTIONS definition statement.
	SPEED	The migration aid adds SPEED=??? when CLOCKNG=INT or CLOCKNG=DIRECT.

## Migration Aid Modifications

Table B-5 (Page 3 of 3). Keywords the Migration Aid Adds

Definition Statement	Keyword	Remarks
	TIMEOUT	<p>When this LINE definition statement represents a moved channel link definition, the migration aid adds TIMEOUT if TIMEOUT is specified on the BUILD definition statement for this channel. The range for TIMEOUT on the BUILD definition statement is 2–840 (the default is 420); on the LINE definition statement the range is 10–840 (the default is 180).</p> <p>If a value less than 10 is specified on BUILD, it is increased to 10. If TIMEOUT is not specified on BUILD for this channel and TYP SYS specifies OS, MVS, DOS, or VSE, the migration aid inserts a comment describing the change to the default value.</p>
PATH	DESTSA	The migration aid adds DESTSA=???.
	ER0–ER7	The migration aid adds ER0=???,ER1=???,...,ER7=???.
PU	TIMEOUT	When this PU definition statement represents a moved channel link definition, the migration aid adds NETID if NETID is specified on the BUILD definition statement for this channel. The migration aid uses the value of CANETID for this channel.



---

## Appendix C. Migration Aid Sample

Input Generation Definition . . . . .	C-1
Output NEWDEFN File . . . . .	C-5

This appendix contains a sample of a migration performed by the migration aid function. In this sample, the input to the migration aid is a generation definition for an IBM 3725 Communication Controller running NCP V3. The output is a NEWDEFN file for an IBM 3745-210 running NCP V7R8.

---

### Input Generation Definition

Figure C-1 shows a sample generation definition for an IBM 3725 Communication Controller running NCP V3, ready to be processed by the migration aid. Notice the migration aid keywords on the OPTIONS definition statement. The output of the migration aid is shown in Figure C-2 on page C-5.

```

OPTIONS TMODEL=3745-210,TVERSION=V7R8,TUSGTIER=4,NERLIM=16
*****
*   NEW NAME = NCP0525 (MAY/22/1999) * ACF/NCP VER 3           *
*****
*   PCCU SPECIFICATIONS - VTAM ONLY                             *
*       MEMORY SIZE IS 768K (IBM3725-1 / INSTALLED 97.11.20) *
*****
PCC3033B PCCU          CUADDR=4F0,                               X
                      SUBAREA=3,                                X
                      AUTODMP=YES,                              X
                      AUTOIPL=YES,                              X
                      DUMPDS=PEPDMP,                            X
                      MAXDATA=4096,                             X
                      CHANCON=COND,                             X
                      RNAME=(POMAHA1)

```

Figure C-1 (Part 1 of 4). Sample Migration Aid Input Generation Definition

## Migration Aid Sample

```

*****
*          BUILD DEFINITION STATEMENT SPECIFICATIONS          *
*****
BUILD    BUILD ABEND=YES,                                     X
          ASMXREF=SHORT,                                     X
          BFRS=128,                                         X
          CA=(TYPE5-TPS,TYPE5),                             X
          CANETID=CNMNET,                                   X
          CATRACE=YES,                                      X
          CWALL=26,                                         X
          DELAY=(0.1,0.1),                                  X
          DSABLT0=3.0,                                     X
          HSBPOOL=50,                                       X
          LOADLIB=NCPLIB,                                   X
          LTRACE=2,                                         X
          MAXSSCP=2,                                        X
          MAXSUBA=255,                                      X
          MEMSIZE=768,                                      X
          MODEL=3725,                                       X
          NCPA=(ACTIVE,ACTIVE),                             X
          NETID=NET1,                                       X
          NEWNAME=NCP0525,                                  X
          NUMHSAS=10,                                       X
          OBJLIB=OBJJOMAHA,                                  X
          QUALIFY=ACF3,                                      X
          SLODOWN=12,                                       X
          SUBAREA=27,                                       X
          TIMEOUT=(420.0,420.0),                             X
          TRACE=(YES,100),                                  X
          TRANSFR=32,                                       X
          TYPGEN=NCP,                                       X
          UNIT=CIDISK,                                       X
          VERSION=V3,                                       X
          VRPOOL=60

*****
*          SYSCNTRL DEFINITION STATEMENT SPECIFICATIONS        *
*****
SYSCNTRL SYSCNTRL  OPTIONS=(BHSASSC,                         X
          STORDSP,                                         X
          ENDCALL,                                         X
          MODE,                                             X
          RCNTRL,                                          X
          RCOND,                                           X
          RECMD,                                           X
          RIMM,                                             X
          NAKLIM,                                          X
          SESSION,                                         X
          SSPAUSE,                                         X
          XMTLMT)

*****
*          GWNAU DEFINITION STATEMENT SPECIFICATIONS            *
*****
          GWNAU NUMADDR=50

*****
*          HOST DEFINITION STATEMENT SPECIFICATIONS              *
*****
HOST303B HOST    INBFRS=10,                                  X
                  SUBAREA=3,                                 X
                  MAXBFRU=16,                               X
                  UNITSZ=300,                               X
                  BFRPAD=0

```

Figure C-1 (Part 2 of 4). Sample Migration Aid Input Generation Definition

```

*****
*          DEFINE PATH TABLE          *
*****
PATHOSA  PATH      DESTSA=3,ERO=(3,1)
PATHCCUB PATH      DESTSA=1,ERO=(1,1)
*****
*          SDLCST DEFINITION STATEMENTS *
*****
SDLPRIB  SDLCST    MODE=PRI,          X
                RETRIES=(7,2,1),     X
                GROUP=GRPRIB
SDLSECB  SDLCST    MODE=SEC,          X
                GROUP=GRSECB
*****
*          INN LINK SPECIFICATION -TO OMAHA AND FARGO *
*****
GRPRIB   GROUP     LNCTL=SDLC,        X
                MODE=PRI,            X
                DIAL=NO,              X
                REPLYTO=3.0
GRSECB   GROUP     LNCTL=SDLC,        X
                MODE=SEC,            X
                DIAL=NO,              X
                ACTIVTO=60.0
****   ****   ****   ****
GFARGOB  GROUP     LNCTL=SDLC,        X
                SPEED=9600,          X
                CLOCKNG=EXT,         X
                NRZI=YES,            X
                DUPLEX=FULL,         X
                NEWSYNC=NO,          X
                ISTATUS=ACTIVE,      X
                MAXOUT=7,            X
                PASSLIM=7,           X
                PAUSE=0.2,           X
                TYPE=NCP,            X
                ACTIVTO=420
***
LFARGO1  LINE      ADDRESS=(012,FULL), X
                SDLCST=(SDLPRIB,SDLSECB), X
                MONLINK=YES,        X
                ISTATUS=ACTIVE
***
PFARGO1  PU        ISTATUS=INACTIVE,   X
                ANS=CONT,           X
                PUTYPE=4,            X
                TGN=ANY
***
LFARGO2  LINE      ADDRESS=(013,FULL), X
                SDLCST=(SDLPRIB,SDLSECB), X
                MONLINK=YES,        X
                ISTATUS=ACTIVE
***
PFARGO2  PU        ISTATUS=INACTIVE,   X
                ANS=CONT,           X
                PUTYPE=4,            X
                TGN=ANY
***

```

Figure C-1 (Part 3 of 4). Sample Migration Aid Input Generation Definition

# Migration Aid Sample

```

LFARG03 LINE ADDRESS=(014,FULL), X
          SDLCST=(SDLPRIB,SDLSECB), X
          MONLINK=YES, X
          ISTATUS=ACTIVE
***
PFARG03 PU ISTATUS=INACTIVE, X
          ANS=CONT, X
          PUTYPE=4, X
          TGN=ANY
*****
* 3270 SDLC MODE *
*****
G3270SNX GROUP LNCTL=SDLC, X
          DIAL=NO, X
          REPLYTO=1.0, X
          SPEED=4800, X
          CLOCKNG=EXT, X
          NRZI=YES, X
          DUPLEX=FULL, X
          NEWSYNC=NO, X
          USSTAB=CIUSS00, X
          MODETAB=CIMODTAB, X
          DLOGMOD=SNA3270, X
          RETRIES=(7,2,1), X
          SERVLIM=10, X
          ISTATUS=ACTIVE, X
          TYPE=NCP, X
          MAXDATA=265, X
          MAXOUT=7, X
          PASSLIM=7, X
          SSCPFM=USSSCS, X
          PACING=0, X
          PAUSE=0.2, X
          VPACING=0
**** *
***
L3270P LINE ADDRESS=(032,HALF), X
          PAUSE=0.2, X
          SERVLIM=30
SV020 SERVICE ORDER=(RU020,RJEP032)
RU020 PU ADDR=01,PUTYPE=2
RD021 LU LOCADDR=2
RP021 LU LOCADDR=3
RJEP032 PU ADDR=02,PUTYPE=2
INBATCHB LU LOCADDR=2,BATCH=YES
INBATCHC LU LOCADDR=3,ISTATUS=INACTIVE
INBATCHD LU LOCADDR=4,ISTATUS=INACTIVE
INBATCHE LU LOCADDR=5,ISTATUS=INACTIVE
*****
NETWORK NETID=CNMNET,SUBAREA=23,NUMHSAS=6,MAXSUBA=255
GWNAU NAME=M55,ELEMENT=5,NETID=ERNIENET
GWNAU NUMADDR=100
PATH DESTSA=4,ER0=(4,1),VR0=0
GENEND

```

Figure C-1 (Part 4 of 4). Sample Migration Aid Input Generation Definition

## Output NEWDEFN File

Figure C-2 shows the NEWDEFN file for an IBM 3745-210 Communication Controller running NCP V7R8, produced by the migration aid from the generation definition shown in Figure C-1 on page C-1.

```

*****
*   NEW NAME = NCP0525 (MAY/22/1999) * ACF/NCP VER 3   *
*****
*   PCCU SPECIFICATIONS - VTAM ONLY   *
*   MEMORY SIZE IS 768K (IBM3725-1 / INSTALLED 97.11.20) *
*****
PCC3033B PCCU CUADDR=4F0, *
          SUBAREA=3, *
          AUTODMP=YES, *
          AUTOIPL=YES, *
          DUMPDS=PEPDMP, *
          MAXDATA=4096, *
          CHANCON=COND, *
          RNAME=(POMAHA1)
*****
*   BUILD DEFINITION STATEMENT SPECIFICATIONS   *
*****
*:MIGINFO*****
*   MIGRATION AID SUMMARY
*
*   THE MIGRATION AID WAS INVOKED WITH THESE PARAMETERS SPECIFIED OR
*   DEFAULTED:
*   TVERSION=V7R8
*   TMODEL=3745-210
*   TUSGTIER=4
*   CHANNELS=GROUP
*   IF CHANNEL DEFINITIONS EXISTED IN THE SOURCE GENERATION
*   DEFINITION, THEY ARE NOW DEFINED ON THE GROUP AND LINE
*   STATEMENTS.
*   DPU=YES
*   TGBXTRA, PATHEXT, AND VRPOOL(2) DEFAULT TO A VALUE
*   GREATER THAN ZERO, MEANING THAT NCP STORAGE IS ALLOCATED
*   FOR THE DYNAMIC PATH UPDATE FUNCTION. SINCE DPU=YES,
*   THE MIGRATION AID ALLOWED UNSPECIFIED VALUES OF
*   TGBXTRA, PATHEXT, AND VRPOOL(2) TO TAKE THEIR NORMAL
*   DEFAULTS. THIS MEANS THAT STORAGE WILL BE ALLOCATED
*   FOR THE DPU FUNCTION, WHETHER YOU INTEND TO USE DPU
*   OR NOT.
*   NERLIM=16
*   NDF WILL ADD ERLIMIT=16 TO NETWORK STATEMENTS ON WHICH
*   ERLIMIT IS NOT SPECIFIED.
*   SAVEADDR=NO
*   THE VALUES SPECIFIED FOR ADDRESS, AUTO, DUALCOM,
*   DYNADMP, HICHAN, AND LOCHAN HAVE BEEN CHANGED TO
*   QUESTION MARKS.
*
*   INFORMATIONAL
*   LSPRI DEFAULT
*   FOR LINES BENEATH GROUP STATEMENTS ON WHICH LEVEL2 IS NOT
*   SPECIFIED, THE LSPRI DEFAULT (LSPRI=PU) CAUSES THE PRIORITY
*   OF TRANSMISSIONS ACROSS THE PHYSICAL UNIT TO BE BASED ON THE
*   PRIORITY OF VIRTUAL ROUTES ASSOCIATED WITH THE SESSIONS.
*   SEE THE NCP RESOURCE DEFINITION REFERENCE FOR MORE DETAILS.

```

Figure C-2 (Part 1 of 8). Sample Migration Aid Output NEWDEFN File

## Migration Aid Sample

```
* NTRI AND CHANNEL LINK POSITIONAL RESTRICTIONS
* THE POSITIONAL RESTRICTIONS AFFECTING NTRI PHYSICAL LINES AND
* CHANNEL LINKS HAVE BEEN EASED. SEE THE "ADDRESS" KEYWORD
* DESCRIPTION IN THE NCP RESOURCE DEFINITION REFERENCE FOR MORE
* DETAILS.
* ALIGN2 PARAMETER
* IF RUNNING UNDER MVS OR VM, VERIFY THAT THE "ALIGN2" PARAMETER
* IS NOT SPECIFIED ON YOUR LINKAGE EDITOR INVOCATION. THIS ENSURES
* ALIGNMENT OF THE NCP ON 4K PAGE BOUNDARIES.
*:MIGEND*****
*:MIGINFO*****
* MIGRATION AID BUILD STATEMENT SUMMARY
*
* INFORMATIONAL
* THE TYP SYS DEFAULT HAS CHANGED FROM "OS" TO THE OPERATING
* SYSTEM ON WHICH YOU ARE RUNNING.
*
* MAXSUBA MAY BE REMOVED IF ALL THE NODES IN YOUR NETWORK ARE
* CAPABLE OF EXTENDED NETWORK ADDRESSING, BUT ONLY IF YOU REMOVE
* IT FROM THE GENERATION DEFINITIONS OF ALL THE OTHER NODES IN YOUR
* NETWORK.
*
*
* ADDITIONS
* USGTIER=4 - VIA TUSGTIER
*
* CHANGES
* VERSION=V7R8 - CHANGED FROM V3
* - CHANGED VIA TVERSION
* MODEL=3745-210 - CHANGED FROM 3725
* - CHANGED VIA TMODEL
* MEMSIZE=??? - CHANGED FROM 768
*
* DELETIONS
* ABEND=YES
* - NCP V7R8 DOES NOT NEED IT
* ASMXREF=SHORT
* - NCP V7R8 DOES NOT NEED IT
* OBJLIB=OBJMAHA
* - NCP V7R8 DOES NOT NEED IT
* UNIT=CIDISK
* - NCP V7R8 DOES NOT NEED IT
* CA=(TYPE5-TPS,TYPE5)
* - DELETED VIA CHANNELS=GROUP
* DELAY=(0.1,0.1)
* - DELETED VIA CHANNELS=GROUP
* NCPA=(ACTIVE,ACTIVE)
* - DELETED VIA CHANNELS=GROUP
* CANETID=CNMNET
* - DELETED VIA CHANNELS=GROUP
* TIMEOUT=(420.0,420.0)
* - DELETED VIA CHANNELS=GROUP
*
* :CRITICAL
* MEMSIZE=??? - CHANGED FROM 768
*
*:MIGEND*****
```

Figure C-2 (Part 2 of 8). Sample Migration Aid Output NEWDEFN File

```

BUILD    BUILD BFRS=128,
          CATRACE=YES,
          CWALL=26,
          DSABLT0=3.0,
          HSBPOOL=50,
          LOADLIB=NCPLIB,
          LTRACE=2,
          MAXSSCP=2,
          MAXSUBA=255,
          MEMSIZE=???,
          MODEL=3745-210,
          NETID=NET1,
          NEWNAME=NCP0525,
          NUMHSAS=10,
          QUALIFY=ACF3,
          SLODOWN=12,
          SUBAREA=27,
          TRACE=(YES,100),
          TRANSFR=32,
          TYPGEN=NCP,
          VERSION=V7R8,
          VRPOOL=60,
          USGTIER=4
          MIGA
*****
*          SYSCNTRL DEFINITION STATEMENT SPECIFICATIONS          *
*****
SYSCNTRL SYSCNTRL OPTIONS=(BHSASSC,STORDSP,ENDCALL,MODE,RCNTRL,RCOND,RE*
          CMD,RIMM,NAKLIM,SESSION,SSPAUSE,XMTLMT)
*****
*          GWNAU DEFINITION STATEMENT SPECIFICATIONS            *
*****
          GWNAU NUMADDR=50
*****
*          HOST DEFINITION STATEMENT SPECIFICATIONS            *
*****
*:MIGINFO*****
* MIGRATION AID HOST STATEMENT SUMMARY
*
* DELETIONS
*   INBFRS=10
*   - NOT NEEDED WHEN CHANNELS DEFINED ON GROUP AND LINE
*
*:MIGEND*****
HOST303B HOST SUBAREA=3,
          MAXBFRU=16,
          UNITSZ=300,
          BFRPAD=0
*****
*          DEFINE PATH TABLE          *
*****
PATHOSA  PATH DESTSA=3,ER0=(3,1)
PATHCCUB PATH DESTSA=1,ER0=(1,1)

```

Figure C-2 (Part 3 of 8). Sample Migration Aid Output NEWDEFN File

# Migration Aid Sample

```
*****
*          SDLCST DEFINITION STATEMENT STATEMENTS          *
*****
SDLPRIB  SDLCST MODE=PRI,                                  *
          RETRIES=(7,2,1),                                *
          GROUP=GRPRIB                                    *
*:MIGINFO*****
* MIGRATION AID SDLCST STATEMENT SUMMARY
*
* INFORMATIONAL
*   THE TADDR DEFAULT HAS CHANGED.  SEE THE NCP RESOURCE DEFINITION
*   REFERENCE FOR DETAILS.
*
*
*:MIGEND*****
SDLSECB  SDLCST MODE=SEC,                                  *
          GROUP=GRSECB                                    *
*****
*          INN LINK SPECIFICATION  -TO OMAHA AND FARGO      *
*****
GRPRIB   GROUP LNCTL=SDLC,                                  *
          MODE=PRI,                                        *
          DIAL=NO,                                        *
          REPLYTO=3.0                                     *
GRSECB   GROUP LNCTL=SDLC,                                  *
          MODE=SEC,                                       *
          DIAL=NO,                                        *
          ACTIVTO=60.0                                    *
****   ****   ****   ****
GFARGOB  GROUP LNCTL=SDLC,                                  *
          SPEED=9600,                                     *
          CLOCKNG=EXT,                                    *
          NRZI=YES,                                       *
          DUPLEX=FULL,                                    *
          NEWSYNC=NO,                                     *
          ISTATUS=ACTIVE,                                 *
          MAXOUT=7,                                       *
          PASSLIM=7,                                      *
          PAUSE=0.2,                                       *
          TYPE=NCP,                                       *
          ACTIVTO=420                                     *
***
*:MIGINFO*****
* MIGRATION AID LINE STATEMENT SUMMARY
*
* CHANGES
*   ADDRESS=(???,FULL) - CHANGED FROM (012,FULL)
*
* :CRITICAL
*   ADDRESS=(???,FULL) - CHANGED FROM (012,FULL)
*
*:MIGEND*****
```

Figure C-2 (Part 4 of 8). Sample Migration Aid Output NEWDEFN File



```

LFARG01  LINE ADDRESS=(???,FULL),
          SDLCST=(SDLPRIB,SDLSECB),
          MONLINK=YES,
          ISTATUS=ACTIVE
***
PFARG01  PU ISTATUS=INACTIVE,
          ANS=CONT,
          PUTYPE=4,
          TGN=ANY
***
**MIGINFO*****
*  MIGRATION AID LINE STATEMENT SUMMARY
*
*  CHANGES
*  ADDRESS=(???,FULL) - CHANGED FROM (013,FULL)
*
*  :CRITICAL
*  ADDRESS=(???,FULL) - CHANGED FROM (013,FULL)
*
**MIGEND*****
LFARG02  LINE ADDRESS=(???,FULL),
          SDLCST=(SDLPRIB,SDLSECB),
          MONLINK=YES,
          ISTATUS=ACTIVE
***
PFARG02  PU ISTATUS=INACTIVE,
          ANS=CONT,
          PUTYPE=4,
          TGN=ANY
***
**MIGINFO*****
*  MIGRATION AID LINE STATEMENT SUMMARY
*
*  CHANGES
*  ADDRESS=(???,FULL) - CHANGED FROM (014,FULL)
*
*  :CRITICAL
*  ADDRESS=(???,FULL) - CHANGED FROM (014,FULL)
*
**MIGEND*****
LFARG03  LINE ADDRESS=(???,FULL),
          SDLCST=(SDLPRIB,SDLSECB),
          MONLINK=YES,
          ISTATUS=ACTIVE
***
PFARG03  PU ISTATUS=INACTIVE,
          ANS=CONT,
          PUTYPE=4,
          TGN=ANY

```

Figure C-2 (Part 5 of 8). Sample Migration Aid Output NEWDEFN File

# Migration Aid Sample

```
*****
*          3270 SDLC MODE          *
*****
G3270SNX GROUP LNCTL=SDLC,          *
          DIAL=NO,                  *
          REPLYTO=1.0,              *
          SPEED=4800,               *
          CLOCKNG=EXT,              *
          NRZI=YES,                 *
          DUPLEX=FULL,              *
          NEWSYNC=NO,               *
          USSTAB=CIUSS00,           *
          MODETAB=CIMODTAB,         *
          DLOGMOD=SNA3270,         *
          RETRIES=(7,2,1),          *
          SERVLIM=10,               *
          ISTATUS=ACTIVE,           *
          TYPE=NCP,                 *
          MAXDATA=265,              *
          MAXOUT=7,                 *
          PASSLIM=7,                *
          SSCPFM=USSSCS,            *
          PACING=0,                 *
          PAUSE=0.2,                *
          VPACING=0                 *
****  ****  ****  ****
***
*:MIGINFO*****
* MIGRATION AID LINE STATEMENT SUMMARY
*
* CHANGES
*   ADDRESS=(???,HALF) - CHANGED FROM (032,HALF)
*
* :CRITICAL
*   ADDRESS=(???,HALF) - CHANGED FROM (032,HALF)
*
*:MIGEND*****
L3270P   LINE ADDRESS=(???,HALF),   *
          PAUSE=0.2,                 *
          SERVLIM=30
SV020   SERVICE ORDER=(RU020,RJEP032)
RU020   PU ADDR=01,PUTYPE=2
RD021   LU LOCADDR=2
RP021   LU LOCADDR=3
RJEP032 PU ADDR=02,PUTYPE=2
*:MIGINFO*****
* MIGRATION AID LU STATEMENT SUMMARY
*
* DELETIONS
*   BATCH=YES
*     - NCP V7R8 DOES NOT NEED IT
*
*:MIGEND*****
```

Figure C-2 (Part 6 of 8). Sample Migration Aid Output NEWDEFN File

```

INBATCHB LU LOCADDR=2
INBATCHC LU LOCADDR=3, ISTATUS=INACTIVE
INBATCHD LU LOCADDR=4, ISTATUS=INACTIVE
INBATSHE LU LOCADDR=5, ISTATUS=INACTIVE
*****
* GENERATED BY NDF
*:MIGINFO*****
* MIGRATION AID GROUP STATEMENT SUMMARY
*
* ADDITIONS
*   LNCTL=CA
*
*:MIGEND*****
NDFCAG1  GROUP LNCTL=CA                                MIGA
*:MIGINFO*****
* MIGRATION AID LINE STATEMENT SUMMARY
*
* INFORMATIONAL
*   SEE THE NCP RESOURCE DEFINITION REFERENCE FOR CORRECT CHANNEL
*   ADDRESS RANGE.
*
*   CA WAS SET TO "???" BECAUSE IT WAS A TPS CHANNEL ON THE BUILD
*   STATEMENT.
*
*
* ADDITIONS
*   DELAY=0.1
*   NCPCA=ACTIVE
*   TIMEOUT=420.0
*
* CHANGES
*   ADDRESS=???
*   CA=???
*
* :CRITICAL
*   ADDRESS=???
*   CA=???
*
*:MIGEND*****
NDFCAL1  LINE ADDRESS=???,                                *
          CA=???,                                         *
          DELAY=0.1,                                       MIGA*
          NCPCA=ACTIVE,                                    MIGA*
          TIMEOUT=420.0                                    MIGA
*:MIGINFO*****
* MIGRATION AID PU STATEMENT SUMMARY
*
* ADDITIONS
*   NETID=CNMNET
*
*:MIGEND*****

```

Figure C-2 (Part 7 of 8). Sample Migration Aid Output NEWDEFN File

## Migration Aid Sample

```
NDFCAP1 PU NETID=CNMNET MIGA
*:MIGINFO*****
* MIGRATION AID LINE STATEMENT SUMMARY
*
* INFORMATIONAL
* SEE THE NCP RESOURCE DEFINITION REFERENCE FOR CORRECT CHANNEL
* ADDRESS RANGE.
*
*
* ADDITIONS
* CA=TYPE6
* DELAY=0.1
* NCPA=ACTIVE
* TIMEOUT=420.0
*
* CHANGES
* ADDRESS=???
*
* :CRITICAL
* ADDRESS=???
*
*:MIGEND*****
NDFCAL2 LINE ADDRESS=???, *
          CA=TYPE6, MIGA*
          DELAY=0.1, MIGA*
          NCPA=ACTIVE, MIGA*
          TIMEOUT=420.0 MIGA
NDFCAP2 PU
*:MIGINFO*****
* MIGRATION AID NETWORK STATEMENT SUMMARY
*
* ADDITIONS
* ERLIMIT=16 - VIA NERLIM
*
*:MIGEND*****
          NETWORK NETID=CNMNET,SUBAREA=23,NUMHSAS=6,MAXSUBA=255, *
          ERLIMIT=16 MIGA
          GWNAU NAME=M55,ELEMENT=5,NETID=ERNIENET
          GWNAU NUMADDR=100
          PATH DESTSA=4,ER0=(4,1),VR0=0
          GENEND
```

Figure C-2 (Part 8 of 8). Sample Migration Aid Output NEWDEFN File

## List of Abbreviations

<b>ACF</b>	Advanced Communications Function	<b>MVS/XA</b>	Multiple Virtual Storage/Extended Architecture
<b>ANR</b>	Automatic network routing	<b>NCP</b>	Network Control Program
<b>ANSI</b>	American National Standards Institute	<b>NCST</b>	NCP connectionless SNA transport
<b>APPN</b>	Advanced Peer-to-Peer Networking	<b>NDF</b>	NCP/EP definition facility
<b>ARP</b>	Address Resolution Protocol	<b>NPA</b>	network performance analyzer
<b>BAN</b>	boundary access node	<b>NPM</b>	NetView Performance Monitor
<b>BCCA</b>	buffer-chaining channel adapter	<b>NPSI</b>	X.25 NCP Packet Switching Interface
<b>BECN</b>	backward explicit congestion notification	<b>NRF</b>	Network Routing Facility
<b>BNN</b>	boundary network node	<b>NTO</b>	Network Terminal Option
<b>CCITT</b>	International Telegraph and Telephone Consultative Committee	<b>NTRI</b>	NCP/Token-Ring interconnection
<b>CD-ROM</b>	compact disk read-only memory	<b>ODLC</b>	outboard data link control
<b>CLA</b>	communication line adapter	<b>OS/VS</b>	operating system/virtual storage
<b>CLP</b>	communication line processor	<b>PEP</b>	partitioned emulation program (EP & NCP)
<b>CMS</b>	conversational monitor system	<b>PLU</b>	primary logical unit
<b>CRP</b>	configuration report program	<b>PTF</b>	program temporary fix
<b>CSS</b>	connectivity subsystem	<b>PU</b>	physical unit
<b>DLCI</b>	data link connection identifier	<b>PVC</b>	permanent virtual circuit
<b>DMPX</b>	data multiplexing	<b>RIP</b>	Routing Information Protocol
<b>EP</b>	Emulation Program	<b>RNR</b>	receive not ready
<b>ESCON</b>	Enterprise Systems Connection	<b>RRT</b>	resource resolution table
<b>ESS</b>	Ethernet-type subsystem	<b>RTP</b>	rapid transport protocol
<b>FRFH</b>	frame-relay frame handler	<b>SDLC</b>	Synchronous Data Link Control
<b>FTP</b>	file transfer protocol	<b>SLU</b>	secondary logical unit
<b>HCD</b>	hardware configuration definition	<b>SMMF</b>	SSCP monitor mode function
<b>HPR</b>	high-performance routing	<b>SMP/E</b>	system modification program extended
<b>HPTSS</b>	high-performance transmission subsystem	<b>SNA</b>	Systems Network Architecture
<b>IEEE</b>	Institute of Electrical and Electronics Engineers	<b>SNI</b>	SNA network interconnection
<b>InARP</b>	inverse address resolution protocol	<b>SPE</b>	small programming enhancement
<b>INN</b>	intermediate network node	<b>SSCP</b>	system services control point
<b>IP</b>	Internet Protocol	<b>SSP</b>	System Support Program(s)
<b>IPCS</b>	Interactive problem control system	<b>TAP</b>	Trace analysis program
<b>IPF</b>	Interactive Presentation facility	<b>TCAM</b>	Telecommunications access method
<b>ISDN</b>	integrated services digital network	<b>TCP/IP</b>	Transmission Control Protocol/Internet Protocol
<b>LAN</b>	local area network	<b>TG</b>	transmission group
<b>LIC</b>	line interface coupler	<b>TIC</b>	token-ring interface coupler
<b>LMI</b>	local management interface	<b>TSS</b>	transmission subsystem
<b>LPDA</b>	Link Problem Determination Aid	<b>VM</b>	virtual machine (IBM S/370 and S/390)
<b>LU</b>	logical unit	<b>VM/ESA</b>	Virtual Machine/Enterprise Systems Architecture
<b>MLTG</b>	multilink transmission group	<b>VM/SP</b>	Virtual Machine/System Product
<b>MSHP</b>	maintain system history program	<b>VMSES/E</b>	Virtual Machine Serviceability Enhancements Staged/Extended
<b>MVS</b>	Multiple Virtual Storage	<b>VTAM</b>	Virtual telecommunications access method
<b>MVS/ESA</b>	Multiple Virtual Storage/Enterprise Systems Architecture	<b>WAN</b>	Wide area network
<b>MVS/SP</b>	Multiple Virtual Storage/System Product	<b>XI</b>	X.25 SNA interconnection



## Glossary

This glossary includes terms and definitions from:

- The *American National Standard Dictionary for Information Systems*, ANSI X3.172-1990, copyright 1990 by the American National Standards Institute (ANSI). Copies may be purchased from the American National Standards Institute, 11 West 42nd Street, New York, New York 10036. Definitions are identified by the symbol (A) after the definition.
- The ANSI/EIA Standard—440-A, *Fiber Optic Terminology*. Copies may be purchased from the Electronic Industries Association, 2001 Pennsylvania Avenue, N.W., Washington, DC 20006. Definitions are identified by the symbol (E) after the definition.
- The *Information Technology Vocabulary*, developed by Subcommittee 1, Joint Technical Committee 1, of the International Organization for Standardization and the International Electrotechnical Commission (ISO/IEC JTC1/SC1). Definitions of published parts of this vocabulary are identified by the symbol (I) after the definition; definitions taken from draft international standards, committee drafts, and working papers being developed by ISO/IEC JTC1/SC1 are identified by the symbol (T) after the definition, indicating that final agreement has not yet been reached among the participating National Bodies of SC1.
- The Network Working Group Request for Comments: 1208.

The following cross-references are used in this glossary:

**Contrast with:** This refers to a term that has an opposed or substantively different meaning.

**Synonym for:** This indicates that the term has the same meaning as a preferred term, which is defined in its proper place in the glossary.

**Synonymous with:** This is a backward reference from a defined term to all other terms that have the same meaning.

**See:** This refers the reader to multiple-word terms that have the same last word.

**See also:** This refers the reader to terms that have a related, but not synonymous, meaning.

**Deprecated term for:** This indicates that the term should not be used. It refers to a preferred term, which is defined in its proper place in the glossary.

## A

**ACF.** Advanced Communications Function.

**ACF/NCP.** Advanced Communications Function for the Network Control Program. Synonym for *NCP*.

**ACF/VTAM.** Advanced Communications Function for the Virtual Telecommunications Access Method. Synonym for *VTAM*.

**adaptive pacing.** Synonym for *adaptive session-level pacing* and *virtual route pacing*.

**adaptive session-level pacing.** A form of session-level pacing in which session components exchange pacing windows that may vary in size during the course of a session. This allows transmission within a network to adapt dynamically to variations in availability and demand of buffers on a session-by-session basis. Session-level pacing occurs within independent stages along the session path according to local congestion at the intermediate and endpoint nodes. Synonymous with *adaptive pacing* and *adaptive session pacing*. See *pacing*, *session-level pacing*, and *virtual route pacing*.

**adaptive session pacing.** Synonym for *adaptive session-level pacing*.

**address resolution.** A method for mapping network-layer addresses to media-specific addresses. See also *Address Resolution Protocol (ARP)*.

**Address Resolution Protocol (ARP).** A protocol that dynamically maps between Internet addresses, baseband adapter addresses, X.25 addresses, and token-ring adapter addresses on a local area network.

**Advanced Communications Function (ACF).** A group of IBM licensed programs, principally VTAM, TCAM, NCP, and SSP, that use the concepts of Systems Network Architecture (SNA), including distribution of function and resource sharing.

**Advanced Peer-to-Peer Networking (APPN).** An extension to SNA featuring (a) greater distributed network control that avoids critical hierarchical dependencies, thereby isolating the effects of single points of failure; (b) dynamic exchange of network topology information to foster ease of connection, reconfiguration, and adaptive route selection; (c) dynamic definition of network resources; and (d) automated resource registration and directory lookup. APPN extends the LU 6.2 peer orientation for end-user services to network control and supports multiple LU types, including LU 2, LU 3, and LU 6.2.

## Glossary

**Advanced Peer-to-Peer Networking (APPN) end node.** A node that provides a broad range of end-user services and supports sessions between its local control point (CP) and the CP in an adjacent network node. It uses these sessions to dynamically register its resources with the adjacent CP (its network node server), to send and receive directory search requests, and to obtain management services. An APPN end node can also attach to a subarea network as a peripheral node or to other end nodes.

**Advanced Peer-to-Peer Networking (APPN) network.** A collection of interconnected network nodes and their client end nodes.

**Advanced Peer-to-Peer Networking (APPN) network node.** A node that offers a broad range of end-user services and that can provide the following:

- Distributed directory services, including registration of its domain resources to a central directory server
- Topology database exchanges with other APPN network nodes, enabling network nodes throughout the network to select optimal routes for LU-LU sessions based on requested classes of service
- Session services for its local LUs and client end nodes
- Intermediate routing services within an APPN network

**Advanced Peer-to-Peer Networking (APPN) node.** An APPN network node or an APPN end node.

**alert.** A message sent to a management services focal point in a network to identify a problem or an impending problem.

**American National Standards Institute (ANSI).** An organization consisting of producers, consumers, and general interest groups, that establishes the procedures by which accredited organizations create and maintain voluntary industry standards in the United States. (A)

**ANSI.** American National Standards Institute.

**APPN.** Advanced Peer-to-Peer Networking.

**APPN network.** See *Advanced Peer-to-Peer Networking (APPN) network*.

**ARP.** Address Resolution Protocol.

## B

**binary synchronous communication (BSC).** A form of telecommunication line control that uses a standard set of transmission control characters and control character sequences, for binary synchronous transmission of binary-coded data between stations. Contrast with *Synchronous Data Link Control (SDLC)*.

**boundary function.** (1) In SNA, a capability of a subarea node to provide protocol support for attached peripheral nodes, such as: (a) interconnecting subarea path control and peripheral path control elements, (b) performing session sequence numbering for low-function peripheral nodes, and (c) providing session-level pacing support. (2) In SNA, the component that provides these capabilities.

**boundary node (BN).** In SNA, a subarea node with boundary function.

**Note:** A subarea node may be a boundary node, an intermediate routing node, both, or neither, depending on how it is used in the network.

**bridge.** (1) A functional unit that interconnects two local area networks that use the same logical link control protocol but may use different medium access control protocols. (T) (2) A functional unit that interconnects multiple LANs (locally or remotely) that use the same logical link control protocol but that can use different medium access control protocols. A bridge forwards a frame to another bridge based on the medium access control (MAC) address. (3) In the connection of local loops, channels, or rings, the equipment and techniques used to match circuits and to facilitate accurate data transmission. (4) See also *gateway*.

**BSC.** Binary synchronous communication.

**buffer.** A portion of storage used to hold input or output data temporarily.

**bus.** A facility for transferring data between several devices located between two end points, only one device being able to transmit at a given moment. (T)

## C

**CA.** Channel adapter.

**casual connection.** (1) In a subarea network, a connection in which type 5 nodes are attached through the boundary function using low-entry networking (LEN). Therefore, the nodes appear as LEN nodes rather than subarea nodes. (2) In an APPN network, a connection between an end node and a network node with different network identifiers.



**CCITT.** International Telegraph and Telephone Consultative Committee. An organization (one of four permanent organs of the International Telecommunication Union [ITU], headquartered in Geneva, Switzerland) that is concerned with the problems relating to international telephony and telegraphy. The CCITT Plenary Assembly meets at regular intervals to prepare a list of technical questions related to telephone and telegraph services. The Assembly assigns these questions to study groups, which then prepare recommendations to be presented at the next plenary meeting. Approved recommendations are published for the use of engineers, scientists, and manufacturers around the world.

**CCU.** Central control unit.

**channel.** A path along which signals can be sent, for example, data channel, output channel. (A)

**channel adapter.** A communication controller hardware unit that is used to attach the communication controller to a host channel.

**channel-attached.** (1) Pertaining to the attachment of devices directly by input/output channels to a host processor. (2) Pertaining to devices attached to a controlling unit by cables, rather than by telecommunication lines. Contrast with *link-attached*. Synonymous with *local*.

**channel link.** A System/370 I/O channel to control unit interface that has an SNA network address. A channel link can be either a subarea link or a peripheral link and is defined in an NCP generation definition using the GROUP, LINE, and PU definition statements. See also *link* and *subarea link*.

**CLP.** Communication line processor.

**CMS.** Conversational monitor system.

**communication controller.** A type of communication control unit whose operations are controlled by one or more programs stored and executed in the unit. It manages the details of line control and the routing of data through a network.

**communication line processor (CLP).** In a communications controller, the processor that manages telecommunication lines.

**composite network node.** A type 5 node and its subordinate type 4 nodes that support APPN network node protocols and appear to an attached APPN or LEN node as a single network node.

**connectivity.** (1) The capability of a system or device to be attached to other systems or devices without modification. (T) (2) The capability to attach a variety of functional units without modifying them.

**connectivity subsystem.** An expansion frame, such as the 3746 Model 900, that extends connectivity and enhances the performance of the IBM 3745 Communication Controller.

**control block.** (1) A storage area used by a computer program to hold control information. (I) (2) In the IBM Token-Ring Network, a specifically formatted block of information provided from the application program to the Adapter Support Interface to request an operation.

**control point (CP).** (1) A component of an APPN or LEN node that manages the resources of that node. In an APPN node, the CP is capable of engaging in CP-CP sessions with other APPN nodes. In an APPN network node, the CP also provides services to adjacent end nodes in the APPN network. (2) A component of a node that manages resources of that node and optionally provides services to other nodes in the network. Examples are a system services control point (SSCP) in a type 5 subarea node, a network node control point (NNCP) in an APPN network node, and an end node control point (ENCP) in an APPN or LEN end node. An SSCP and an NNCP can provide services to other nodes.

**conversational monitor system (CMS).** A virtual machine operating system that provides general interactive time sharing, problem solving, and program development capabilities, and operates only under control of the VM/370 control program.

**coupler.** A device that connects a modem to a telephone network.

**CP.** Control point.

**cross-domain.** In SNA, pertaining to control or resources involving more than one domain.

**cross-network.** In SNA, pertaining to control or resources involving more than one network.

**cross-network session.** An LU-LU or SSCP-SSCP session whose path traverses more than one SNA network.

**CWALL.** An NCP threshold of buffer availability, below which the NCP will accept only high-priority path information units (PIUs).

## D

**data link connection identifier (DLCI).** A numeric identifier that is used in a frame-relay network to identify the next segment of a permanent virtual circuit over which a frame is to be relayed.

**data link control (DLC).** A set of rules used by nodes

## Glossary

on a data link (such as an SDLC link or a token ring) to accomplish an orderly exchange of information.

**data link level.** (1) In the hierarchical structure of a data station, the conceptual level of control or processing logic between high level logic and the data link that maintains control of the data link. The data link level performs such functions as inserting transmit bits and deleting receive bits; interpreting address and control fields; generating, transmitting, and interpreting commands and responses; and computing and interpreting frame check sequences.

**datagram.** (1) In packet switching, a self-contained packet, independent of other packets, that carries information sufficient for routing from the originating data terminal equipment (DTE) to the destination DTE without relying on earlier exchanges between the DTEs and the network. (I) (2) In TCP/IP, the basic unit of information passed across the Internet environment. A datagram contains a source and destination address along with the data. An Internet Protocol (IP) datagram consists of an IP header followed by the transport layer data. See also *packet* and *segment*.

**definition statement.** An instruction that defines an NCP or VTAM resource.

**DLCI.** data link connection identifier

**domain.** That part of a computer network in which the data processing resources are under common control. (T)

**DOS.** Disk Operating System. See *IBM Disk Operating System*.

**DR.** Dynamic reconfiguration.

**DSR.** Data set ready.

**duplex.** Pertaining to communication in which data can be sent and received at the same time. Synonymous with *full duplex*. Contrast with *half duplex*.

**dynamic.** Pertaining to an operation that occurs at the time it is needed rather than at a predetermined or fixed time.

**dynamic path update.** The process of changing the network path for sending information without regenerating complete configuration tables.

**dynamic reconfiguration (DR).** The process of changing the network configuration (peripheral PUs and LUs) without regenerating complete configuration tables or deactivating the affected major node.

## E

**early token release.** A function, supported by token-ring adapter types 2 and 3, that allows a transmitting station to release the token after transmitting the ending delimiter.

**echo.** In data communication, a reflected signal on a communications channel. On a communications terminal, each signal is displayed twice, once when entered at the local terminal and again when returned over the communications link. This allows the signals to be checked for accuracy.

**element.** In SNA, the particular resource within a subarea that is identified by an element address. See also *subarea*.

**element address.** In SNA, a value in the element address field of the network address identifying a specific resource within a subarea. See *subarea address*.

**emulation mode.** The function of a network control program that enables it to perform activities equivalent to those performed by a transmission control unit. Contrast with *network control mode*.

**Emulation Program (EP).** An IBM control program that allows a channel-attached 3705 or 3725 communication controller to emulate the functions of an IBM 2701 Data Adapter Unit, an IBM 2702 Transmission Control, or an IBM 2703 Transmission Control. See also *network control program*.

**Enterprise Systems Connection (ESCON).** A set of IBM products and services that provide a dynamically connected environment within an enterprise.

**EP.** Emulation Program.

**ER.** Explicit route.

**ESCON.** Enterprise Systems Connection.

**Ethernet.** A 10-Mbps baseband local area network that allows multiple stations to access the transmission medium at will without prior coordination, avoids contention by using carrier sense and deference, and resolves contention by using collision detection and transmission. Ethernet uses carrier sense multiple access with collision detection (CSMA/CD).

**Ethernet-type LAN.** A local area network that uses either the Ethernet Version 2 or IEEE 802.3 protocol.

**exchange identification (XID).** A specific type of basic link unit that is used to convey node and link characteristics between adjacent nodes. XIDs are exchanged between link stations before and during link activation to establish and negotiate link and node char-

acteristics, and after link activation to communicate changes in these characteristics.

**EXEC.** In a VM operating system, a user-written command file that contains CMS commands, other user-written commands, and execution control statements, such as branches.

**explicit route (ER).** In SNA, a series of one or more transmission groups that connect two subarea nodes. An explicit route is identified by an origin subarea address, a destination subarea address, an explicit route number, and a reverse explicit route number. Contrast with *virtual route (VR)*.

**extended architecture (XA).** An extension to System/370 architecture that takes advantage of continuing high performance enhancements to computer system hardware.

**extended network addressing.** The network addressing system that splits the address into an 8-bit subarea and a 15-bit element portion. The subarea portion of the address is used to address host processors or communication controllers. The element portion is used to permit processors or controllers to address resources.

**extended recovery facility (XRF).** A facility that minimizes the effect of failures in MVS, VTAM, the host processor, or high availability applications during sessions between high availability applications and designated terminals. This facility provides an alternate subsystem to take over sessions from the failing subsystem.

**extended subarea addressing.** A network addressing system that is used in a network with more than 255 subareas.

## F

**fallback.** In an IBM 3745 Communication Controller with twin central control units (CCUs) in standby or backup mode, the process by which buses are switched from the failing CCU to the active CCU (backup mode) or the idle CCU (standby mode) to recover the path of communication flow in the failed CCU. See also *switchback*.

**fanout.** A feature that allows several data terminal equipment (DTEs) to share the same modem. Only one DTE can transmit at a time.

**FASTRUN.** One of several options available with the NCP/EP definition facility (NDF) that indicates that only the syntax is to be checked in generation definition statements.

**FHSP.** Frame handler support.

**first failure data capture.** A VTAM problem diagnosis aid that enables VTAM to identify certain VTAM errors, to gather information about the errors, and to present this information for problem resolution.

**flow control.** In SNA, the process of managing the rate at which data traffic passes between components of the network. The purpose of flow control is to optimize the rate of flow of message units with minimum congestion in the network; that is, to neither overflow the buffers at the receiver or at intermediate routing nodes, nor leave the receiver waiting for more message units. See also *adaptive session-level pacing*, *pacing*, and *session-level pacing*.

**frame.** (1) The unit of transmission in some local area networks, including the IBM Token-Ring Network. It includes delimiters, control characters, information, and checking characters. (2) In SDLC, the vehicle for every command, every response, and all information that is transmitted using SDLC procedures.

**frame handler (FH).** Synonym for *frame-relay frame handler (FRFH)*.

**frame handler support (FHSP).** The access point of a frame-relay frame handler to a PVC segment. Frame handler supports function in pairs; frames enter the frame handler through one frame handler support and exit through the other. Contrast with *terminating equipment support*. See also *support set*.

**frame relay.** (1) An interface standard describing the boundary between a user's equipment and a fast-packet network. In frame-relay systems, flawed frames are discarded; recovery comes end-to-end rather than hop-by-hop. (2) A technique derived from the integrated services digital network (ISDN) D channel standard. It assumes that connections are reliable and dispenses with the overhead of error detection and control within the network.

**frame-relay frame.** The frame-relay frame structure defined by American National Standards Institute (ANSI) Standard T1.618.

**frame-relay frame handler (FRFH).** (1) The function in a frame-relay node that routes (or switches) frames along a permanent virtual circuit (PVC). A frame handler receives frames from an adjacent frame-relay node and uses the DLCI to forward them to the next node on the PVC. Synonymous with *frame handler*. See also *frame-relay switching equipment support* and *frame-relay terminating equipment*. (2) In NCP, the function that switches frames between frame handler supports on an internal PVC segment. The NCP frame handler function can also switch frames to the frame-relay terminating equipment function.

## Glossary

**frame-relay network.** A network that consists of frame-relay frame handlers (FRFH) and in which frames are passed from one frame-relay terminal equipment (FRTE) station to another through a series of one or more FRFHs.

**frame-relay physical line.** The physical connection between two frame-relay nodes. A frame-relay physical line can simultaneously support PVC segments for both the frame-handler and terminating-equipment functions. In NCP, a frame-relay physical line is defined as a non-switched duplex line.

**frame-relay switch.** A frame-relay node that provides both the frame-relay frame handler function and the local management interface (LMI) function.

**frame-relay switching equipment (FRSE) support.** In NCP, a set of frame-relay functions that include the frame-relay frame handler function and the local management interface (LMI) function. These functions are defined by American National Standards Institute (ANSI) Standards T1.617 and T1.618 and International Telegraph and Telephone Consultative Committee (CCITT) Standards Q.922 and Q.933. NCP provides additional functions, including performance measurement and enhanced reliability, that are not defined by ANSI or CCITT standards.

**frame-relay terminal equipment.** A device that can connect to a frame-relay network and provide the frame-relay terminating equipment function. See also *frame-relay frame handler* and *frame-relay terminating equipment*.

**frame-relay terminating equipment (FRTE).** The function at the end of a frame-relay permanent virtual circuit (PVC). Frame-relay terminating equipment provides higher-layer protocols with access to a frame-relay network through terminating equipment subports (TESPs). It does this by (a) adding frame-relay frame headers to data for another protocol and sending the frames to adjacent frame-relay nodes, and (b) receiving frames from adjacent frame-relay nodes and removing the frame headers. See also *frame-relay frame handler*, *frame-relay switching equipment support*, and *frame-relay terminal equipment*.

**FRFH.** Frame-relay frame handler.

**full duplex (FDX).** Synonym for *duplex*.

## G

**gateway.** (1) A functional unit that interconnects two computer networks with different network architectures. A gateway connects networks or systems of different architectures. A bridge interconnects networks or systems with the same or similar architectures. (T)

(2) In TCP/IP, a device used to connect two systems that use either the same or different communications protocols. (3) The combination of machines and programs that provide address translation, name translation, and system services control point (SSCP) rerouting between independent SNA networks to allow those networks to communicate. A gateway consists of one gateway NCP and at least one gateway VTAM. (4) In the IBM Token-Ring Network, a device and its associated software that connect a local area network to another local area network or a host that uses different logical link protocols.

**gateway NCP.** An NCP that performs address translation to allow cross-network session traffic. The gateway NCP connects two or more independent SNA networks. Synonymous with *gateway node*.

**generation.** The process of assembling and link editing definition statements so that resources can be identified to all the necessary programs in a network.

**generation definition.** A set of definition statements and associated keywords that define the resources for an NCP.

**generic alert.** A product-independent method of encoding alert data by means of both (a) code points indexing short units of stored text and (b) textual data.

## H

**half-duplex (HD, HDX).** In data communication, pertaining to transmission in only one direction at a time. Contrast with *duplex*. See also *half-duplex operation* and *half-duplex transmission*.

**hardcopy.** A printed copy of machine output in a visually readable form; for example, printed reports, listings, documents, and summaries. Contrast with *softcopy*.

**high-performance routing (HPR).** An addition to the Advanced Peer-to-Peer Networking (APPN) architecture that enhances data routing performance and reliability, especially when using high-speed links.

**high-performance transmission subsystem (HPTSS).** A high-speed line adapter that attaches to the IBM 3745 Communication Controller.

**host node.** (1) A node at which a host computer is located. (T) (2) A node that provides an application program interface (API) and a common application interface. See *boundary node*, *node*, *peripheral node*, *subarea host node*, and *subarea node*. See also *boundary function* and *node type*.

**HPR.** High-performance routing.

**HPTSS.** High-performance transmission subsystem.

**hypertext link.** A pointer from a location in an online book to another location in the same book or another book. When selected, a hypertext link enables you to move quickly to the new location containing related information. BookManager associates terms with related information such as the glossary, a message or code, an index entry, or a language element reference. Cross-references indicated by markup are automatically linked to the referenced location.

## I

**I/O.** Input/output.

**IBM Disk Operating System (DOS).** A disk operating system based on MS-DOS that operates with all IBM personal computers.

**ID.** (1) Identifier. (2) Identification.

**IEEE.** Institute of Electrical and Electronics Engineers.

**inbound.** In communications, data that is received from the network.

**information (I) format.** A format used for information transfer.

**information (I) frame.** A frame in I format used for numbered information transfer.

**initial program load (IPL).** (1) The initialization procedure that causes an operating system to commence operation. (2) The process by which a configuration image is loaded into storage at the beginning of a work day or after a system malfunction. (3) The process of loading system programs and preparing a system to run jobs. (4) Synonymous with *system restart* and *system startup*.

**integrated services digital network (ISDN).** A digital end-to-end telecommunication network that supports multiple services including, but not limited to, voice and data.

**Note:** ISDNs are used in public and private network architectures.

**interconnected networks.** SNA networks connected by gateways.

**interconnection.** See *SNA network interconnection (SNI)*.

**internet.** A collection of networks interconnected by a set of routers that allow them to function as a single, large network. See also *Internet*.

**Internet.** The internet administered by the Internet Architecture Board (IAB), consisting of large national

backbone networks and many regional and campus networks all over the world. The Internet uses the Internet suite of protocols.

**Internet address.** See *IP address*.

**Internet Protocol (IP).** A connectionless protocol that routes data through a network or interconnected networks. IP acts as an intermediary between the higher protocol layers and the physical network. However, this protocol does not provide error recovery and flow control and does not guarantee the reliability of the physical network.

**Internet router.** A device that enables an Internet Protocol host to act as a gateway for routing data between separate networks that use a specific adapter.

**IP.** Internet Protocol.

**IP address.** The 32-bit address defined by the Internet Protocol, standard 5, Request for Comment (RFC) 791. It is usually represented in dotted decimal notation.

**IPL.** Initial program load.

**ISDN.** integrated services digital network.

## J

**JCL.** Job control language.

**job control language (JCL).** A control language used to identify a job to an operating system and to describe the job's requirements.

## K

**keyword.** The part of a command operand that consists of a specific character string (such as *DSNAME=*). See also *definition statement*.

## L

**LAN.** Local area network.

**LIC.** Line interface coupler.

**limited resource.** A connection facility that causes a session traversing it to be terminated if no session activity is detected for a specified period of time. See also *limited-resource session*.

**limited-resource session.** A session that traverses a limited-resource link. This session is terminated if no session activity is detected for a specified period of time.

## Glossary

**line group.** One or more telecommunication lines of the same type that can be activated and deactivated as a unit.

**link.** The combination of the link connection (the transmission medium) and two link stations, one at each end of the link connection. A link connection can be shared among multiple links in a multipoint or token-ring configuration.

**link-attached.** Pertaining to devices that are connected to a controlling unit by a data link. Contrast with *channel-attached*. Synonymous with *remote*.

**link integrity verification tests (LIVT).** A set of operational procedures and messages that is defined by American National Standards Institute (ANSI) Standard T1.617 Annex D and International Telegraph and Telephone Consultative Committee (CCITT) Standard Q.933 Annex A and that is transferred over DLCI 0. This set of operational procedures and messages provides status and outage notification for frame-relay frame handler (FRFH) and frame-relay terminal equipment (FRTE) connections. See also *local management interface (LMI)*.

**Link Problem Determination Aid (LPDA).** A series of procedures that are used to test the status of and to control DCEs, the communication line, and the remote device interface. These procedures, or a subset of them, are implemented by host programs (such as the NetView program and VTAM), communication controller programs (such as NCP), and IBM LPDA DCEs. See also *LPDA-1* and *LPDA-2*.

**link station.** The hardware and software components within a node representing a connection to an adjacent node over a specific link. For example, if node A is the primary end of a multipoint line that connects to three adjacent nodes, node A will have three link stations representing the connections to the adjacent nodes.

**LIVT.** Link integrity verification tests.

**LMI.** Local management interface.

**LMI support.** A frame-relay support that exchanges line status information with adjacent nodes using local management interface (LMI) protocol. In NCP, the LMI support is the link-station support for the physical line.

**load module.** All or part of a computer program in a form suitable for loading into main storage for execution. A load module is usually the output of a linkage editor. (T)

**local.** Pertaining to a device accessed directly without use of a telecommunication line. Synonym for *channel-attached*.

**local address.** In SNA, an address used in a peripheral node in place of a network address and transferred to or from a network address by the boundary function in a subarea node.

**local area network (LAN).** (1) A computer network located on a user's premises within a limited geographical area. Communication within a local area network is not subject to external regulations; however, communication across the LAN boundary may be subject to some form of regulation. (T) (2) A network in which a set of devices are connected to one another for communication and that can be connected to a larger network. See also *Ethernet* and *token ring*. (3) Contrast with *wide area network (WAN)*.

**local management interface (LMI).** See *local management interface (LMI) protocol*.

**local management interface (LMI) protocol.** (1) In NCP, a set of frame-relay network management procedures and messages used by adjacent frame-relay nodes to exchange line status information over DLCI X'00'. NCP supports both the American National Standards Institute (ANSI) and International Telegraph and Telephone Consultative Committee (CCITT) versions of LMI protocol. These standards refer to LMI protocol as *link integrity verification tests (LIVT)*. (2) Originally, a set of frame-relay network management procedures and messages used by frame-relay nodes to exchange line status information over DLCI X'03FF' (1023). This protocol is defined in *Frame-Relay Specification with Extensions*, a document based on proposed T1S1 standards, which are copyrighted by Digital Equipment Corporation, Northern Telecom, Inc., and StrataCom, Inc. This protocol is not compatible with the ANSI or CCITT version. In this context, the term *local management interface* is a deprecated term for *link integrity verification tests (LIVT)*.

**locally administered address.** In a local area network, an adapter address that the user can assign to override the universally administered address.

**logical line.** In NCP, the representation of the connection between NCP and a node communicating with NCP over a physical line such as token-ring or frame-relay. A single physical line can support multiple logical lines. Contrast with *physical line*.

**logical unit (LU).** A type of network accessible unit that enables end users to gain access to network resources and communicate with each other.

**logical unit (LU) 6.2.** A type of logical unit that supports general communication between programs in a distributed processing environment. LU 6.2 is characterized by (a) a peer relationship between session partners, (b) efficient utilization of a session for multiple transactions, (c) comprehensive end-to-end error proc-

essing, and (d) a generic application program interface (API) consisting of structured verbs that are mapped into a product implementation.

**LPDA.** Link Problem Determination Aid.

**LPDA-1.** The first version of the LPDA command set. LPDA-1 is not compatible with LPDA-2. See also *Link Problem Determination Aid (LPDA)* and *LPDA-2*.

**LPDA-2.** The second version of the LPDA command set. LPDA-2 provides all of the functions of LPDA-1; it also supports commands such as the following:

- DCE configuration
- Dial
- Set transmit speed
- Commands to operate a contact that can control external devices.

See also *Link Problem Determination Aid (LPDA)* and *LPDA-1*.

**LU.** Logical unit.

## M

**MAC.** Medium access control.

**maintenance and operator subsystem (MOSS).** A subsystem of an IBM communication controller, such as the 3725 or the 3720, that contains a processor and operates independently of the rest of the controller. It loads and supervises the controller, runs problem determination procedures, and assists in maintaining both hardware and software.

**maintenance and operator subsystem extended (MOSS-E).** A subsystem of the IBM 3745 Communication Controller that operates independently of the rest of the controller. It loads and supervises the controller, runs problem determination procedures, and assists in maintaining both hardware and software.

**major node.** In VTAM, a set of resources that can be activated and deactivated as a group. See *minor node*.

**mask.** (1) A pattern of characters used to control retention or elimination of portions of another pattern of characters. (I) (A) (2) To use a pattern of characters to control retention or elimination of portions of another pattern of characters. (I) (A)

**MB.** Megabit; 1 048 576 bits.

**MB.** Megabyte; 1 048 576 bytes.

**Mbps.** One million bits per second.

**medium access control (MAC).** In LANs, the sub-layer of the data link control layer that supports medium-dependent functions and uses the services of the physical layer to provide services to the logical link control (LLC) sublayer. The MAC sublayer includes the method of determining when a device has access to the transmission medium.

**medium access control (MAC) protocol.** In a local area network, the protocol that governs access to the transmission medium, taking into account the topological aspects of the network, in order to enable the exchange of data between data stations. (T)

**medium access control (MAC) sublayer.** In a local area network, the part of the data link layer that applies a medium access method. The MAC sublayer supports topology-dependent functions and uses the services of the physical layer to provide services to the logical link control sublayer. (T)

**microcode.** A code, representing the instructions of an instruction set, that is implemented in a part of storage that is not program-addressable.

**migration.** The installation of a new version or release of a program to replace an earlier version or release.

**minor node.** In VTAM, a uniquely defined resource within a major node. See *major node* and *node*.

**mixed-media multilink transmission group (MMMLTG).** See *transmission group (TG)*.

**MLTG.** Multilink transmission group.

**MMMLTG.** Mixed-media multilink transmission group.

**modem (modulator/demodulator).** (1) A functional unit that modulates and demodulates signals. One of the functions of a modem is to enable digital data to be transmitted over analog transmission facilities. (T) (A) (2) A device that converts digital data from a computer to an analog signal that can be transmitted on a telecommunication line, and converts the analog signal received to data for the computer.

**modulo.** (1) Pertaining to a modulus; for example, 9 is equivalent to 4 modulo 5. (2) See also *modulus*.

**modulus.** A number, such as a positive integer, in a relationship that divides the difference between two related numbers without leaving a remainder; for example, 9 and 4 have a modulus of 5 (9 - 4 = 5; 4 - 9 = -5; and 5 divides both 5 and -5 without leaving a remainder).

**MOSS.** Maintenance and operator subsystem.

**MOSS-E.** Maintenance and operator subsystem extended.

## Glossary

**multilink transmission group (MLTG).** See *transmission group (TG)*.

**Multiple Virtual Storage (MVS).** See *MVS*.

**multipoint line.** A telecommunication line or circuit that connects two or more stations. Synonymous with *multidrop line*. Contrast with *point-to-point line*.

**multitailed.** Pertaining to a communication controller with an NCP attached to more than one host processor. See also *fanout*, *tailing*, and *twin-tailed*.

**MVS.** Multiple Virtual Storage. Implies MVS/370, the MVS/XA product, and the MVS/ESA product.

**MVS/ESA product.** Multiple Virtual Storage/Enterprise Systems Architecture.

**MVS/XA product.** Multiple Virtual Storage/Extended Architecture product, consisting of MVS/System Product Version 2 and the MVS/XA Data Facility Product, operating on a System/370 processor in the System/370 extended architecture mode. MVS/XA allows virtual storage addressing to 2 gigabytes. See also *MVS*.

## N

**native network.** The subnetwork whose network identifier a node uses for its own network-qualified resource names.

**NCP.** Network Control Program.

**NCP connectionless SNA transport (NCST).** An NCP function that allows a communication controller to transfer data across the SNA subarea routing network using TCP/IP protocols. The NCST function causes LU 0 sessions to be established between NCST logical units in the NCP and between an NCST logical unit in the NCP and SNA network link (SNALINK) logical units in the host processors.

**NCP V4 Subset.** Advanced Communications Function for Network Control Program (NCP) V4 Subset. An IBM licensed program that is a subset of NCP. It operates only on IBM 3720 Communication Controllers with certain capacity limitations such as number of scanners, lines, and channel adapters supported.

**NCP/EP definition facility (NDF).** A program that is part of System Support Programs (SSP) and that is used to generate a load module for a partitioned emulation program (PEP), a Network Control Program (NCP), or an Emulation Program (EP).

**NCP/Token-Ring interconnection (NTRI).** An NCP function that allows a communication controller to attach to the IBM Token-Ring Network and that provides both

subarea and peripheral node data link control (DLC) services in the SNA network.

**NCST.** NCP connectionless SNA transport.

**NDF.** NCP/EP definition facility.

**NETID.** Network identifier.

**NetView Performance Monitor (NPM).** An IBM licensed program that collects, monitors, analyzes, and displays data relevant to the performance of a VTAM telecommunication network. It runs as an online VTAM application program.

**NetView program.** An IBM licensed program used to monitor and manage a network and to diagnose network problems.

**network.** (1) An arrangement of nodes and connecting branches. (T) (2) A configuration of data processing devices and software connected for information interchange. (3) A group of nodes and the links interconnecting them.

**network control mode.** The mode in which a network control program can direct a communication controller to perform such activities as polling, device addressing, dialing, and answering. See also *emulation mode*.

**network control program.** A program, generated by the user from a library of IBM-supplied modules, that controls the operation of a communication controller.

**Network Control Program (NCP).** An IBM licensed program that provides communication controller support for single-domain, multiple-domain, and interconnected network capability.

**network identifier.** (1) In TCP/IP, that part of the Internet address that defines a network. The length of the network ID depends on the type of network class (A, B, or C). (2) A 1- to 8-byte customer-selected name or an 8-byte IBM-registered name that uniquely identifies a specific subnetwork.

**network name.** The symbolic identifier by which end users refer to a network accessible unit, a link, or a link station within a given subnetwork. In APPN networks, network names are also used for routing purposes. Contrast with *network address*.

**network node (NN).** Synonym for *Advanced Peer-to-Peer Networking (APPN) network node*.

**network performance analyzer (NPA).** A function of NCP that collects performance data about devices. The data is recorded by NPM.

**Network Routing Facility (NRF).** An IBM licensed program that resides in NCP. NRF provides a path for



routing messages between terminals and routes messages over this path without going through the host processor.

**network session accounting (NSA).** The NetView Performance Monitor (NPM) subsystem that receives session accounting information from the NCP for sessions that flow throughout a network.

**Network Terminal Option (NTO).** An IBM licensed program, used in conjunction with NCP, that allows certain non-SNA devices to participate in sessions with SNA application programs in the host processor. When data is sent from a non-SNA device to the host processor, NTO converts non-SNA protocol to SNA protocol; and when data is sent from the host processor to the non-SNA device, NTO converts SNA protocol to non-SNA protocol.

**NN.** Network node.

**node.** (1) In a network, a point at which one or more functional units connect channels or data circuits. (I) (2) Any device, attached to a network, that transmits and receives data. (3) An endpoint of a link or a junction common to two or more links in a network. Nodes can be processors, communication controllers, cluster controllers, or terminals. Nodes can vary in routing and other functional capabilities. (4) In VTAM, a point in a network defined by a symbolic name. See *major node* and *minor node*.

**node type.** A designation of a node according to the protocols it supports or the role it plays in a network. Node type was originally denoted numerically (as 1, 2.0, 2.1, 4, and 5) but is now characterized more specifically by protocol type (APPN network node, LEN node, subarea node, and interchange node, for example) because type 2.1 nodes and type 5 nodes support multiple protocol types and roles.

**nonswitched connection.** A connection that does not have to be established by dialing. Contrast with *switched connection*.

**nonswitched line.** A telecommunication line on which connections do not have to be established by dialing. Contrast with *switched line*.

**notification.** An unscheduled, spontaneously generated report of an event that has occurred.

**NPA.** Network performance analyzer.

**NPM.** NetView Performance Monitor.

**NPSI.** X.25 NCP Packet Switching Interface.

**NRF.** Network Routing Facility.

**NRZ-1.** Non-return-to-zero change-on-ones recording. (I) (A)

**NRZI.** Non-return-to-zero (inverted) recording. Deprecated term for *non-return-to-zero change-on-ones recording (NRZ-1)*.

**NTO.** Network Terminal Option.

**NTRI.** NCP/Token-Ring interconnection.

**NTune.** A set of programs (NTuneMON and NTuneNCP) that allow monitoring and tuning of active NCPs. See *NTuneMON* and *NTuneNCP*.

**NTuneMON.** A program that runs on NetView, and monitors NCPs that were activated, by VTAM, on the host where NTuneMON is running. See *NTune* and *NTuneNCP*.

**NTuneNCP.** A program that runs in the communications controller and, together with NTuneMON and VTAM provides interactive tuning capability of internal NCP resources. See *NTune* and *NTuneMON*.

## O

**operating system (OS).** Software that controls the execution of programs and that may provide services such as resource allocation, scheduling, input/output control, and data management. Although operating systems are predominantly software, partial hardware implementations are possible. (T)

**OS.** Operating system.

**outbound.** In communications, data that is transmitted to the network.

## P

**padding.** A technique by which a receiving component controls the rate of transmission of a sending component to prevent overrun or congestion. See *session-level padding*, *send padding*, and *virtual route (VR) padding*. See also *flow control*.

**padding window.** (1) The path information units (PIUs) that can be transmitted on a virtual route before a virtual-route padding response is received, indicating that the virtual route receiver is ready to receive more PIUs on the route. (2) The requests that can be transmitted on the normal flow in one direction on a session before a session-level padding response is received, indicating that the receiver is ready to accept the next group of requests.

**packet.** In data communication, a sequence of binary digits, including data and control signals, that is trans-

## Glossary

mitted and switched as a composite whole. The data, control signals, and, possibly, error control information are arranged in a specific format. (I)

**parallel transmission groups.** Multiple transmission groups between adjacent nodes, with each group having a distinct transmission group number.

### **partitioned emulation programming (PEP)**

**extension.** A function of a network control program that enables a communication controller to operate some telecommunication lines in network control mode while simultaneously operating others in emulation mode.

**path.** (1) In a network, any route between any two nodes. A path may include more than one branch. (T) (2) The series of transport network components (path control and data link control) that are traversed by the information exchanged between two network accessible units. See also *explicit route (ER)*, *route extension*, and *virtual route (VR)*.

**path information unit (PIU).** A message unit consisting of a transmission header (TH) alone, or a TH followed by a basic information unit (BIU) or a BIU segment. See also *transmission header*.

**PCID.** Procedure-correlation identifier.

**peer.** In network architecture, any functional unit that is in the same layer as another entity. (T)

**PEP.** Partitioned emulation programming.

**peripheral host node.** A node that provides an application program interface (API) for running application programs but does not provide SSCP functions and is not aware of the network configuration. The peripheral host node does not provide subarea node services. It has boundary function provided by its adjacent subarea. See *boundary node*, *host node*, *node*, *peripheral node*, *subarea host node*, and *subarea node*. See also *boundary function* and *node type*.

**peripheral link.** In SNA, a link between a subarea and a peripheral node. See also *route extension (REX)*.

**peripheral logical unit (LU).** In SNA, a logical unit in a peripheral node.

**peripheral LU.** Peripheral logical unit.

**peripheral node.** A node that uses local addresses for routing and therefore is not affected by changes in network addresses. A peripheral node requires boundary-function assistance from an adjacent subarea node. A peripheral node can be a type 1, 2.0, or 2.1 node connected to a subarea boundary node.

**permanent virtual circuit (PVC).** (1) In X.25 and frame-relay communications, a virtual circuit that has a logical channel permanently assigned to it at each data terminal equipment (DTE). Call-establishment protocols are not required. Contrast with *switched virtual circuit (SVC)*. (2) The logical connection between two frame-relay terminating equipment stations, either directly or through one or more frame-relay frame handlers. A PVC consists of one or more PVC segments.

**physical line.** In NCP, the physical connection between NCP and an adjacent device or local area network (LAN). A single physical line, such as token-ring or frame-relay, can support multiple logical lines. Contrast with *logical line*.

**physical unit (PU).** The component that manages and monitors the resources (such as attached links and adjacent link stations) associated with a node, as requested by an SSCP via an SSCP-PU session. An SSCP activates a session with the physical unit in order to indirectly manage, through the PU, resources of the node such as attached links. This term applies to type 2.0, type 4, and type 5 nodes only.

**PIU.** Path information unit.

**point-to-point line.** A switched or nonswitched telecommunication line that connects a single remote station to a computer. Contrast with *multipoint line*.

**polling.** (1) On a multipoint connection or a point-to-point connection, the process whereby data stations are invited, one at a time, to transmit. (I) (2) Interrogation of devices for such purposes as to avoid contention, to determine operational status, or to determine readiness to send or receive data. (A)

**port.** (1) An access point for data entry or exit. (2) A connector on a device to which cables for other devices such as display stations and printers are attached. (3) The representation of a physical connection to the link hardware. A port is sometimes referred to as an adapter; however, there can be more than one port on an adapter. There may be one or more ports controlled by a single DLC process. (4) In the Internet suite of protocols, a 16-bit number used to communicate between TCP or the User Datagram Protocol (UDP) and a higher-level protocol or application. Some protocols, such as File Transfer Protocol (FTP) and Simple Mail Transfer Protocol (SMTP), use the same well-known port number in all TCP/IP implementations.

**problem determination.** The process of determining the source of a problem; for example, a program component, machine failure, telecommunication facilities, user or contractor-installed programs or equipment, environmental failure such as a power loss, or user error.

**procedure-correlation identifier (PCID).** In SNA, a value used to correlate all requests and replies associated with a given procedure.

**PU.** Physical unit.

**PVC.** Permanent virtual circuit.

**PVC segment.** In NCP, the connection between two frame-relay subports in the same NCP or in adjacent NCPs. A PVC segment between adjacent NCPs may pass through a frame-relay network.

## Q

**queue.** (1) A list constructed and maintained so that the next data element to be retrieved is the one stored first. (T) (2) A line or list of items waiting to be processed; for example, work to be performed or messages to be displayed. (3) To arrange in or form a queue.

## R

**receive not ready (RNR).** In communications, a data link command or response that indicates a temporary condition of being unable to accept incoming frames.

**redefinable line.** A line that is in use and can be activated (defined using the USE keyword on the LINE definition statement). It can be changed to a spare line using NTuneMON with NTuneNCP.

**remote.** Pertaining to a system, program, or device that is accessed through a telecommunication line. Contrast with *local*. Synonym for *link-attached*.

**request unit (RU).** A message unit that contains control information, end-user data, or both.

**request/response unit (RU).** A generic term for a request unit or a response unit. See *request unit (RU)* and *response unit (RU)*.

**response unit (RU).** A message unit that acknowledges a request unit. It may contain prefix information received in a request unit. If positive, the response unit may contain additional information (such as session parameters in response to BIND SESSION). If negative, the response unit contains sense data defining the exception condition.

**REX.** Route extension.

**RIP.** Routing Information Protocol.

**RNR.** Receive not ready.

**route.** (1) An ordered sequence of nodes and transmission groups (TGs) that represent a path from an

origin node to a destination node traversed by the traffic exchanged between them. (2) The path that network traffic uses to get from source to destination.

**route extension (REX).** In SNA, the path control network components, including a peripheral link, that make up the portion of a path between a subarea node and a network addressable unit (NAU) in an adjacent peripheral node. See also *explicit route (ER)*, *path*, and *virtual route (VR)*.

**router.** (1) A computer that determines the path of network traffic flow. The path selection is made from several paths based on information obtained from specific protocols, algorithms that attempt to identify the shortest or best path, and other criteria such as metrics or protocol-specific destination addresses. (2) An attaching device that connects two LAN segments, which use similar or different architectures, at the reference model network layer. Contrast with *bridge* and *gateway*. (3) In OSI terminology, a function that determines a path by which an entity can be reached.

**routing.** (1) The process of determining the path to be used for transmission of a message over a network. (T) (2) The assignment of the path by which a message is to reach its destination. (3) In SNA, the forwarding of a message unit along a particular path through a network, as determined by parameters carried in the message unit, such as the destination network address in a transmission header.

**Routing Information Protocol (RIP).** In the Internet suite of protocols, an interior gateway protocol used to exchange intradomain routing information and to determine optimum routes between internet hosts. RIP determines optimum routes on the basis of route metrics, not link transmission speed.

**routing table.** A collection of routes used to direct datagram forwarding or to establish a connection. The information is passed among routers to identify network topology and destination feasibility.

**RR.** Receive ready.

**RU.** Request/response unit.

## S

**scanner.** (1) A device that examines a spatial pattern one part after another, and generates analog or digital signals corresponding to the pattern. Scanners are often used in mark sensing, pattern recognition, or character recognition. (I) (A) (2) For the 3725 communication controller, a processor dedicated to controlling a small number of telecommunication lines. It provides the connection between the line interface coupler hardware and the central control unit.

## Glossary

**SDLC.** Synchronous Data Link Control.

**segment.** (1) In the IBM Token-Ring Network, a section of cable between components or devices. A segment may consist of a single patch cable, several patch cables that are connected, or a combination of building cable and patch cables that are connected. (2) In Internet communications, the unit of transfer between TCP functions in different machines. Each segment contains control and data fields; the current byte stream position and actual data bytes are identified along with a checksum to validate received data.

**session.** (1) In network architecture, for the purpose of data communication between functional units, all the activities which take place during the establishment, maintenance, and release of the connection. (T) (2) A logical connection between two network accessible units (NAUs) that can be activated, tailored to provide various protocols, and deactivated, as requested. Each session is uniquely identified in a transmission header (TH) accompanying any transmissions exchanged during the session.

**session control (SC).** In SNA, either of the following:

- One of the components of transmission control. Session control is used to purge data flowing in a session after an unrecoverable error occurs, to resynchronize the data flow after such an error, and to perform cryptographic verification.
- A request unit (RU) category used for requests and responses exchanged between the session control components of a session and for session activation and deactivation requests and responses.

**session-level pacing.** A flow control technique that permits a receiving half-session or session connector to control the data transfer rate (the rate at which it receives request units) on the normal flow. It is used to prevent overloading a receiver with unprocessed requests when the sender can generate requests faster than the receiver can process them. See *pacing* and *virtual route pacing*.

**session limit.** (1) The maximum number of concurrently active LU-LU sessions that a particular logical unit (LU) can support. (2) In NCP, the maximum number of concurrent line-scheduling sessions on a non-SDLC, multipoint line.

**session partner.** In SNA, one of the two network accessible units (NAUs) having an active session.

**shared.** Pertaining to the availability of a resource for more than one use at the same time.

**SMMF.** SSCP monitor mode function.

**SNA.** Systems Network Architecture.

**SNA network.** The part of a user-application network that conforms to the formats and protocols of Systems Network Architecture. It enables reliable transfer of data among end users and provides protocols for controlling the resources of various network configurations. The SNA network consists of network accessible units (NAUs), boundary function, gateway function, and intermediate session routing function components; and the transport network.

**SNA network interconnection (SNI).** The connection, by gateways, of two or more independent SNA networks to allow communication between logical units in those networks. The individual SNA networks retain their independence.

**SNI.** SNA network interconnection.

**softcopy.** One or more files that can be electronically distributed, manipulated, and printed by a user. Contrast with *hardcopy*.

**spare line.** A line that is not in use and cannot be activated (defined using the USE keyword on the LINE definition statement). It can be changed to a redefinable line using NTuneMON with NTuneNCP, and then activated.

**SPE.** Small programming enhancement.

**SSCP.** System services control point.

**SSCP monitor mode function (SMMF).** A function within NCP that keeps NCP resources active when an external SSCP has not established ownership of NCP.

**SSP.** System Support Programs.

**station.** An input or output point of a system that uses telecommunication facilities; for example, one or more systems, computers, terminals, devices, and associated programs at a particular location that can send or receive data over a telecommunication line.

**subarea.** A portion of the SNA network consisting of a subarea node, attached peripheral nodes, and associated resources. Within a subarea node, all network accessible units (NAUs), links, and adjacent link stations (in attached peripheral or subarea nodes) that are addressable within the subarea share a common subarea address and have distinct element addresses.

**subarea address.** A value in the subarea field of the network address that identifies a particular subarea. See also *element address*.

**subarea host node.** A host node that provides both subarea function and an application program interface (API) for running application programs. It provides system services control point (SSCP) functions and subarea node services, and it is aware of the network

configuration. See *boundary node*, *communication management configuration host node*, *data host node*, *host node*, *node*, *peripheral node*, and *subarea node*. See also *boundary function* and *node type*.

**subarea link.** In SNA, a link that connects two subarea nodes. See *channel link* and *link*.

**subarea LU.** A logical unit that resides in a subarea node. Contrast with *peripheral LU*.

**subarea network.** Interconnected subareas, their directly attached peripheral nodes, and the transmission groups that connect them.

**subarea node (SN).** A node that uses network addresses for routing and maintains routing tables that reflect the configuration of the network. Subarea nodes can provide gateway function to connect multiple subarea networks, intermediate routing function, and boundary function support for peripheral nodes. Type 4 and type 5 nodes can be subarea nodes.

**subarea PU.** In SNA, a physical unit (PU) in a subarea node.

**subnet.** (1) In TCP/IP, a part of a network that is identified by a portion of the Internet address. (2) Synonym for *subnetwork*.

**subnetwork.** (1) Any group of nodes that have a set of common characteristics, such as the same network ID. (2) In the AIX operating system, one of a group of multiple logical network divisions of another network, such as can be created by the Transmission Control Protocol/Internet Protocol (TCP/IP) interface program. (3) Synonymous with *subnet*.

**suboperand.** In NCP, one of multiple elements in a keyword value. See also *definition statement* and *keyword*.

**support.** (1) An access point for data entry or exit over a logical connection. The relationship between the physical line and the port is analogous to the relationship between the logical connection and the support. (2) In a frame-relay network, the representation of a logical connection on a frame-relay physical line and the point where the logical connection attaches to the frame-relay frame handler (FRFH). Each support on a physical line has a unique data link connection identifier (DLCI) and can represent an FRTE, FRFH, or LMI connection. See *frame handler support (FHSP)* and *terminal equipment support*.

**support set.** In NCP, a set of frame handler supports linked by internal PVC segments. A support set consists of two primary frame handler supports and an optional substitute frame handler support for each primary.

**subsystem.** A secondary or subordinate system, usually capable of operating independently of, or asynchronously with, a controlling system. (T)

**subvector.** A subcomponent of the NMVT major vector.

**supervisor call (SVC).** A request that serves as the interface into operating system functions, such as allocating storage. The SVC protects the operating system from inappropriate user entry. All operating system requests must be handled by SVCs.

**SVC.** (1) Supervisor call. (2) Switched virtual circuit.

**switchback.** In an IBM 3745 Communication Controller with twin central control units (CCUs) in backup mode, the process by which, after fallback, buses are moved back to the central control unit (CCU) that originally operated them.

**switched connection.** (1) A mode of operating a data link in which a circuit or channel is established to switching facilities as, for example, in a public switched network. (T) (2) A connection established by dialing. Contrast with *nonswitched connection*.

**switched line.** A telecommunication line in which the connection is established by dialing. Contrast with *non-switched line*.

**switched major node.** In VTAM, a major node whose minor nodes are physical units and logical units attached by switched SDLC links.

**switched virtual circuit (SVC).** An X.25 circuit that is dynamically established when needed. The X.25 equivalent of a switched line.

**synchronous.** (1) Pertaining to two or more processes that depend upon the occurrence of specific events such as common timing signals. (T) (2) Occurring with a regular or predictable time relationship.

**Synchronous Data Link Control (SDLC).** A discipline conforming to subsets of the Advanced Data Communication Control Procedures (ADCCP) of the American National Standards Institute (ANSI) and High-level Data Link Control (HDLC) of the International Organization for Standardization, for managing synchronous, code-transparent, serial-by-bit information transfer over a link connection. Transmission exchanges may be duplex or half-duplex over switched or nonswitched links. The configuration of the link connection may be point-to-point, multipoint, or loop. (I) Contrast with *binary synchronous communication (BSC)*.

**system services control point (SSCP).** A component within a subarea network for managing the configuration, coordinating network operator and problem determination requests, and providing directory services and

## Glossary

other session services for end users of the network. Multiple SSCPs, cooperating as peers with one another, can divide the network into domains of control, with each SSCP having a hierarchical control relationship to the physical units and logical units within its own domain.

**system services control point (SSCP) domain.** The system services control point, the physical units (PUs), the logical units (LUs), the links, the link stations, and all the resources that the SSCP has the ability to control by means of activation and deactivation requests.

**System Support Programs (SSP).** An IBM licensed program, made up of a collection of utilities and small programs, that supports the operation of the NCP.

**Systems Network Architecture (SNA).** The description of the logical structure, formats, protocols, and operational sequences for transmitting information units through, and controlling the configuration and operation of, networks. The layered structure of SNA allows the ultimate origins and destinations of information, that is, the end users, to be independent of and unaffected by the specific SNA network services and facilities used for information exchange.

## T

**tailig.** A feature on a multichannel modem that allows another modem link to be attached to one of the channels. See also *fanout*, *multitailed*, and *twin-tailed*.

**TCP.** Transmission Control Protocol.

**TCP/IP.** Transmission Control Protocol/Internet Protocol.

**teletypewriter exchange service (TWX).** Teletypewriter service in which suitably arranged teletypewriter stations are provided with lines to a central office for access to other such stations throughout the U.S. and Canada. Both baudot-coded and ASCII-coded machines are used. Business machines may also be used, with certain restrictions.

**terminal equipment subport.** A subport that serves as a termination point on a virtual circuit.

**terminating equipment subport (TESP).** The endpoint of a frame-relay permanent virtual circuit (PVC); the point at which frame-relay terminating equipment has access to the PVC. A TESP provides higher-level functions with access to a frame-relay physical line. Each TESP in a single frame-relay port has a unique data link connection identifier (DLCI). Contrast with *frame handler subport*.

**TG.** Transmission group.

**TIC.** Token-ring interface coupler.

**timeout.** (1) An event that occurs at the end of a predetermined period of time that began at the occurrence of another specified event. (I) (2) A time interval allotted for certain operations to occur; for example, response to polling or addressing before system operation is interrupted and must be restarted.

**token.** (1) In a local area network, the symbol of authority passed successively from one data station to another to indicate the station temporarily in control of the transmission medium. Each data station has an opportunity to acquire and use the token to control the medium. A token is a particular message or bit pattern that signifies permission to transmit. (T) (2) In LANs, a sequence of bits passed from one device to another along the transmission medium. When the token has data appended to it, it becomes a frame.

**token ring.** (1) According to IEEE 802.5, network technology that controls media access by passing a token (special packet or frame) between media-attached stations. (2) A FDDI or IEEE 802.5 network with a ring topology that passes tokens from one attaching ring station (node) to another. (3) See also *local area network (LAN)*.

**token-ring interface coupler (TIC).** An adapter that can connect a 3720, 3725, or 3745 Communication Controller to an IBM Token-Ring Network.

**token-ring network.** (1) A ring network that allows unidirectional data transmission between data stations, by a token passing procedure, such that the transmitted data return to the transmitting station. (T) (2) A network that uses a ring topology, in which tokens are passed in a circuit from node to node. A node that is ready to send can capture the token and insert data for transmission.

**Transmission Control Protocol (TCP).** A communications protocol used in Internet and in any network that follows the U.S. Department of Defense standards for internetwork protocol. TCP provides a reliable host-to-host protocol between hosts in packet-switched communications networks and in interconnected systems of such networks. It assumes that the Internet protocol is the underlying protocol.

**Transmission Control Protocol/Internet Protocol (TCP/IP).** A set of communications protocols that support peer-to-peer connectivity functions for both local and wide area networks.

**transmission group (TG).** (1) A connection between adjacent nodes that is identified by a transmission group number. See also *parallel transmission groups*. (2) In a subarea network, a single link or a group of links between adjacent nodes. When a transmission

group consists of a group of links, the links are viewed as a single logical link, and the transmission group is called a *multilink transmission group (MLTG)*. A *mixed-media multilink transmission group (MMMLTG)* is one that contains links of different medium types (for example, token-ring, switched SDLC, nonswitched SDLC, and frame-relay links). (3) In an APPN network, a single link between adjacent nodes.

**transmission header (TH)**. Control information, optionally followed by a basic information unit (BIU) or a BIU segment, that is created and used by path control to route message units and to control their flow within the network. See also *path information unit*.

**transmission priority**. A rank assigned to a message unit that determines its precedence for being selected by the path control component in each node along a route for forwarding to the next node in the route.

**transmission subsystem (TSS)**. A line adapter that attaches to the IBM 3745 Communication Controller.

**TSS**. Transmission subsystem.

**twin-tailed**. In NCP, pertaining to the attachment of a communication controller to two host processors. See also *fanout*, *multitailed*, and *tailing*.

**TWX**. Teletypewriter exchange service.

**type 2.1 node**. A node that can be an APPN network node, an APPN end node, or a LEN node. It can also attach as a peripheral node to a subarea boundary node in the same way as a type 2.0 node.

## U

**User Datagram Protocol (UDP)**. In the Internet suite of protocols, a protocol that provides unreliable, connectionless datagram service. It enables an application program on one machine or process to send a datagram to an application program on another machine or process. UDP uses the Internet Protocol (IP) to deliver datagrams.

## V

**V.25**. In data communications, a specification of the CCITT that defines the automatic answering equipment and parallel automatic calling equipment on the General Switched Telephone Network, including procedures for disabling of echo controlled devices for both manually and automatically established calls.

**V.25 bis**. A procedure defined by CCITT that allows call establishment and data transfer to take place over the same link. The support eliminates the need for two

physical lines or ports when automatic call units (ACUs) are employed in a switched connection.

**virtual machine (VM)**. In VM, a functional equivalent of a computing system. On the 370 Feature of VM, a virtual machine operates in System/370 mode. On the ESA Feature of VM, a virtual machine operates in System/370, 370-XA, ESA/370, or ESA/390 mode. Each virtual machine is controlled by an operating system. VM controls the concurrent execution of multiple virtual machines on an actual processor complex.

**Virtual Machine/Enterprise Systems Architecture (VM/ESA)**. An IBM licensed program that manages the resources of a single computer so that multiple computing systems appear to exist. Each virtual machine is the functional equivalent of a *real* machine.

**virtual route (VR)**. In SNA, either a) a logical connection between two subarea nodes that is physically realized as a particular explicit route or b) a logical connection that is contained wholly within a subarea node for intranode sessions. A virtual route between distinct subarea nodes imposes a transmission priority on the underlying explicit route, provides flow control through virtual route pacing, and provides data integrity through sequence numbering of path information units (PIUs). See also *explicit route (ER)*, *path*, and *route extension (REX)*.

**virtual route (VR) pacing**. In SNA, a flow control technique used by the virtual route control component of path control at each end of a virtual route to control the rate at which path information units (PIUs) flow over the virtual route. VR pacing can be adjusted according to traffic congestion in any of the nodes along the route. See also *pacing* and *session-level pacing*.

**Virtual Storage Extended (VSE)**. An IBM licensed program whose full name is the Virtual Storage Extended/Advanced Function. It is a software operating system controlling the execution of programs.

**Virtual Telecommunications Access Method (VTAM)**. An IBM licensed program that controls communication and the flow of data in an SNA network. It provides single-domain, multiple-domain, and interconnected network capability.

**VM**. Virtual machine.

**VM/ESA**. Virtual Machine/Enterprise Systems Architecture.

**VM/SP**. Virtual Machine/System Product.

**VM/370 control program (CP)**. The component of VM/370 that manages the resources of a single computer with the result that multiple computing systems appear to exist. Each virtual machine is the functional equivalent of an IBM System/370 computing system.

## Glossary

**VR.** Virtual route.

**VSE.** Virtual Storage Extended. Synonymous with *VSE/Advanced Functions*.

**VSE/Advanced Functions.** The basic operating system support needed for a VSE-controlled installation. Synonym for *VSE*.

**VSE/ESA.** Virtual Storage Extended/Enterprise Systems Architecture.

**VSE/SP.** Virtual Storage Extended/System Package.

**VTAM.** Virtual Telecommunications Access Method. Synonymous with *ACF/VTAM*.

## W

**WAN.** Wide area network.

**wide area network (WAN).** (1) A network that provides communication services to a geographic area larger than that served by a local area network or a metropolitan area network, and that may use or provide public communication facilities. (T) (2) A data communications network designed to serve an area of hundreds or thousands of miles; for example, public and private packet-switching networks, and national telephone networks. Contrast with *local area network (LAN)* and *metropolitan area network (MAN)*.

**window size.** The specified number of frames of information that can be sent before receiving an acknowledgment response.

## X

**X.21.** An International Telegraph and Telephone Consultative Committee (CCITT) recommendation for a general-purpose interface between data terminal equipment and data circuit-terminating equipment for synchronous operations on a public data network.

**X.25.** An International Telegraph and Telephone Consultative Committee (CCITT) recommendation for the interface between data terminal equipment and packet-switched data networks. See also *packet switching*.

**X.25 NCP Packet Switching Interface (NPSI).** An IBM licensed program that allows SNA users to communicate over packet switching data networks that have interfaces complying with CCITT Recommendation X.25. It allows SNA programs to communicate with SNA or non-SNA equipment over such networks.

**XA.** Extended architecture.

**XID.** Exchange identification.

**XRF.** Extended recovery facility.

## 3

**37CS.** Deprecated term for *3746 Model 900 connectivity subsystem*.



---

# Bibliography

---

## NCP, SSP, and EP Library

---

The following paragraphs briefly describe the library for NCP, SSP, and EP. Other publications related to NTuneMON, VTAM, NPSI, NetView, NTO, and NRF are listed without the accompanying descriptions.

*NCP and EP Reference* (LY43-0029)

This book describes various aspects of the internal processing of NCP and EP (PEP or EP Standalone). It provides information for customization and diagnosis.

*NCP and EP Reference Summary and Data Areas* (LY43-0030)

This two-volume book provides quick access to often-used diagnostic and debugging information about NCP and EP (PEP or EP Standalone).

*NCP and SSP Customization Guide* (LY43-0031)

This book helps users who are familiar with the internal logic of NCP and SSP to modify these products. It describes how to change NCP and SSP to support stations that IBM-supplied programs do not support.

*NCP and SSP Customization Reference* (LY43-0032)

This book supplements the *NCP and SSP Customization Guide*. It describes the resources and macroinstructions provided by IBM for customizing NCP and SSP.

*NCP, SSP, and EP Diagnosis Guide* (LY43-0033)

This book helps users isolate and define problems in NCP and EP (PEP or EP Standalone) using SSP. The primary purpose of the book is to help the user interact with the IBM Support Center to resolve a problem. In addition, it explains some of the diagnostic aids and service aids available with SSP.

*NCP, SSP, and EP Trace Analysis Handbook* (LY43-0037)

This book describes how to use the trace analysis program and how to read trace analysis program output.

*NCP, SSP, and EP Generation and Loading Guide* (SC31-6221)

This book provides detailed explanations of how to generate and load NCP and EP (PEP or EP Standalone)

using SSP. It contains information for generating and loading under MVS, VM, and VSE.

*NCP, SSP, and EP Messages and Codes* (SC31-6222)

This book is a reference book of abend codes issued by NCP and EP (PEP or EP Standalone), and messages issued by the System Support Programs associated with NCP. This information is also available through the online message facility, an IBM OS/2 application available on diskette.

*NCP, SSP, and EP Resource Definition Guide* (SC31-6223)

This book helps users understand how to define NCP and EP (PEP or EP Standalone), using SSP. It describes functions and resources and lists the definition statements and keywords that define those functions and resources.

*NCP, SSP, and EP Resource Definition Reference* (SC31-6224)

This book helps users code definition statements and keywords to define NCP and EP (PEP or EP Standalone), using SSP. It also provides a quick reference of definition statement coding order and keyword syntax.

*NCP V7R8, SSP V4R8, and EP R14 Library Directory* (SC30-4025)

This book helps users locate information on a variety of NCP, SSP, and EP tasks. It also provides a high-level understanding of NCP, SSP, and EP and summarizes the changes to these products and to the library for NCP V7R8, SSP V4R8, and EP R14.

*NCP V7R8 Migration Guide* (SC30-4024)

This book helps users migrate an NCP generation definition from an earlier release to NCP V7R8. It also describes how to add new functions for NCP V7R8.

*NCP Version 7 and X.25 NPSI Version 3 Planning and Installation* (SC30-3470)

This book helps users plan and install support for X.25 lines in the 3745 or 3746 Model 900.

*NCP Version 7 and X.25 NPSI Version 3 Diagnosis, Customization, and Tuning* (LY30-5610)

This book helps users diagnose, customize, and tune X.25 lines in the 3745 or 3746 Model 900.

---

### Other Networking Products' Libraries

The following publications provide cross-product information for NTuneMON, SNA Services (VTAM), NPSI, NetView, and NPM. For detailed information about these products, refer to the library for each.

### Networking Library

*Planning for NetView, NCP, and VTAM* (SC31-8063)

*Planning for Integrated Networks* (SC31-8062)

*ACF/NCP, ACF/SSP, EP, NTuneMON, and NPSI Softcopy Collection Kit* (CD-ROM, LK2T-0414)

### NTuneMON Library

*NTuneMON User's Guide* (SC31-6266)

*NTuneNCP Feature Reference* (LY43-0039)

**Related Publication:** *NCP Tuning with NTune*, GG24-2520

### SNA Services Library (formerly VTAM Library)

*OS/390 SecureWay Communications Server: SNA Planning and Migration Guide* (SC31-8622)

*OS/390 SecureWay Communications Server: SNA Network Implementation* (SC31-8563)

*OS/390 SecureWay Communications Server: SNA Resource Definition Reference* (SC31-8565)

*OS/390 SecureWay Communications Server: SNA Operation* (SC31-8567)

*OS/390 SecureWay Communications Server: Quick Reference* (SX75-0121)

*OS/390 SecureWay Communications Server: SNA Diagnosis Vol 1* (LY43-0079)

*OS/390 SecureWay Communications Server: SNA Diagnosis Vol 2* (LY43-0080)

*OS/390 SecureWay Communications Server: SNA Messages* (SC31-8569)

*OS/390 SecureWay Communications Server: IP and SNA Codes* (SC31-8571)

*OS/390 SecureWay Communications Server: Data Areas Vol 1* (LY43-0111)

*OS/390 SecureWay Communications Server: Data Areas Vol 2* (LY43-0112)

*OS/390 SecureWay Communications Server: SNA Customization* (LY43-0110)

*OS/390 SecureWay Communications Server: Anynet Sockets over SNA* (SC31-8577)

### NPSI Library

*X.25 NPSI Version 3 General Information* (GC30-3469)

*NCP Version 7 and X.25 NPSI Version 3 Planning and Installation* (SC30-3470)

*X.25 NPSI Version 3 Host Programming* (SC30-3502)

*NCP Version 7 and X.25 NPSI Version 3 Diagnosis, Customization, and Tuning* (LY30-5610)

*X.25 NPSI Version 3 Release 9 Data Areas* (LY30-5627)

### NetView Library

*TME 10 NetView for OS/390 NGMF User's Guide* (SC31-8234)

*TME 10 NetView for OS/390 User's Guide* (SC31-8241)

*TME 10 NetView for OS/390 Administration and Security Reference* (SC31-8222)

*TME 10 NetView for OS/390 Application Programmer's Guide* (SC31-8223)

*TME 10 NetView for OS/390 Automation Guide* (SC31-8225)

*TME 10 NetView for OS/390 Bridge Implementation* (SC31-8238)

*TME 10 NetView for OS/390 Command Reference* (SC31-8227)

*TME 10 NetView for OS/390 Customization Guide* (SC31-8228)

*TME 10 NetView for OS/390 Customization: Using Assembler* (SC31-8229)

*TME 10 NetView for OS/390 Customization: Using PL/I and C* (SC31-8230)

*TME 10 NetView for OS/390 Customization: Using REXX and the NetView Command List Language* (SC31-8231)

*TME 10 NetView for OS/390 Planning Guide* (GC31-8226)

*TME 10 NetView for OS/390 Installation and Administration Guide* (SC31-8236)

*TME 10 NetView for OS/390 Messages* (SC31-8237)

*TME 10 NetView for OS/390 Diagnosis Guide* (LY43-0108)

*TME 10 NetView for OS/390 Resource Object Data Manager and GMFHS Programmer's Guide* (SC31-8233)

*TME 10 NetView for OS/390 Tuning Guide* (SC31-8240)

*TME 10 NetView for OS/390 User's Guide* (SC31-8241)

*TME 10 NetView for OS/390 NGMF User's Guide* (SC31-8234)

*TME 10 NetView for OS/390 SNA Topology Manager and APPN Accounting Manager Implementation Guide* (SC31-8239)

*TME 10 NetView for OS/390 Data Model Reference* (SC31-8232)

*TME 10 NetView for OS/390 APPN Topology and Accounting Agent Guide* (SC31-8224)

## NPM Library

*NPM Concepts and Planning* (GH19-6961-03)

*NPM Installation and Customization* (SH19-6964-03)

*NPM Desk/2 User's Guide* (SH19-6963-02)

*NPM User's Guide* (SH19-6962-03)

*NPM Messages and Codes* (SH19-6966-03)

*NPM Graphic Subsystem* (SH19-6967-00)

*NPM Reference* (SH19-6965-03)

*NPM Diagnosis* (LY19-6381-03)

## NTO Library

*Network Terminal Option: Planning, Migration, and Resource Definition Guide* (SC30-3347)

*Network Terminal Option: Diagnosis* (LY30-3194)

## NRF Library

*NRF Planning* (SC27-0593)

*NRF Migration, Resource Definition and Customization* (SC31-6203)

*NRF Resource Definition and Customization* (SC30-3407)

*NRF Diagnosis* (LY30-5597)

---

## Related Publications

The following publications, though not directly related to this book, may be helpful in understanding your network.

*Internet Standard Subnetting Procedure (TCP/IP RFC 950)*

*Network Design and Analysis General Information* (GC30-3495)

*Remote Loading/Activation Guide* (SA33-0161)

*3745 and 3746 Service Processor Installation and Maintenance* (SY33-2115)

*TPF Concepts and Structures Manual* (GH20-7488)

## IBM 3745 Communication Controller Publications

The following list shows selected publications for the IBM 3745 Communication Controller.

*IBM 3745 Communication Controller Introduction* (GA33-0138 for the 3745-130, 3745-150, and 3745-170)

*IBM 3745 Communication Controller Introduction* (GA33-0092 for the 3745-210, 3745-310, 3745-410, and 3745-610)

*IBM 3745 Communication Controller All Models and 3746 Model 900: Connection and Integration Guide* (SA33-0129)

*3745 Communications Controller Models 130, 150, 160, and 170: Connection and Integration Guide* (SA33-0141)

*IBM 3745 Communication Controller (All Models): Principles of Operation* (SA33-0102)

*IBM 3745 Advanced Operations Guide* (SA33-0097)

## Bibliography

*3745 Communication Controller Model A, 3746 Nways Multiprotocol Controller Models 900 and 950: Planning Guide* (GA33-0457)

*IBM 3745 Problem Determination Guide* (SA33-0096)

### IBM 3746 Model 900 and Model 950 Publications

*IBM 3745 Communication Controller Model A, IBM 3746 Expansion Unit Model 900, IBM 3746 Nways Multinetwork Controller Model 950 Overview* (GA33-0180)

*IBM 3746 Nways Multinetwork Controller Model 950 User's Guide* (SA33-0356)

### MVS/ESA Publications

*MVS/ESA Device Validation Support* (GC28-1617)

*MVS/ESA Hardware Configuration Definition: User's Guide* (GC33-6457)

### SNA Publications

The following publications contain information on SNA.

*Systems Network Architecture Technical Overview* (GC30-3073)

*Systems Network Architecture Management Services Reference* (SC30-3346)

*Systems Network Architecture Formats* (GA27-3136)

### TCAM Publications

*TCAM Version 2 Base Installation Guide* (SC30-3132)

*TCAM Version 2 Networking Installation Guide* (SC30-3153)

### TCP/IP Publications

The following publications contain information on Transmission Control Protocol/Internet Protocol (TCP/IP).

**General:** The following list shows selected publications with general information on TCP/IP.

*Internetworking with TCP/IP Volume I: Principles, Protocols, and Architecture*, Douglas E. Comer, Prentice Hall, Englewood Cliffs, New Jersey, 1991 (SC31-6144)

*Internetworking with TCP/IP Volume II: Implementation and Internals*, Douglas E. Comer, Prentice Hall, Englewood Cliffs, New Jersey, 1991 (SC31-6145)

*TCP/IP Introduction* (GC31-6080)

*IBM TCP/IP Tutorial and Technical Overview* (GG24-3376)

**OS/390 Publications:** The following list shows selected publications on IP Services for the OS/390 SecureWay Communications Server.

*OS/390 SecureWay Communications Server: IP Planning and Migration Guide* (SC31-8512)

*OS/390 SecureWay Communications Server: IP User's Guide* (GC31-8514)

**MVS Publications:** The following list shows selected publications on TCP/IP for MVS.

*IBM TCP/IP for MVS: Planning and Migration Guide* (SC31-7189)

*IBM TCP/IP for MVS: User's Guide* (SC31-7136)

**VM Publications:** The following list shows selected publications on TCP/IP for VM.

*IBM TCP/IP Version 2 Release 4 for VM: Planning and Customization* (SC31-6082)

*IBM TCP/IP Version 2 Release 4 for VM: User's Guide* (SC31-6081)

**IBM OS/2 Publications:** The following list shows selected publications on TCP/IP for IBM OS/2.

*IBM TCP/IP Version 2.0 for OS/2: Installation and Administration* (SC31-6075)

*IBM TCP/IP Version 2.0 for OS/2: User's Guide* (SC31-6076)

**DOS Publications:** The following list shows selected publications on TCP/IP for DOS.

*IBM TCP/IP Version 2.1.1 for DOS: Installation and Administration* (SC31-7047)

*IBM TCP/IP Version 2.1.1 for DOS: User's Guide* (SC31-7045)

# Index

## Special Characters

:CRITICAL tag in migration aid output 1-12  
 :MIGEND tag in migration aid output 1-10  
 :MIGINFO tag in migration aid output 1-10  
 ??? string in migration aid output 1-15

## Numerics

16-megabit token-ring speed  
   V4R3.1 13-30  
   V5R4 12-30  
 3174 group poll  
   V4R3.1 13-26  
   V5R4 12-26  
 3745 Communication Controller 1-6, 2-1  
 3745 line interface coupler 4 requirement for SPEED  
   V4R3.1 13-25  
   V5R4 12-25  
 3745 publications X-23  
 3745-1xx Communication Controllers 2-1  
 3746 Model 900 connectivity subsystem (CSS)  
   frame relay 7-3, 8-3, 9-5, 9-15, 10-7, 10-21, 11-7,  
     11-24, 12-51, 13-51  
   SDLC lines  
     V4R3.1 13-27  
     V5R4 12-27  
     V6R2 11-21  
   token-ring resources  
     V4R3.1 13-31  
     V5R4 12-32  
   usage tiers 2-3  
 3746 publications X-24  
 4941 modems  
   V4R3.1 13-26  
   V5R4 12-26  
 786x modems extended LPDA2 capability  
   V4R3.1 13-41  
   V5R4 12-41

## A

acknowledgment timer enhancement for NTRI  
   V4R3.1 13-28  
   V5R4 12-27  
 adaptive session pacing enhancement  
   V4R3.1 13-43  
   V5R4 12-43  
 additions by migration aid  
   general 1-4  
   in comments 1-11  
   in NEWDEFN file 1-14  
   list of B-14

additions by migration aid (*continued*)  
   summary table B-1  
 ADDRCONV migration aid parameter 1-7  
 addressing, channel, by physical position  
   V4R3.1 13-16  
   V5R4 12-16  
 Advanced Peer-to-Peer Networking (APPN) support  
   V4R3.1 13-20  
   V5R4 12-20  
 ALIGN2 JCL parameter, warning 2-2  
 auto-speed detection for teletypewriter exchange  
 service (TWX)  
   general  
     V4R3.1 13-40  
     V5R4 12-40  
 automatic line generation (autoline)  
   V4R3.1 13-18  
   V5R4 12-18  
 automatic resource copying enhancement (autocopy)  
   V4R3.1 13-17  
   V5R4 12-17

## B

BALANCE keyword 6-4  
 BCCA (buffer-chaining channel adapter) 2-3  
 bibliography X-21  
 blocked virtual route alerts  
   V4R3.1 13-35  
   V5R4 12-35  
 buffer-chaining (type 7) channel adapter 2-3  
 BUILD 6-3

## C

casual connection  
   V4R3.1 13-34  
   V5R4 12-34  
 CD-ROM documentation xiv  
 changes by migration aid  
   general 1-3  
   in comments 1-12  
   in NEWDEFN file 1-14  
   list of B-9  
   summary table B-1  
 channel adapter addresses, preserved by migration  
 aid 1-7  
 channel adapter IOH trace  
   V4R3.1 13-41  
   V5R4 12-41  
 channel adapter, type 7 (buffer-chaining) 2-3

## Index

- channel addressing by physical position
    - V4R3.1 13-16
    - V5R4 12-16
  - channel links
    - defining, general
      - V4R3.1 13-21
      - V5R4 12-21
    - Enterprise Systems Connection (ESCON)
      - V4R3.1 13-24
      - V5R4 12-24
  - channel-link definitions, moved by migration aid B-13
  - CHANNELS migration aid parameter 1-7
  - comment block sample, NEWDEFN file 1-10
  - comments, migration aid, in NEWDEFN file
    - removing 1-15, 1-16
    - statement comment block 1-11
    - summary comment block 1-10
  - communication controller model for migration aid 1-2, 1-6
  - communication controllers
    - enhanced loading and activation of remote controllers
      - V4R3.1 13-38
      - V5R4 12-38
  - IBM 3745 2-1
  - IBM 3745 line interface coupler 4 requirement for SPEED
    - V4R3.1 13-25
    - V5R4 12-25
  - IBM 3745-1xx 2-1
  - storage requirements, changes to
    - V4R3.1 13-4
    - V5R4 12-4
    - V6R2 11-2
    - V6R3 10-2
    - V7R1 9-2
    - V7R3 8-2
    - V7R4 7-2
  - connectivity subsystem
    - See CSS
  - control blocks, dynamically created
    - V4R3.1 13-18
    - V5R4 12-18
    - V6R2 11-20
    - V6R3 10-18
    - V7R1 9-3
    - V7R3 8-2
    - V7R4 7-2
    - V7R5 6-2
    - V7R6 5-2
    - V7R7 4-2
  - controller storage requirements for V7R8 4-2, 5-2, 6-2
  - counter thresholds for NTRI lines
    - V4R3.1 13-31
    - V5R4 12-31
  - CRATEDLY keyword 6-4
  - CRITICAL tag in migration aid output 1-12
  - CSS 3746 Model 900
    - frame relay 7-3, 8-3, 9-5, 9-15, 10-7, 10-21, 11-7, 11-24, 12-51, 13-51
  - SDLC lines
    - V4R3.1 13-27
    - V5R4 12-27
    - V6R2 11-21
  - token-ring resources
    - V4R3.1 13-31
    - V5R4 12-32
  - usage tiers 2-3
- ## D
- defaults, changed
    - V4R3.1 13-3
    - V5R4 12-3
    - V6R2 11-2
    - V6R3 10-2
    - V7R1 9-2
    - V7R3 8-1
    - V7R4 7-1
    - V7R5 6-1
    - V7R6 5-1
    - V7R7 4-1
  - definition statement, modified by migration aid
    - added 1-4, B-14
    - changed 1-3, B-9
    - deleted 1-3, 1-14, B-6
    - example 1-14
    - moved 1-4, B-13
    - summary table B-1
  - delayed logical link activation, NTRI
    - V4R3.1 13-31
    - V5R4 12-31
  - deleted keywords
    - V4R3.1 13-3
    - V5R4 12-3
    - V6R2 11-2
    - V6R3 10-2
    - V7R1 9-2
    - V7R3 8-2
    - V7R4 7-2
    - V7R5 6-1
    - V7R6 5-1
    - V7R7 4-1
  - deletions by migration aid
    - general 1-3
    - in comments 1-12
    - in NEWDEFN file 1-14
    - list of B-6
    - summary table B-1
  - DPU migration aid parameter 1-7

DSCRDDLY keyword 6-4  
dynamic definition of independent logical units  
  V4R3.1 13-20  
  V5R4 12-20  
dynamic internet routing  
  V6R2 11-21  
  V6R3 10-18  
dynamic network identification  
  V4R3.1 13-39  
  V5R4 12-39  
dynamic path update  
  migration aid parameters 1-7  
  V4R3.1 13-33  
  V5R4 12-33  
dynamically created control blocks  
  V4R3.1 13-18  
  V5R4 12-18  
  V6R2 11-20  
  V6R3 10-18  
  V7R1 9-3  
  V7R3 8-2  
  V7R4 7-2  
  V7R5 6-2  
  V7R6 5-2  
  V7R7 4-2  
DYNWIND keyword 6-4, 6-5

**E**

Emulation Program (EP)  
  migration aid support for 1-2  
Emulation Program (EP) sense codes, selection of  
  V4R3.1 13-40  
  V5R4 12-40  
enhanced loading and activation for remote controllers  
  V4R3.1 13-38  
  V5R4 12-38  
Enterprise Systems Connection (ESCON) support  
  V4R3.1 13-24  
  V5R4 12-24  
EP (Emulation Program)  
  migration aid support for 1-2  
Ethernet-type LANs  
  internet routing  
    V4R3.1 13-45  
    V5R4 12-45  
examples, migration aid  
  changed definition statement 1-14  
  comments 1-11, 1-13  
  input generation definition C-1  
  invocation 1-8  
  output NEWDEFN file C-5  
EXEC, VM generation, for invoking migration aid 1-8  
explicit routes  
  increased explicit route capability  
    V4R3.1 13-23  
    V5R4 12-23

explicit routes (*continued*)  
  variable explicit route limits  
    V4R3.1 13-17  
    V5R4 12-17  
extended LPDA2 capability, IBM 786x modems  
  V4R3.1 13-41  
  V5R4 12-41  
extended recovery facility  
  V4R3.1 13-42  
  V5R4 12-42  
extended subarea addressing  
  V4R3.1 13-23  
  V5R4 12-23

**F**

FASTRUN generation for migration aid 1-5, 1-8, 1-15  
frame relay  
  internet protocol over frame relay  
    V7R1 9-4, 10-7, 11-7  
  local management interface (LMI) protocol  
    V4R3.1 13-49  
    V5R4 12-49  
  over token ring  
    V7R1 9-4, 10-6, 11-6  
  peripheral links  
    V4R3.1 13-50  
    V5R4 12-50  
    V6R2 11-24  
    V6R3 10-20  
  subarea links  
    V4R3.1 13-49  
    V5R4 12-49  
  switching  
    V4R3.1 13-50  
    V5R4 12-50  
FRRATES keyword 6-4  
FRSPRI keyword 6-4, 6-5  
functions added by migration aid 1-4

**G**

gateway session accounting  
  V4R3.1 13-39  
  V5R4 12-39  
gateway session pacing override  
  V4R3.1 13-40  
  V5R4 12-40  
general updates  
  V4R3.1 13-4  
  V5R4 12-4  
  V6R2 11-12  
  V6R3 10-10  
  V7R1 9-8, 9-12  
  V7R3 8-5, 8-9  
  V7R4 7-4, 7-7

## Index

general updates (*continued*)

- V7R5 6-5
- V7R6 5-3, 5-4
- V7R7 4-3
- V7R8 4-3

general updates to keywords 6-3

generation definition, migration aid

- added function 1-4
- additions 1-4, B-14
- changes 1-3, B-9
- comments 1-10
- deletions 1-3, B-6
- examples C-1, C-5
- input 1-1, 1-6
- moves 1-4, B-13
- output 1-5, 1-10

generation listing, migration aid 1-5, 1-9

group poll, IBM 3174

- V4R3.1 13-26
- V5R4 12-26

## H

hardcopy library, NCP, SSP, and EP xiii

HLOQSTOP keyword 6-4

HONE Configurator

- hardware configuration output report 1-7
- installation sheets 1-7

host operating system, migrating to different 2-1

hypertext links xii

## I

IBM 3174 group poll

- V4R3.1 13-26
- V5R4 12-26

IBM 3745 Communication Controller 1-6, 2-1

IBM 3745 line interface coupler 4 requirement for  
SPEED

- V4R3.1 13-25
- V5R4 12-25

IBM 3745-1xx Communication Controllers 2-1

IBM 4941 modems

- V4R3.1 13-26
- V5R4 12-26

IBM 786x modems extended LPDA2 capability

- V4R3.1 13-41
- V5R4 12-41

increased explicit route capability

- V4R3.1 13-23
- V5R4 12-23

independent logical units, dynamic definition of

- V4R3.1 13-20
- V5R4 12-20

inline modifications 1-10, 1-14

input, migration aid

- example C-1
- generation definition 1-1, 1-6
- migration aid parameters 1-6
- NEWDEFN file 1-15

internet routing

dynamic

- V6R2 11-21
- V6R3 10-18

general

- V4R3.1 13-47
- V5R4 12-47

over Ethernet-type LANs

- V4R3.1 13-45
- V5R4 12-45

over NTRI-attached token rings

- V4R3.1 13-46
- V5R4 12-46

- V6R2 11-23
- V6R3 10-20

over SNA networks

- V4R3.1 13-44
- V5R4 12-44

INTERFACE keyword 6-3

invoking the migration aid, samples 1-8

IOH trace, channel adapter

- V4R3.1 13-41
- V5R4 12-41

IPOWNER 6-3

IPROUTE 6-3

ISDNCALL keyword 6-4

ISDNRPN keyword 6-4

ISDNRSA keyword 6-4

## J

job control language (JCL) for invoking migration  
aid 1-8

## K

keywords, modified by migration aid

- added 1-4, B-14
- changed 1-3, B-9
- deleted 1-3, 1-14, B-6
- moved 1-4, B-13
- summary table B-1

## L

library, NCP, SSP, and EP

- hardcopy library xiii

licensing agreement vii

LINE 6-4

link problem determination aid (LPDA)

- general
- V4R3.1 13-41



- link problem determination aid (LPDA) (*continued*)
    - general (*continued*)
      - V5R4 12-41
    - secondary-initiated LPDA2 tests
      - V4R3.1 13-41
  - link session priority
    - V4R3.1 13-43
    - V5R4 12-43
  - link station priority, NTRI
    - V4R3.1 13-43
    - V5R4 12-43
  - links, hypertext xii
  - LMI (local management interface) protocol, frame relay
    - V4R3.1 13-49
    - V5R4 12-49
  - LMI keyword 6-5
  - load module, increase in maximum size
    - V4R3.1 13-40
    - V5R4 12-40
  - local management interface (LMI) protocol, frame relay
    - V4R3.1 13-49
    - V5R4 12-49
  - logical line timer enhancement
    - V4R3.1 13-19
    - V5R4 12-19
    - V6R2 11-20
    - V6R3 10-18
  - logical lines, token ring
    - peripheral
      - V4R3.1 13-30
      - V5R4 12-30
    - subarea
      - V4R3.1 13-28
      - V5R4 12-28
  - logical unit resource pool definition enhancement
    - V4R3.1 13-16
    - V5R4 12-16
  - LPDA (link problem determination aid)
    - general
      - V4R3.1 13-41
      - V5R4 12-41
    - secondary-initiated LPDA2 tests
      - V4R3.1 13-41
- M**
- MAXDLCI keyword 6-4
  - maximum load module size increase
    - V4R3.1 13-40
    - V5R4 12-40
  - messages, migration aid 1-9
  - MIGA tag 1-14
  - MIGEND tag in migration aid output 1-10
  - MIGINFO tag in migration aid output 1-10
  - Migrating from NCP Version 7 Release 5 6-1
  - Migrating from NCP Version 7 Release 6 5-1
  - Migrating from NCP Version 7 Release 7 4-1
  - migration aid function
    - comments in NEWDEFN file
      - removing 1-15, 1-16
      - statement comment block 1-11
      - summary comment block 1-10
    - description 1-1
    - examples
      - changed definition statement 1-14
      - comments 1-11, 1-13
      - input generation definition C-1
      - invocation 1-8
      - output NEWDEFN file C-5
    - generation listing 1-5, 1-9
    - how to use 1-5
    - input
      - example C-1
      - generation definition 1-1, 1-6
      - migration aid parameters 1-6
      - NEWDEFN file 1-15
    - invoking, sample of code 1-8
    - messages 1-9
    - migrating from
      - V4R3.1 13-15
      - V5R4 12-15
      - V6R2 11-20
      - V6R3 10-17
      - V7R1 9-15
      - V7R3 8-11
      - V7R4 7-9
      - V7R5 6-7
      - V7R6 5-5
      - V7R7 4-4
    - modifications
      - added function 1-4
      - additions 1-4, B-14
      - changes 1-3, B-9
      - deletions 1-3, B-6
      - documented 1-4
      - inline modifications to NEWDEFN file 1-14
      - moves 1-4, B-13
      - summary table B-1
    - output
      - example C-5
      - generation listing 1-5, 1-9
      - NEWDEFN file 1-5, 1-10, C-5
      - object module 1-5, 1-8, 1-15
    - parameters
      - ADDRCONV 1-7
      - CHANNELS 1-7
      - coding 1-8
      - DPU 1-7
      - NERLIM 1-7
      - removing 1-15
      - SAVEADDR 1-7
      - TMODEL 1-6

## Index

- migration aid function (*continued*)
  - parameters (*continued*)
    - TOCONV 1-8
    - TUSGTIER 1-6
    - TVERSION 1-6
  - sample C-1
  - support for
    - EP 1-2
    - NCP 1-2
    - NCP and related products, table 1-2
    - NPSI 1-3
    - NRF 1-3
    - NTO 1-3
    - PEP 1-2
  - user-written generation applications 1-3
  - when to use 1-2
- migration sample C-1
- mixed-media multilink transmission groups (MMMLTGs)
  - V4R3.1 13-35
  - V5R4 12-35
- model, communication controller for migration aid 1-2, 1-6
- modems
  - 4941
    - V4R3.1 13-26
    - V5R4 12-26
  - 786x extended LPDA2 capability
    - V4R3.1 13-41
    - V5R4 12-41
  - multiple local modem support
    - V4R3.1 13-26
    - V5R4 12-26
- modification summary table, migration aid B-1
- modifications by migration aid
  - added function 1-4
  - additions 1-4, B-14
  - changes 1-3, B-9
  - deletions 1-3, B-6
  - documented 1-4
  - general B-1
  - inline modifications to NEWDEFN file 1-10, 1-14
  - moves 1-4, B-13
  - summary table B-1
- modifying NEWDEFN file 1-15
- moves by migration aid
  - general 1-4
  - in comments 1-14
  - in NEWDEFN file 1-14
  - list of B-13
  - summary table B-1
- multilink transmission group processing enhancements
  - line selection order
    - V4R3.1 13-35
    - V5R4 12-35
  - mixed-media multilink transmission groups (MMMLTGs)
    - V4R3.1 13-35

- multilink transmission group processing enhancements (*continued*)
  - mixed-media multilink transmission groups (MMMLTGs) (*continued*)
    - V5R4 12-35
- multiple local modem support
  - V4R3.1 13-26
  - V5R4 12-26
- multipoint subarea support
  - multipoint subarea links for primary stations
    - V4R3.1 13-36
    - V5R4 12-36
  - multipoint subarea links for secondary stations
    - V4R3.1 13-37
    - V5R4 12-37
  - predefined subarea links for primary stations
    - V4R3.1 13-36
    - V5R4 12-36
  - predefined subarea links for secondary stations
    - V4R3.1 13-36
    - V5R4 12-36
- MVS/ESA publications X-24

## N

- NCP and related products, migration aid support for, table 1-2
- NCP Migration Aid
  - See migration aid function
- NCP Packet Switching Interface, X.25 (NPSI), migration aid support for 1-3
- NCP releases
  - unsupported, migrating from 3-1
- NCP version, specifying for migration aid 1-6
- NCP, SSP, and EP library
  - hardcopy library xiii
- NCP/EP definition facility (NDF)
  - migrating from
    - V4R3.1 13-15
    - V5R4 12-15
  - migration aid 1-1
  - to process NEWDEFN file 1-15
  - to run migration aid 1-9
- NCP/EP definition facility (NDF) standard attachment facility
  - V4R3.1 13-15
  - V5R4 12-15
- NCP/Token-Ring interconnection (NTRI)
  - 16-megabit token-ring speed
    - V4R3.1 13-30
    - V5R4 12-30
  - counter thresholds for NTRI lines
    - V4R3.1 13-31
    - V5R4 12-31
  - delayed logical link activation
    - V4R3.1 13-31
    - V5R4 12-31

- NCP/Token-Ring interconnection (NTRI) *(continued)*
  - internet routing support
    - V4R3.1 13-46
    - V5R4 12-46
    - V6R2 11-23
    - V6R3 10-20
  - link station priority
    - V4R3.1 13-43
    - V5R4 12-43
  - network performance data collection
    - V4R3.1 13-31
    - V5R4 12-31
  - serviceability enhancement (snap trace)
    - V4R3.1 13-31
    - V5R4 12-31
  - token-ring interface coupler swap
    - V4R3.1 13-30
    - V5R4 12-30
- NCP/Token-Ring interconnection (NTRI) lines
  - logical peripheral lines
    - V4R3.1 13-30
    - V5R4 12-30
  - logical subarea lines
    - V4R3.1 13-28
    - V5R4 12-28
  - physical peripheral lines
    - V4R3.1 13-29
    - V5R4 12-29
  - physical subarea lines
    - V4R3.1 13-28
    - V5R4 12-28
- NDF (NCP/EP definition facility)
  - migrating from
    - V4R3.1 13-15
    - V5R4 12-15
  - migration aid 1-1
  - to process NEWDEFN file 1-15
  - to run migration aid 1-9
- NDF (NCP/EP definition facility) standard attachment facility
  - V4R3.1 13-15
  - V5R4 12-15
- NERLIM, migration aid parameter 1-7
- NetView Performance Monitor (NPM)
  - data collection by transmission priority
    - V4R3.1 13-44
    - V5R4 12-44
  - data collection for Ethernet-type LANs
  - data collection for IBM special products or user-written code
    - V4R3.1 13-43
    - V5R4 12-43
  - session accounting for IBM special products or user-written code
    - V4R3.1 13-43
    - V5R4 12-43
- NetView publications X-22
- network addressability
  - extended subarea addressing
    - V4R3.1 13-23
    - V5R4 12-23
  - increased explicit route capability
    - V4R3.1 13-23
    - V5R4 12-23
- network identification, dynamic
  - V4R3.1 13-39
  - V5R4 12-39
- network performance data collection
  - Ethernet-type LANs
    - general
      - V4R3.1 13-42
      - V5R4 12-42
    - token-ring resources
      - V4R3.1 13-31
      - V5R4 12-31
- Network Routing Facility (NRF), migration aid support for 1-3
- Network Terminal Option (NTO), migration aid support for 1-3
- New, What is xii
- NEWDEFN file
  - created by migration aid 1-5, C-5
  - migration aid output sample C-5
  - modifications 1-15
  - reusable
    - V4R3.1 13-16
    - V5R4 12-16
  - size for migration aid 1-6
- non-native network attachment
  - V4R3.1 13-20
  - V5R4 12-20
- NPM (NetView Performance Monitor)
  - See NetView Performance Monitor (NPM)
- NPM publications X-23
- NPSI (X.25 NCP Packet Switching Interface), migration aid support for 1-3
- NPSI publications X-22
- NRF (Network Routing Facility), migration aid support for 1-3
- NRF publications X-23
- NTO (Network Terminal Option), migration aid support for 1-3
- NTO publications X-23
- NTRI (NCP/Token-Ring interconnection)
  - See NCP/Token-Ring interconnection (NTRI)
- NTRI (NCP/Token-Ring interconnection) lines
  - See NCP/Token-Ring interconnection (NTRI) lines
- NTuneMON
  - publications X-22
- NTuneNCP
  - publication X-22

## Index

### O

- object module produced by NDF 1-5, 1-8, 1-15
- online versions of this book viii
- operating system, migrating to different 2-1
- OPTIONS 6-5
- out-of-service NCP releases, migrating from 3-1
- output, migration aid
  - example C-5
  - generation listing 1-5, 1-9
  - NEWDEFN file 1-5, 1-10, C-5
  - object module 1-5, 1-8, 1-15
- OWNERPL keyword 6-3

### P

- pacing
  - adaptive session pacing
    - See adaptive session pacing enhancement
  - gateway session pacing
    - See gateway session pacing override
- parallel transmission group support for channel links
  - V4R3.1 13-38
  - V5R4 12-38
- partitioned emulation program (PEP), migration aid support for 1-2
- pause enhancement
  - V4R3.1 13-37
  - V5R4 12-37
- PEP (partitioned emulation program), migration aid support for 1-2
- performance data collection
  - Ethernet-type LANs
    - general
      - V4R3.1 13-42
      - V5R4 12-42
    - token-ring resources
      - V4R3.1 13-31
      - V5R4 12-31
- physical lines, token ring
  - peripheral
    - V4R3.1 13-29
    - V5R4 12-29
  - subarea
    - V4R3.1 13-28
    - V5R4 12-28
- PIU blocking performance improvements for subarea links
  - V4R3.1 13-44
  - V5R4 12-44
- predefined subarea links
  - primary stations
    - V4R3.1 13-36
    - V5R4 12-36
  - secondary stations
    - V4R3.1 13-36
    - V5R4 12-36

- priority, link session
  - V4R3.1 13-43
  - V5R4 12-43
- priority, NTRI link station
  - V4R3.1 13-43
  - V5R4 12-43
- PU 6-5
- publications X-21
  - 3745 X-23
  - 3746 X-24
  - MVS/ESA X-24
  - NetView X-22
  - NPM X-23
  - NPSI X-22
  - NRF X-23
  - NTO X-23
  - related X-23
  - SecureWay X-22
  - SNA X-22, X-24
  - TCAM X-24
  - VTAM X-22

### Q

- QSIZE keyword 6-4
- QSIZEDE keyword 6-4
- QSZALERT keyword 6-3
- question-mark string (???) in migration aid output 1-15

### R

- REMOVCOM keyword 1-15, 1-16
- reusable NEWDEFN file
  - V4R3.1 13-16
  - V5R4 12-16

### S

- samples, migration aid
  - changed definition statement 1-14
  - comments 1-11, 1-13
  - input generation definition C-1
  - invocation 1-8
  - output NEWDEFN file C-5
- SAVEADDR migration aid parameter 1-7
- SDLC lines, 3746 Model 900 connectivity subsystem
  - V4R3.1 13-27
  - V5R4 12-27
  - V6R2 11-21
- secondary-initiated LPDA2 tests
  - V4R3.1 13-41
- SecureWay publications X-22
- selection of EP sense codes
  - V4R3.1 13-40
  - V5R4 12-40

session accounting  
   gateway  
     V4R3.1 13-39  
     V5R4 12-39  
   general  
     V4R3.1 13-42  
     V5R4 12-42  
 session pacing, gateway, override  
   V4R3.1 13-40  
   V5R4 12-40  
 session priority  
   V4R3.1 13-43  
   V5R4 12-43  
 shared port identification  
   V4R3.1 13-25  
   V5R4 12-25  
 SMMF (SSCP monitor mode function)  
   V4R3.1 13-26  
   V5R4 12-26  
 SNA network interconnection (SNI) session limit  
   increase  
     V4R3.1 13-39  
     V5R4 12-39  
 SNA publications X-22, X-24  
 snap trace, NTRI serviceability enhancement  
   V4R3.1 13-31  
   V5R4 12-31  
 SNETMASK keyword 6-3  
 softcopy documentation xiv  
 softcopy library, NCP, SSP, and EP  
 SSCP (system services control point) monitor mode  
   function (SMMF)  
     V4R3.1 13-26  
     V5R4 12-26  
 standard attachment facility, NCP/EP definition facility  
   (NDF)  
     V4R3.1 13-15  
     V5R4 12-15  
 statement comment block, migration aid sample 1-11  
 storage requirements for V7R8 4-2, 5-2, 6-2  
 storage requirements, controller, changes to  
   V4R3.1 13-4  
   V5R4 12-4  
   V6R2 11-2  
   V6R3 10-2  
   V7R1 9-2  
   V7R3 8-2  
   V7R4 7-2  
 subarea channel-link activation  
   V4R3.1 13-24  
   V5R4 12-24  
 subarea links, predefined  
   primary stations  
     V4R3.1 13-36  
     V5R4 12-36  
   secondary stations  
     V4R3.1 13-36

subarea links, predefined (*continued*)  
   secondary stations (*continued*)  
     V5R4 12-36  
 summary comment block, migration aid sample 1-11  
 switched subarea support  
   V4R3.1 13-34  
   V5R4 12-34  
 system services control point (SSCP) monitor mode  
   function (SMMF)  
     V4R3.1 13-26  
     V5R4 12-26

## T

TCAM publications X-24  
 TCP/IP (Transmission Control Protocol/Internet Protocol)  
   publications X-24  
 teletypewriter exchange service (TWX) auto-speed  
   detection  
   general  
     V4R3.1 13-40  
     V5R4 12-40  
 TMODEL migration aid parameter 1-6  
 TOCONV migration aid parameter 1-8  
 token ring  
   See NCP/Token-Ring interconnection (NTRI)  
   See token-ring resources, 3746 Model 900  
   connectivity subsystem  
 token ring, internet routing support  
   V4R3.1 13-46  
   V5R4 12-46  
   V6R2 11-23  
   V6R3 10-20  
 token-ring lines  
   See NCP/Token-Ring interconnection (NTRI) lines  
 token-ring resources, 3746 Model 900 connectivity sub-  
   system  
   V4R3.1 13-31  
   V5R4 12-32  
 trace, channel adapter IOH  
   V4R3.1 13-41  
   V5R4 12-41  
 traces  
   channel adapter IOH trace  
     See channel adapter IOH trace  
   snap trace  
     See snap trace, NTRI serviceability enhancement  
 Transmission Control Protocol/Internet Protocol  
   (TCP/IP)  
   publications X-24  
 TUSGTIER keyword 6-5  
 TUSGTIER migration aid parameter 1-6  
 TVERSION migration aid parameter 1-6  
 TWX (teletypewriter exchange service) auto-speed  
   detection

## Index

TWX (teletypewriter exchange service) auto-speed  
detection (*continued*)  
  general  
    V4R3.1 13-40  
    V5R4 12-40  
type 2.1 peripheral node support  
  V4R3.1 13-19  
  V5R4 12-19  
type 7 (buffer-chaining) channel adapter 2-3

## U

UNIQUE keyword 6-5  
unsupported NCP releases, migrating from 3-1  
usage tier, specifying for migration aid 1-6  
usage tiers  
  IBM 3745 Communication Controller 2-2  
  V4R3.1 13-16  
  V5R4 12-16  
user-written generation applications, with migration  
  aid 1-3  
USGTIER keyword 6-3

## V

V.25 bis  
  general  
    V4R3.1 13-26  
    V5R4 12-26  
variable explicit route limits  
  V4R3.1 13-17  
  V5R4 12-17  
version, NCP, specifying for migration aid 1-6  
VOSDEACT keyword 6-3  
VSUBNETS keyword 6-3  
VTAM publications X-22  
VTAM updates  
  V4R3.1 13-10  
  V5R4 12-10  
  V6R2 11-16  
  V6R3 10-14

## W

warning, ALIGN2 JCL parameter 2-2

## X

X.25 NCP Packet Switching Interface (NPSI), migration  
  aid support for 1-3

---

# Tell Us What You Think!

**Network Control Program  
Version 7 Release 8  
Migration Guide**

**Publication No. SC30-4024-00**

We hope you find this publication useful, readable, and technically accurate, but only you can tell us! Your comments and suggestions will help us improve our technical publications. Please take a few minutes to let us know what you think by completing this form. If you are in the USA, you can mail this form postage free or fax it to us at 1-800-253-3520. Elsewhere, your local IBM branch office or representative will forward your comments or you may mail them directly to us.

<b>Overall, how satisfied are you with the information in this book?</b>	Satisfied	Dissatisfied
	<input type="checkbox"/>	<input type="checkbox"/>

<b>How satisfied are you that the information in this book is:</b>	Satisfied	Dissatisfied
Accurate	<input type="checkbox"/>	<input type="checkbox"/>
Complete	<input type="checkbox"/>	<input type="checkbox"/>
Easy to find	<input type="checkbox"/>	<input type="checkbox"/>
Easy to understand	<input type="checkbox"/>	<input type="checkbox"/>
Well organized	<input type="checkbox"/>	<input type="checkbox"/>
Applicable to your task	<input type="checkbox"/>	<input type="checkbox"/>

Specific comments or problems:

---

---

---

Please tell us how we can improve this book:

---

---

---

Thank you for your comments. If you would like a reply, provide the necessary information below.

\_\_\_\_\_  
Name

\_\_\_\_\_  
Address

\_\_\_\_\_  
Company or Organization

\_\_\_\_\_

\_\_\_\_\_  
Phone No.

\_\_\_\_\_



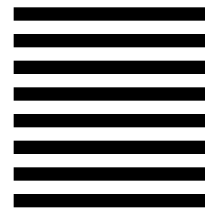
Fold and Tape

Please do not staple

Fold and Tape



NO POSTAGE  
NECESSARY  
IF MAILED IN THE  
UNITED STATES



# BUSINESS REPLY MAIL

FIRST-CLASS MAIL PERMIT NO. 40 ARMONK, NEW YORK

POSTAGE WILL BE PAID BY ADDRESSEE

Design & Information Development  
Dept. CGF/Bldg. 656  
International Business Machines Corporation  
PO BOX 12195  
RESEARCH TRIANGLE PARK NC 27709-9990



Fold and Tape

Please do not staple

Fold and Tape







Program Number: 5648-063



Printed in the United States of America  
on recycled paper containing 10%  
recovered post-consumer fiber.

SC30-4024-00

