IBM

3174 Establishment Controller

Planning Guide

Configuration Support C Release 1

3270 Information Display System

IBM

3174 Establishment Controller

Planning Guide

Configuration Support C Release 1

3174 Licensed Internal Code

Licensed Internal Code remains the property of IBM and is to be used only in accordance with the Agreement for Purchase of IBM Machines or the Agreement for Lease or Rental of IBM Machines, whichever Agreement is applicable.

In this document, the term **3174 microcode** refers to Licensed Internal Code.

Choosing the Right Book from the 3174 Library

The 3174 library contains information for installing, customizing, operating, maintaining, and programming the data stream for the 3174 controller. The list below shows the manuals you need to perform these tasks.

To Find Translations of Safety Notices:

Safety Notices, GA27-3824

To Organize Library Materials:

Binders and Inserts, SBOF-0089
　　Binder, SX23-0331
　　Inserts, SX23-0332

To Become Familiar with the 3174:

Master Index, GC30-3515
3174 Introduction, GA27-3850

To Prepare Your Site for the 3174:

Site Planning, GA23-0213
Physical Planning Template, GX27-2999

To Set Up and Operate the 3174:

Models 1L, 1R, 2R, 3R, 11L, 11R, 12L, 12R, 13R User's Guide, GA23-0337
Models 21L, 21R, 22L, and 23R User's Guide, GA27-3874
Models 51R, 52R, 53R, 61R, 62R, and 63R User's Guide, GA23-0333
Models 81R, 82R, 90R, 91R, and 92R User's Guide, GA23-0313

To Plan for and Customize the 3174:

Configuration Support A and S

Planning Guide, GA27-3844
Utilities Guide, GA27-3853
Central Site Customizing User's Guide, GA23-0342
Asynchronous Emulation Adapter Description and Reference, GA27-3872

Configuration Support B

Planning Guide, GA27-3862
Model 90R Tokenway Planning, GD21-0036
Utilities Guide, GA27-3863
Central Site Customizing User's Guide, GA27-3868
Asynchronous Emulation Adapter Description and Reference, GA27-3872

Configuration Support C

Planning Guide, GA27-3918
Utilities Guide, GA27-3920
Central Site Customizing User's Guide, GA27-3919
Asynchronous Emulation Adapter Description and Reference, GA27-3872

To Perform Problem Determination:

Customer Problem Determination, GA23-0217
Status Codes, GA27-3832

To Install Features or Convert Models on the 3174:

Fixed Disk Installation and Removal Instructions, GA27-3864
Diskette Drive Installation and Removal Instructions, GA23-0263
Device Control Adapters Installation and Removal Instructions, GA23-0265
Model Conversion Instructions, GA23-0295
Token-Ring Network Feature Installation and Removal Instructions, GA23-0329
Storage Expansion Feature Installation and Removal Instructions, GA23-0330
Communication Adapter Installation and Removal Instructions, GA27-3830
Asynchronous Emulation Adapter Installation and Removal Instructions, GA23-0341
Concurrent Communication Adapter and Integrated Services Digital Network Adapter Installation and Removal Instructions, GA27-3851
Models 21L, 21R, 22L, and 23R Feature Installation and Removal Instructions , GA27-3875

To Use the Asynchronous Emulation Adapter Feature:

Asynchronous Emulation Adapter Description and Reference, GA27-3872
Terminal User's Reference for Expanded Functions, GA23-0332

To Use the Multiple Logical Terminals Function:

Terminal User's Reference for Expanded Functions, GA23-0332

To Obtain Data Stream Programming and Reference Information:

Functional Description, GA23-0218
Data Stream Programmer's Reference, GA23-0059
Asynchronous Emulation Adapter Description and Reference, GA27-3872
3174 Reference Summary, GX27-3872
3174 Character Set Reference, GA27-3831
3270 X.25 Operation, GA23-0204

To Perform Maintenance (Service Personnel):

Models 1L, 1R, 2R, 3R, 11L, 11R, 12L, 12R, and 13R Maintenance Information, SY27-2572
Models 21L, 21R, 22L, and 23R Maintenance Information, SY27-0323
Models 51R, 52R, 53R, 61R, 62R, and 63R Maintenance Information, SY27-2573
Models 81R, 82R, 90R, 91R, and 92R Maintenance Information, SY27-2584
CE Reference Summary, SX27-3873
Status Codes, GA27-3832

Other Publications

The following publications are available for the 3174. They are developed by the International Technical Support Center. The intended audience for these books are IBM System Engineers and Customer Network Planners.

IBM 3174 Establishment Controller Installation Guide, GG24-3061.

NetView Distribution Manager Release 2 and 3174 Central Site Change Management Implementation Guide, GG24-3424.

IBM 3174 CECP Migration Issues, GG24-3380.

Special Notices

The following terms, DENOTED BY AN ASTERISK (*), used in this publication, are trademarks of the IBM Corporation in the United States and/or other countries:

ANSI 3.64 Terminal	PC/FTTERM Mono
Enterprise Systems Connection	System/370
ESCON	System/390
FTTERM	4201 Proprinter
GDDM	4202 Proprinter XL
NetView	4207 Proprinter X24
PC/FTTERM Color	4208 Proprinter XL24
Personal System/2	

The following terms, DENOTED BY A DOUBLE ASTERISK (**), used in this publication, are trademarks of other companies:

ADDS Viewpoint A2	Applied Digital Data Systems, Inc.
ADDS Viewpoint/78	Applied Digital Data Systems, Inc.
DEC VT100	Digital Equipment Corporation
DEC VT220	Digital Equipment Corporation
DEC VT240	Digital Equipment Corporation
DEC VT241	Digital Equipment Corporation
DEC VT52	Digital Equipment Corporation
D210	Data General
Esprit Executive 10/78	Esprit Systems, Inc.
Hayes AT	Hayes Microcomputer Products, Inc.
Hazeltine 1500	Hazeltine Systems, Inc.
Hewlett-Packard 2621B	Hewlett-Packard Company
Lear Siegler ADM 3A Dumb Terminal	Lear Siegler, Inc.
Lear Siegler ADM 5 Dumb Terminal	Lear Siegler, Inc.
Lear Siegler ADM 11	Lear Siegler, Inc.
Lear Siegler ADM 12	Lear Siegler, Inc.
Lear Siegler ADM 1178	Lear Siegler, Inc.
Micom	Micom Systems, Inc.
Minitel 1B	France Telecom
Switched Service (UKPSS)	British Telecom
Tektronix 4105	Tektronix, Inc.
Tektronix 4205	Tektronix, Inc.
TELENET	General Telephone and Electronics (GTE) Telenet Communications Corporation
TeleVideo 912	TeleVideo Systems, Inc.
TeleVideo 970	TeleVideo Systems, Inc.
United Kingdom Packet	
WYSE 50/60	Wyse Technology, Inc.

ES/9000 Users: The 3174 Model 21H used with the ES/9000 Models 120, 130, 150, and 170 is the same as a 3174 Model 21L throughout this publication.

Preface

The planning information in this book pertains to Configuration Support C, Release 1. The customizing and utilities procedures related to this book are contained in the *3174 Utilities Guide*, GA27-3863.

This manual briefly introduces the 3174 Establishment Controller and discusses considerations to keep in mind when planning for it. The book supplies the background information required for general and customization planning and explains the procedures for completing the configuration worksheets.

What This Book Will Do for You

This book:

- Introduces you to the 3174 Establishment Controller, its features, model capabilities, and supporting microcode

- Informs you of the planning considerations

- Guides you through the planning process

- Provides you with the information and knowledge required for planning

- Teaches you the microcode customization process

- Aids you in filling in the configuration worksheets

- Gives you a solid plan, which, when implemented, results in a smooth installation and startup.

Who This Book Is For

This book is written for the person who plans for the 3174 Establishment Controller. In various establishments, different people do this job:

- Systems programmers
- Systems analysts
- Systems specialists
- Software specialists

- Communication analysts
- Operations analysts
- Network planners
- Telecommunication specialists.

How to Use This Book

This book has three parts and five appendixes:

Part 1. Introduction (Chapters 1 and 2): This part introduces the 3174 Establishment Controller and provides considerations when planning. If you are using this book for the first time, read Part 1.

Part 2. General Planning (Chapters 3 and 4): This part contains general planning information that aids in planning for 3174 storage and the host.

Part 3. Microcode Customization Planning (Chapters 5 through 17): This part introduces microcode customization and provides the planning information you need to customize the microcode. It describes filling in the configuration worksheets (from Appendix A) and helps you answer the configuration questions.

Appendix A: This appendix contains the configuration worksheets. You may want to reproduce them in quantity so that you always have an unused set of worksheets available for planning.

Appendix B: Examples of planning for the Asynchronous Emulation Adapter.

Appendix C: Examples of planning for the Token-Ring Network.

Appendix D: Examples of VTAM/NCP definitions.

Appendix E: Examples of using service access points for Single Link Multi-Host Support.

Appendix F: Examples of IBM default Class of Service Tables.

Divider Pages

The following divider pages with tabs are included with this book:

- Microcode Customization Planning
- Worksheet Summary
- 3174 Configuration Questions Reference.

These divider pages are printed on card stock and contain specific planning and customizing information. They can be used to section off Part 3 and the Appendixes of this book.

The **Microcode Customization Planning** divider page contains a step-by-step procedure that guides you through microcode customization. We recommend that you use this procedure the first few times that you plan.

The **Worksheet Summary** lists the worksheets you need to fill out for specific features and functions. You can use this summary to plan if you are familiar with microcode customization and have been through the process previously.

The **3174 Configuration Questions Reference** lists the possible responses for each of the configuration questions, the worksheets they appear on, and the page number they appear on in this publication.

Related Publications

In addition to this book, you may need to refer to one or more of the following publications:

- *IBM 3174 Workstation Peer Communication Support Program User's Guide*, available with the 3174-WPCSP, P/N 96X5677

- *IBM Local Area Network Technical Reference*, SC30-3383

- *IBM LAN Network Manager User's Guide*, Version 1.1

- *IBM Token-Ring Network Architecture Reference*, SC30-3374

- *IBM Local Area Network Administrator's Guide*, GA27-3748

- *IBM Token-Ring Network Installation Guide*, GA27-3678

- *IBM Token-Ring Network Bridge Program*,

    Version 1.1 available with P/N 83X8880
    Versions 2.0 and 2.1 available with P/N 16F0493
    Version 2.2 available with P/N 53F7724.

Contents

Appendixes

Figures

Tables

Part 1. Introduction

Chapter 1. Introduction to the 3174 Establishment Controller

The 3174 Establishment Controller

The 3174 Establishment Controller is available in both local (channel-attached) and remote (telecommunication-attached) models. It provides a broad range of connectivity options, workstation and host attachment possibilities, network asset management capabilities, and the ability to expand features. The major enhancements for Configuration C Release 1 include Advanced Peer-to-Peer Networking (APPN), Peer Communication, and Integrated Services Digital Network (ISDN). Figure 1-1 illustrates APPN and Peer Communication, Figure 1-2 on page 1-4 illustrates ISDN, and Figure 1-3 on page 1-5 illustrates some of the capabilities provided by previous 3174 releases.
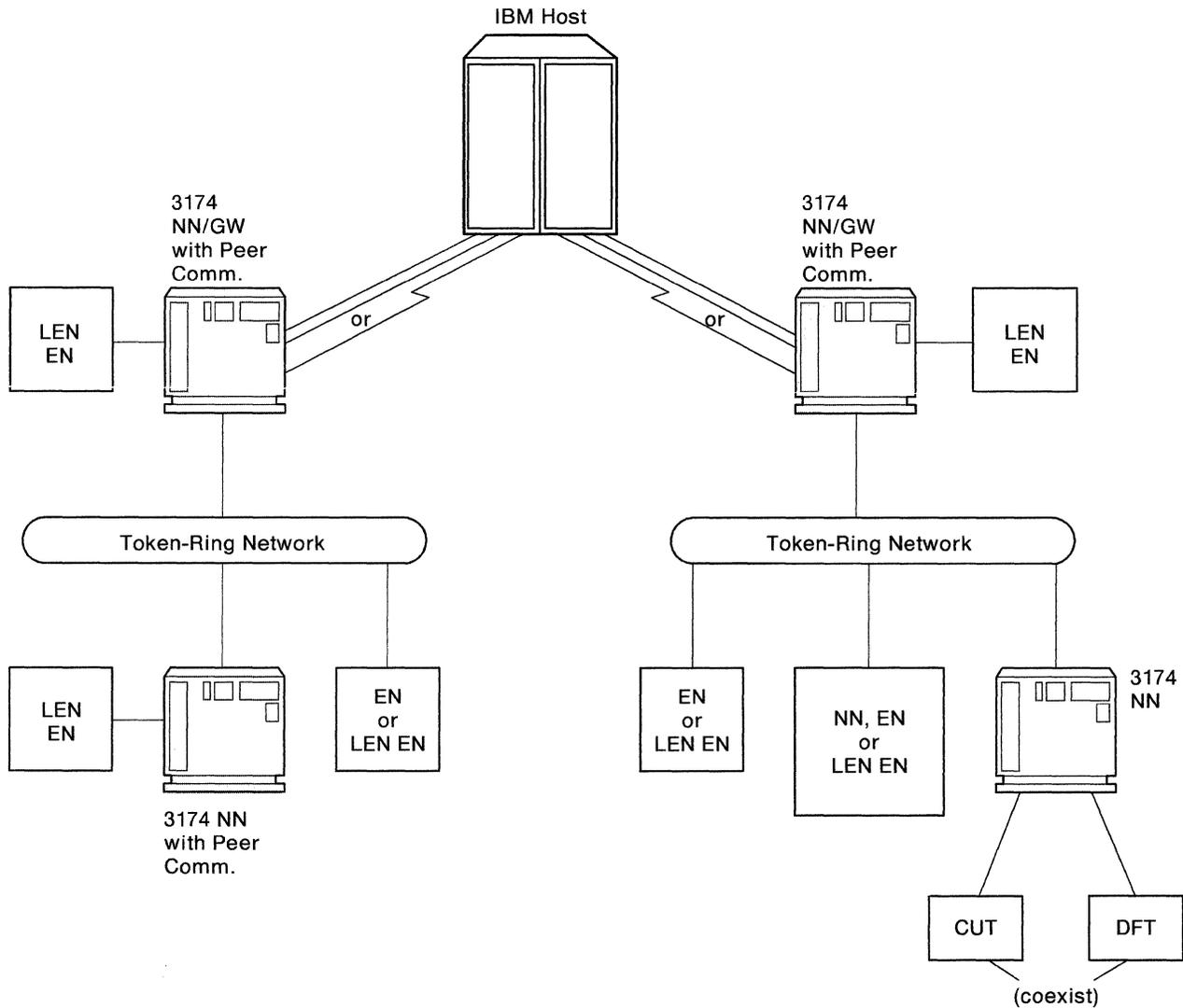
Legend:

NN = Network Node

EN = End Node

LEN EN = Low-Entry Networking End Node

Figure 1-1. An Example of an APPN Network

SNA Host

3174
with
ISDN
Adapter

ISDN Cable
from ISDN Adapter
to ISDN Network

ISDN Network

DSPU PU2.0   DSPU PU2.0
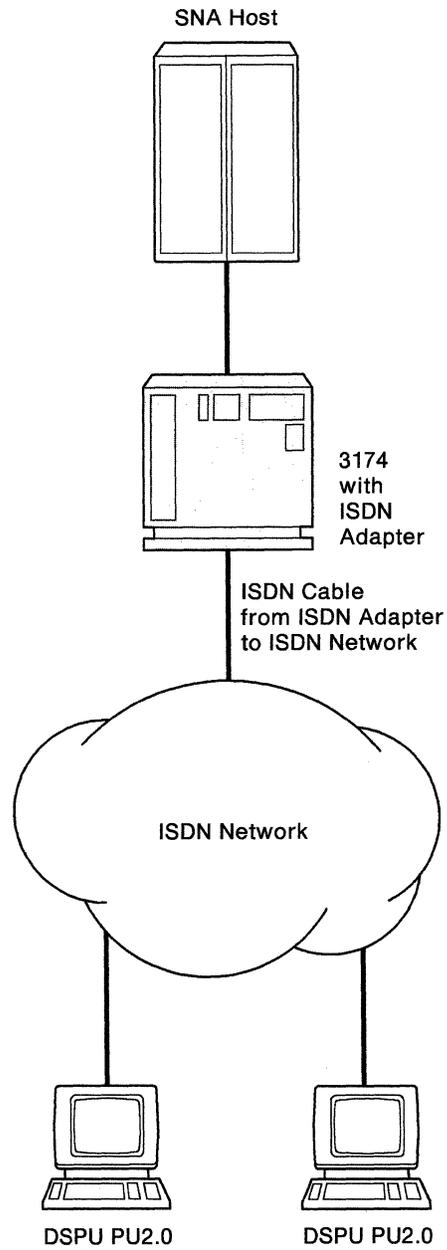
Figure   1-2. An Example of an ISDN Network
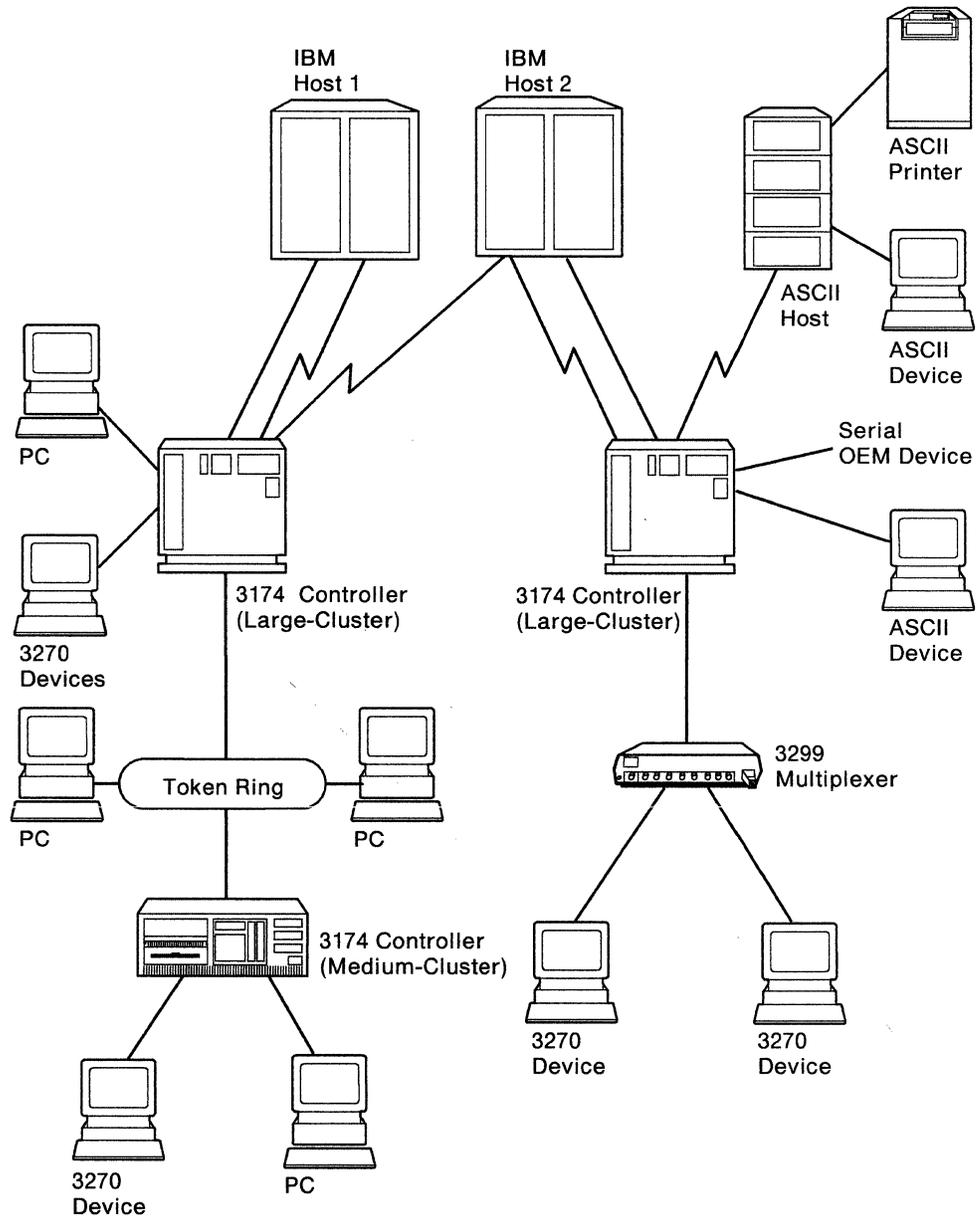
Figure 1-3. An Example of the 3174 Establishment Controller

3174 Establishment Controller Models

The 3174 Establishment Controller and the display stations and printers that are attached to it are collectively called a *cluster*. Several 3174 Establishment Controller models are available. Each model falls into one of three categories: large-, medium-, or small-cluster controllers. Configuration Support C Release 1 is only supported on large and medium-cluster controllers. Figures 1-4, 1-5, and 1-7

illustrate the controller categories and models. The features that each model can support are listed below each model's description.

Large-Cluster Controllers

Models 1L, 1R, 2R, 3R, 11L, 11R, 12L, 12R, 13R, 21L, 21R, 22L, and 23R are large-cluster controllers. Models 1L, 1R, 2R, and 3R can attach up to thirty-two 3270 devices and/or 24 ASCII devices. Models 11L, 11R, 12L, 12R, 13R, 21L, 21R, 22L, and 23R can attach up to sixty-four 3270 devices and/or 24 ASCII devices.
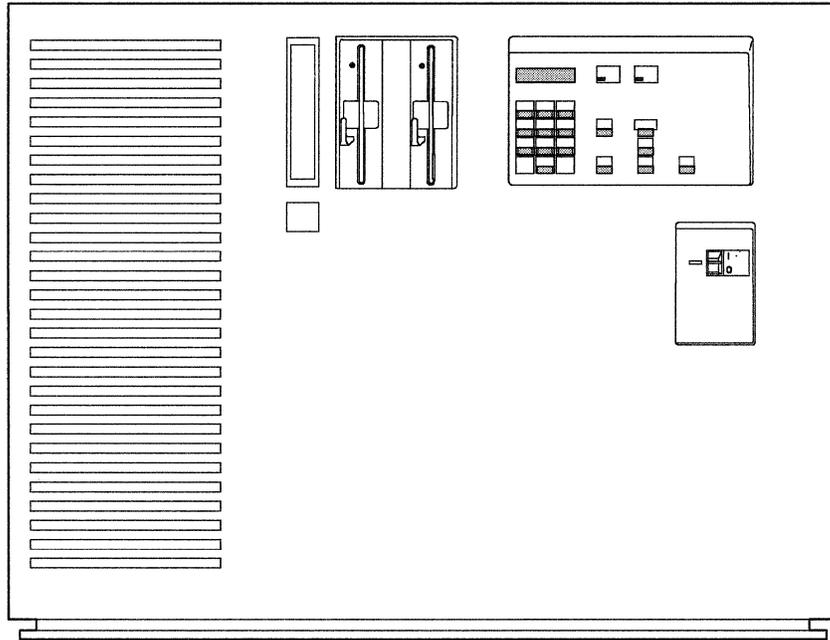
Figure 1-4. Models 1R, 2R, 3R, 11R, 12L, 12R, and 13R (Models 1L and 11L are similar)

Models 1L and 11L have a System/370*-type channel adapter for Systems Network Architecture (SNA) and non-SNA channel attachment.

Models 1R and 11R have a Type 1 Communication Adapter designed for remote operation. They contain EIA 232D/CCITT V.24/V.28 or CCITT V.35 interfaces for SDLC, BSC, or X.25 remote link attachment to a host.

Models 2R and 12R have a Type 2 Communication Adapter designed for remote operation. They contain an X.21 interface (CCITT V.11) for SDLC or X.25 remote attachment to a host.

Models 3R and 13R are designed for remote connection to a Token-Ring Network. They contain a Token-Ring Adapter and cable for connection to a Token-Ring Network.

Model 12L has an Enterprise System Connection* (ESCON)* Adapter that allows for SNA and non-SNA channel attachment to the Enterprise Systems Connection Architecture optical I/O interface with fiber optic cables.
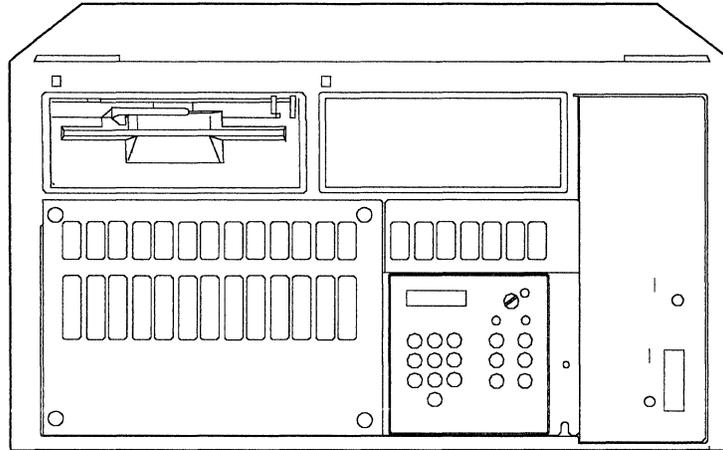
Figure   1-5. Model 21L

Model 21L has a System/370-type channel adapter for Systems Network Architecture (SNA) and non-SNA channel attachment. This model is designed for rack-mounted physical configurations.
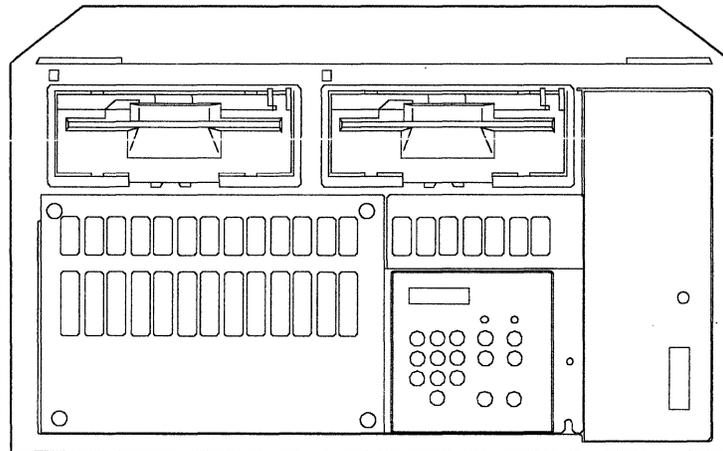
Figure   1-6. Models 21R, 22L, and 23R

Model 21R has a Type 1 Communication Adapter designed for remote operation. It contains EIA 232D/CCITT V.24/V.28 and CCITT V.35 interfaces for SDLC, BSC, or X.25 remote link attachment to a host. This model is designed for rack-mounted physical configurations.

Model 22L has an Enterprise Systems Connection (ESCON) Adapter that allows for SNA and non-SNA channel attachment to the Enterprise Systems Connection Architecture with fiber optic cables. This model is designed for rack-mounted physical configurations.

Model 23R is designed for remote connection to a Token-Ring Network. It has a Token-Ring Adapter and a cable for connection to a Token-Ring Network. It also contains a Type 1 Communication Adapter designed for remote operation and contains EIA 232D/CCITT V.24/V.28 and CCITT V.35 interfaces for SDLC, BSC, or X.25 remote link attachment to a host. This model is designed for rack-mounted physical configurations.

Medium-Cluster Controllers

Models 51R, 53R, 61R, 62R, and 63R are medium-cluster controllers for attaching up to sixteen 3270 devices and/or eight ASCII devices.

Notes:

1. Model 52R is not supported for Configuration C microcode because of storage constraints.

2. Models 51R and 53R require RPQ SW1646 which replaces the 1.2MB diskette drive shipped with these models.
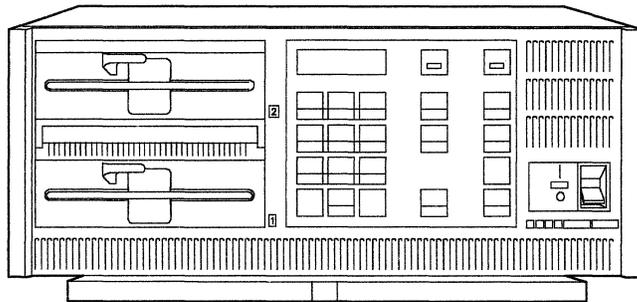
Figure   1-7. Models 51R, 53R, 61R, 62R, and 63R

Models 51R and 61R have a Type 1 Communication Adapter designed for remote operation. They contain EIA 232D/CCITT V.24/V.28 or CCITT V.35 interfaces for SDLC, BSC, or X.25 remote link attachment to a host.

Note: 51R does not support Multi-Host Token-Ring Gateway. The 51R can, however, provide gateway support to a single host.

Model 62R has a Type 2 Communication Adapter designed for remote operation. It contains an X.21 interface (CCITT V.11) for SDLC or X.25 remote link attachment to a host.

Models 53R and 63R are designed for remote connection to a Token-Ring Network. They contain a Token-Ring Adapter and cable for connection to a Token-Ring Network.

Note: 53R does not support CCAs or AEAs because of feature slot limitations.

Features for the 3174 Establishment Controller

There are several hardware features for the 3174 Establishment Controller. Tables 1-1 and 1-2 show which features are supported by which controller models. Not all features are supported on all 3174 models.

Terminal Multiplexer Adapter (TMA) allows attachment of up to thirty-two 3270 terminals if four TMAs are installed. It attaches to the Terminal Adapter and multiplexes the data streams from eight 3270 devices into a single coaxial cable.

3299 Terminal Multiplexer is attached to the Terminal Adapter with a coaxial cable, the IBM Cabling System, or to the Fiber Optic Terminal Adapter using fiber optic cable. It multiplexes the data streams from up to eight or thirty-two 3270 devices into a single cable, depending on the multiplexer model.

Type 1 Communication Adapter (EIA 232D/CCITT V.24/V.28 or CCITT V.35) provides a telecommunication path to a host. It supports SDLC, BSC, or X.25 remote link attachment.

Type 2 Communication Adapter (CCITT X.21/V.11) provides a telecommunication path to a host. It supports SDLC or X.25 remote attachment.

16/4Mbps Token-Ring Adapter connects the controller to an IBM Token-Ring Network. This adapter is also referred to as the Type 3A Communication Adapter.

Asynchronous Emulation Adapter (AEA) allows ASCII terminals to communicate with ASCII hosts, ASCII terminals to emulate 3270 devices and communicate with 3270/IBM hosts, and 3270 terminals attached to the controller to emulate ASCII terminals and communicate with ASCII hosts.

Type 1 Concurrent Communication Adapter (EIA 232D/CCITT V.24/V.28 or CCITT V.35) provides a concurrent telecommunication path to another host. It supports SDLC, BSC, or X.25 remote link attachment.

Type 2 Concurrent Communication Adapter (CCITT X.21/V.11) provides a concurrent telecommunication path to another host. It supports SDLC or X.25 remote attachment.

Second diskette drive is required for Configuration C unless a fixed disk drive is available.

Fixed Disk Drive is used to load and store microcode. If Central Site Change Management is being used, at least one fixed disk drive should be installed on the Central Site Controller.

Storage Expansion is available to support additional features and functions not supported by the base storage.

Fiber Optic Terminal Adapter provides for attaching 3299 Model 32 terminal multiplexers. This adapter attaches to the Terminal Adapter with a coaxial cable and to the 32-port 3299 Terminal Multiplexer with fiber optic cable.

Integrated Services Digital Network (ISDN) Adapter provides a Basic Rate Interface for attaching to an ISDN Network. Each adapter has four ports and up to four adapters can be installed in a controller. Each port provides one D-channel for signaling and two B-channels for data, with each B-channel supporting one device.

3270 Port Expansion Feature allows attachment of 32 additional 3270 terminals. This feature can also attach Terminal Multiplexer Adapters (TMAs) and 3299 multiplexers. The feature provides a new Terminal Adapter.

Hardware Features of the 3174

The following tables list, by model, the hardware and combination hardware/microcode features that are supported on the controller. The first table shows large-cluster models; the second table shows medium-cluster models. To support some of the features, many of the models require additional storage. Refer to Chapter 3, "Planning for Controller Storage" on page 3-1 for details. Configuration Support C requires that the controller contain two 2.4MB Diskette Drives, or one 2.4MB Diskette Drive and a Fixed Disk, and at least 3MB of storage.

Table 1-1. Features Supported by Models 1L through 23R													
Feature	**1L**	**1R**	**2R**	**3R**	**11L**	**11R**	**12L**	**12R**	**13R**	**21L**	**21R**	**22L**	**23R**
1MB Base Storage	B	B	B	B	X	X	X	X	X	X	X	X	X
2MB Base Storage	X	X	X	X	B	B	B	B	B	B	B	B	B
Storage Expansion	O	O	O	O	O	O	O	O	O	O	O	O	O
1.2MB Diskette Drive	B	B	B	B	X	X	X	X	X	X	X	X	X
2.4MB Diskette Drive	O	O	O	O	B	B	B	B	B	B	B	B	B
20MB Fixed Disk	O	O	O	O	O	O	O	O	O	O	O	O	O
Terminal Adapter	B	B	B	B	B	B	B	B	B	B	B	B	B
Terminal Adapter (3270 Port Expansion Feature)	X	X	X	X	O	O	O	O	O	O	O	O	O
Fiber Optic Terminal Adapter	O	O	O	O	O	O	O	O	O	O	O	O	O
Terminal Multiplexer Adapter*	O	O	O	O	O	O	O	O	O	O	O	O	O
Channel Adapter	B	X	X	X	B	X	X	X	X	B	X	X	X
ESCON Adapter	X	X	X	X	X	X	B	X	X	X	X	B	X
Type 1 Communication Adapter	O	B	X	O	O	B	O	X	O	X	B	B	B
Type 2 Communication Adapter	O	X	B	O	O	X	O	B	O	X	X	X	X
Type 3A Communication Adapter (Token-Ring Adapter)	O	O	O	B	O	O	O	O	B	O	O	O	B
Asynchronous Emulation Adapter	O	O	O	O	O	O	O	O	O	O	O	O	O
Concurrent Communication Adapter	O	O	O	O	O	O	O	O	O	O	O	O	O
ISDN Adapter	O	O	O	X	O	O	O	O	X	O	O	O	X

Legend:

B = Base
O = Optional
X = Not Available on this model

* Although not a feature of the 3174, the 3299 Terminal Multiplexer provides a similar function as the Terminal Multiplexer Adapter and is supported by all models of the 3174.

The 3174 Establishment Controller

Table 1-2. Features Supported by Models 51R through 63R					
Feature	**51R**	**53R**	**61R**	**62R**	**63R**
1MB Base Storage	B	B	X	X	X
2MB Base Storage	X	X	B	B	B
Storage Expansion	O	O	O	O	O
1.2MB Diskette Drive	B	B	X	X	X
2.4MB Diskette Drive	O	O	B	B	B
20MB Fixed Disk	O	O	O	O	O
Terminal Adapter	B	B	B	B	B
Type 1 Communication Adapter	B	X	B	X	X
Type 2 Communication Adapter	X	X	X	B	X
Type 3A Communication Adapter (Token-Ring Adapter)	O	B	O	O	B
Asynchronous Emulation Adapter	O	X	O	O	O
Concurrent Communication Adapter	O	X	O	O	O
ISDN Adapter	X	X	O	O	X
Legend:					
B = Base O = Optional X = Not Available on this model					

Alternate Configurations

Many models of the 3174 Establishment Controller can be configured to act as other models; most models require additional hardware to support alternate configurations. Functions not normally supported by a particular model controller may be supported on the controller under an alternate configuration. For example, a Model 13R can only be customized as Token-Ring attached. By installing a Type 1 Communication Adapter and designating Model 11R in question 100, you can customize for functions supported on the Model 11R that are not supported on a Model 13R, such as X.25 or Token-Ring Gateway. The models that can be alternately configured are listed below, along with the features and the alternate configurations that can be attained.

Table 1-3. Alternate Configurations. These alternate configurations are for models that can contain, in addition to their primary communication adapter, a Type 1, Type 2, or Type 3A Communication Adapter.		
Primary Configuration	**Additional Adapter Type**	**Alternate Configuration**
	Type 1 (3040 or 3041)	Model 01R
Model 01L	Type 2 (3043)	Model 02R
	Type 3A (3044)	Model 03R
Model 01R	Type 3A (3044)	Model 03R
Model 02R	Type 3A (3044)	Model 03R
Model 03R	Type 1 (3040 or 3041)	Model 01R
	Type 2 (3043)	Model 02R
	Type 1 (3040 or 3041)	Model 11R
Model 11L	Type 2 (3043)	Model 12R
	Type 3A (3044)	Model 13R
Model 11R	Type 3A (3044)	Model 13R
	Type 1 (3040 or 3041)	Model 11R
Model 12L	Type 2 (3043)	Model 12R
	Type 3A (3044)	Model 13R
Model 12R	Type 3A (3044)	Model 13R
Model 13R	Type 1 (3040 or 3041)	Model 11R
	Type 2 (3043)	Model 12R
Model 21L	Type 3A (3044)	Model 23R
Model 21R	Type 3A (3044)	Model 23R*
Model 22L	None Required**	Model 21R
	Type 3A (3044)	Model 23R
Model 23R	None Required**	Model 21R
Model 51R	Type 3A (3044)	Model 53R
Model 61R	Type 3A (3044)	Model 63R
Model 62R	Type 3A (3044)	Model 63R
* Model 23R is recommended, but Model 21R can also be used as the model designation for this alternate configuration. ** The Type 1 Communication Adapter, required for the alternate configuration, is integrated in the planar board for this model.		

Microcode

Microcode[1] for the 3174 Establishment Controller is on purchased diskettes. This microcode can be copied from a diskette onto a fixed disk (with the exception of some RPQ microcode on diskettes that can be merged) as separate diskette images. Diskettes and fixed disks are used to load and store the operational microcode and customization data.

In this manual, the word "disk" is used as the generic term for the media (diskette or fixed disk) on which the microcode is stored. You can use several different disks:

3174 Utility Disk contains the microcode necessary to run various utilities. This microcode arrives on a 2.4MB diskette and requires at least 3MB of controller storage to execute.

3174 Control Disk, when customized, contains the microcode necessary to make the 3174 Establishment Controller operational. This microcode arrives on a 2.4MB diskette and requires at least 3MB of controller storage to execute.

The **Control Extension Disk** is used in conjunction with the Control Disk and contains microcode necessary to make the 3174 Establishment Controller operational. This microcode arrives on a 2.4MB diskette and other DSL disks must be merged onto this disk.

3174 Limited Function Utility Disk is used in networks that are under central site control to limit the number of 3174 utilities that can be performed and prevent unauthorized reconfiguration of the controller. This microcode arrives on a 2.4MB diskette. The diskette is ordered using specify code 9005. (See the *3174 Utilities Guide*, GA27-3863, for more information.)

RPQ Diskette contains a request for price quotation (RPQ), an alteration or addition to the functional capabilities the controller provides. An RPQ diskette is requested by a customer. RPQ diskettes can contain the microcode for up to 30 RPQs. Microcode for mergeable RPQs arrives on a 1.2MB diskette; microcode for RPQ Control disks is on 2.4MB diskettes.

Downstream Load (DSL) Disks can be used for display stations that require the controller to downstream-load its operational microcode; for example, the 3290 Information Panel. The following 3174 features also require DSL microcode which is shipped on individual DSL diskettes:

- Asynchronous Emulation Adapter (AEA)
- Peer Communication
- Advanced Peer-to-Peer Networking (APPN)

For more information on these disks, see the *3174 Utilities Guide*, GA27-3863.

---

[1] Microcode may be classified as IBM Licensed Internal Code. See the 3174 Licensed Internal Code notice at the beginning of this document for more information.

The 3174 Establishment Controller Library

Each manual in the 3174 library is written to help you perform a specific *task*. A task consists of the operations you must perform to reach a specific goal. The tasks covered by the 3174 library include:

- Planning
- Installation
- Customization

- Operation
- Maintenance
- Problem determination.

The manuals in the 3174 library are grouped by task on page iii. Contact your IBM representative to order the manuals you need.

Chapter 2. Planning Considerations

3174 Establishment Controller Planning

Now that you have been introduced to the 3174 Establishment Controller, you are ready to begin planning to meet the needs of your establishment. Although planning is a straightforward process, many things must be considered. This chapter identifies those considerations and provides the "big picture," which is required in any planning activity.

The Site

Preparing and planning the site for installation of a controller is made up of many tasks, which include several subtasks. The major tasks in planning for the site are:

- Checking the environment
- Ordering the 3174 Establishment Controllers and terminals
- Defining the controller's physical configuration
- Designing the site floor plan
- Determining the controller cabling
- Completing the 3174 cabling worksheets
- Giving the completed worksheets to the setup personnel.

Use the *3174 Site Planning* manual, GA23-0213, during this phase of your installation; it will help you complete these tasks.

Controller Storage

You need to ensure, through planning, that you have sufficient storage for the features and functions that you wish to use. The procedure in Chapter 3, "Planning for Controller Storage," helps you determine these storage requirements.

Storage capabilities will vary depending on the controller model. In some cases, you can gain additional storage by installing a storage expansion card. These storage expansion cards are customer-installable features.

Physical Installation

The controller is a customer-installable product, so the IBM service representative is needed only to attach the channel interface cables (bus and tag) to Models 1L, 11L, and 21L and set the channel priority switches. Installation of the controller involves:

- Unpacking the controller
- Placing it in the desired location
- Installing any features (such as an AEA, TMAs, and so on)
- Connecting power
- Running tests
- Connecting the communication cables
- Attaching terminals
- Customizing the microcode using completed configuration worksheets
- IMLing (initial microcode loading) the controller.

Refer to the *3174 Site Planning*, GA23-0213, and to the setup procedure in the *3174 User's Guide* when physically installing the controller.

Types of Host Attachment

You need to consider your establishment's needs for host attachment. The attachment capabilities depend on the controller model and features. The following types of host attachment are supported:

- Channel Attachment (S/370, S/390*)
- Token-Ring Network

- ASCII
- Remote Link (BSC, SDLC, X.25).

S/370 or S/390 Channel

Channel attachment is direct attachment to the host using cable and adapter combinations. The 3174 controller supports two types of channel attachment: S/370 and S/390 Attachment, which supports the Enterprise Systems Connection Architecture. Both types support SNA and non-SNA.

S/370 Channel

This method of channel attachment uses Channel Interface Cables (bus and tag) and a channel adapter. The System/370-architecture channel interface for SNA and non-SNA is used for attachment. Models 1L, 11L, and 21L are capable of this kind of channel attachment. They have Data-Chaining Interlocked and High Speed Transfer channel operational modes. These can provide channel data rates up to 1.0 and 1.25 megabytes per second (respectively) and 2.5MBps with data streaming. The allowable distance from the host to the controller is 122 meters (400 feet).

In addition to the channel speed, you should consider burst sizes, priority settings, and unit control words (UCW) when planning for this type of attachment.

S/390 Channel

The ESCON Channel Adapter supports S/390 Channel attachment from the host to the controller. This type of attachment supports both SNA and non-SNA. The adapter is available on Models 12L and 22L only.

The allowable distance from the host to the controller is increased from 122 meters (400 feet) to 3 kilometers (1.86 Miles) without an ES Connection Director. If two ES Connection Directors are installed between the host and the controller, the controller can be installed up to 9 kilometers (5.5 miles) from the host.

Token-Ring Network

Token-Ring Network attachment is another way to attach controllers to SNA hosts. With this method of attachment, the Token-Ring and a gateway are between the controller and the host. To plan for Token-Ring attachment, use the customization question information in Chapter 6, "Planning to Configure" on page 6-1.

If you will be using your controller as a gateway, use the information in Chapter 16, "Planning for Gateways (Token-Ring and ISDN)" on page 16-1, Chapter 12, "Planning for APPN" on page 12-1, and the examples in Appendix C, "Token-Ring Planning Examples" on page C-1, to plan its configuration.

ASCII

ASCII attachment is accomplished through the Asynchronous Emulation Adapter (AEA). Before you plan for ASCII attachment, read the 3174 *AEA Description and Reference*, GA27-3872. To plan for ASCII attachment, use Chapter 14, "Planning for the Asynchronous Emulation Adapter" on page 14-1 and Appendix B, "AEA Planning Examples" on page B-1.

Remote Link

Remote attachment requires communication adapters and Data Circuit Terminating Equipment (DCE) instead of channel adapters.

Table 2-1 illustrates remote link attachment.

Table 2-1. Remote Attachment Adapter Requirements					
Remote Link Attachment					
	Primary Link			**Secondary Link**	
Model	**Type 1 CA**	**Type 2 CA**	**Token-Ring Adapter**	**Type 1 CCA**	**Type 2 CCA**
1L				√	√
1R	√			√	√
2R		√		√	√
3R			√	√	√
11L				√	√
11R	√			√	√
12L				√	√
12R		√		√	√
13R			√	√	√
21L				√	√
21R				√	√
22L				√	√
23R			√	√	√
51R	√			√	√
53R			√		
61R	√			√	√
62R		√		√	√
63R			√	√	√

:

Multi-Host Support

The 3174 Establishment Controller can be configured to access multiple 3270 hosts. Using the MLT function, each terminal connected to a 3270 controller port can have up to five host sessions. These sessions may be all to one host or to several hosts. A terminal can access the different hosts through a keying sequence that switches between the sessions and/or hosts.

There are two types of Multi-Host Support:

* An additional link to hosts through a Concurrent Communication Adapter (CCA)
* Single Link Multi-Host Support (Token-Ring, ESCON Channel, X.25).

Various combinations of Multi-Host Support can be used at the same time. For instance, the ESCON Channel Adapter, Concurrent Communication Adapters and X.25 can be used simultaneously. For information on configuring for multiple hosts, see "Microcode Customization" on page 2-17.

The following terms are used throughout this book in order to differentiate hosts and links:

* Link attachment
* Host attachment.

Link Attachment

Link attachment refers generally to the physical means of attaching to a host or network (the hardware link). Depending upon its type, the link is considered "primary" or "secondary". (A primary link is typically the link provided by the model you have purchased and does not require any optional features.)

Primary links are provided by:

* Channel Adapter
* ESCON Channel Adapter
* Type 1 Communication Adapter
* Type 2 Communication Adapter
* Token-Ring Adapter.

Secondary links are provided by:

* Type 1 Concurrent Communication Adapter
* Type 2 Concurrent Communication Adapter.

Host Attachment

Some kinds of link attachment allow multiple hosts to be accessed. Consider one of these hosts the primary host and the others, secondary hosts. Thus, on a primary link, you can have a primary host (1A) and secondary hosts (1B-1H). And on a secondary link you can have a primary host (2A or 3A) and secondary hosts (2B-2D, 3B-3D). The following matrix illustrates this concept:

	Primary Link	Secondary Link
Primary Host	1A	2A, 3A
Secondary Host	1B-1H	2B-2D, 3B-3D

You make primary and secondary host assignments as part of planning for customization. The number/letter combinations are the *host IDs*, by which you identify each host. A host ID is always two characters: the first is a number and indicates the link, the second is a letter and indicates the host. The number **1** and the letter **A** always indicate **primary**. (Thus the 1A host is the primary host on the primary link, and the 2A host is the primary host on a secondary link.)

Concurrent Communication Adapter

The Concurrent Communication Adapter (CCA) is a hardware feature. It provides access to additional 3270 hosts. It can provide access to one additional host, or it can provide access over an X.25 network to a maximum of four hosts (X.25 Single Link Multi-Host Support).

There are two types of these adapters:

- The Type 1 Concurrent Communication Adapter provides for remote link attachment using BSC, SDLC, and X.25.

- The Type 2 Concurrent Communication Adapter provides for remote link attachment using X.21 and X.25.

The number of Concurrent Communication Adapters that can be installed in a controller varies depending on the controller model:

Model	Number of CCA's
1L, 1R, 2R, 3R, 11L, 11R, 12L, 12R, 13R	2
51R, 63R	1
21L, 21R, 22L, 23R	2
61R, 62R	2

Figure 2-1 illustrates the multiple 3270 hosts that a terminal can access when Concurrent Communication Adapters are present in a controller.
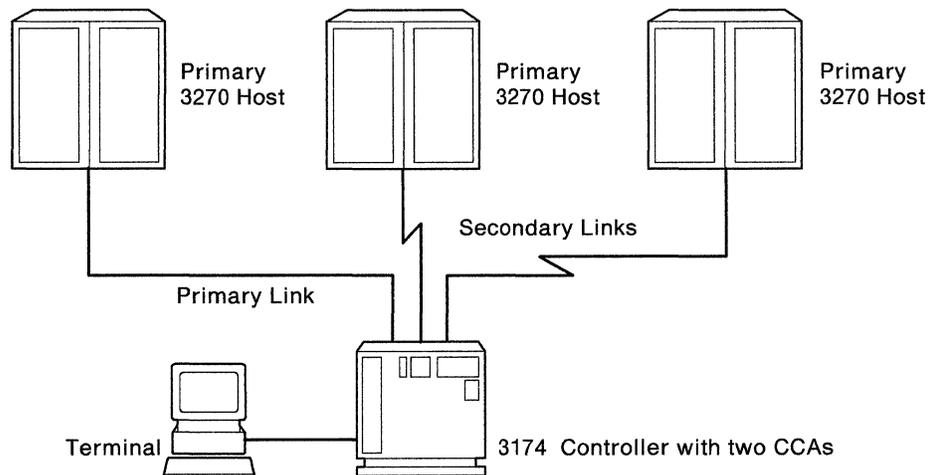
Figure 2-1. Multiple 3270 Host Access through Concurrent Communication Adapters

Single Link Multi-Host Support

Single Link Multi-Host Support enables terminals attached to a controller to access multiple 3270 hosts on a single physical link. If the link is primary, up to eight hosts can be configured; if the link is secondary, up to four hosts can be configured.

The 3174 Establishment Controller supports three types of Single Link Multi-Host Support. Each is explained in the following sections.

ESCON Channel

ESCON Channel Support allows you to access up to eight IBM hosts on the primary link through an ES Connection Director connected to a S/390 host. For an illustration of ESCON Channel Support, see Figure 2-2.
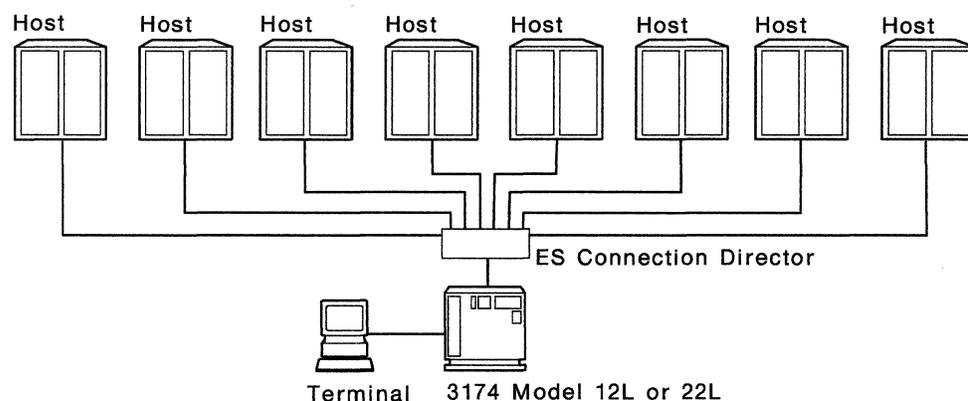
Figure 2-2. ESCON Channel Support

Token-Ring

This function is for controllers attached to the IBM Token-Ring Network as a downstream physical unit. The single link is the link between the controller and the ring; it is the controller's primary link. Terminals attached to the controller can access multiple 3270 hosts.

The Token-Ring is attached to the hosts through gateways. Each gateway has a unique address. That address is used during the customization of a controller using Token-Ring Single Link Multi-Host Support to identify the path to the gateway. Service Access Points (SAPs), specified in conjunction with the gateway address, identify the different hosts upstream of the gateway.

Models 3R, 13R, 23R, 53R, and 63R support Token-Ring Single Link Multi-Host Support. Controllers configured as a gateway do not. Alternate configurations allow other controllers to appear as one of these models and thus support this function (see Table 1-3 on page 1-13 for more information). Figure 2-3 on page 2-9 illustrates Token-Ring Single Link Multi-Host Support.
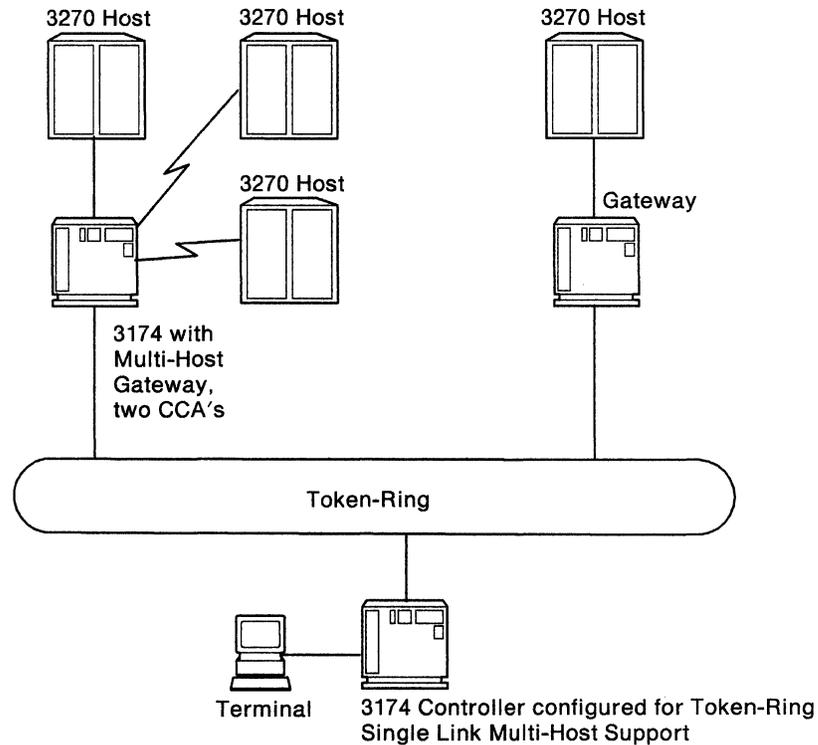
Figure 2-3. Token-Ring Single Link Multi-Host Support

Single Link Multi-Host Support over a Token-Ring means that primary and secondary hosts are accessed through the primary link, supplied by the Token-Ring Adapter. At customization, you can choose which host will be your primary host on the link and which hosts will be the secondary hosts.

X.25

This function is for controllers attached to X.25 networks. Unlike other types of single link support, X.25 Single Link Multi-Host Support can be accomplished over the primary or secondary link—or both at once.

On a primary link, up to eight hosts can be configured. The link is accomplished using a Type 1 or Type 2 Communication Adapter and X.25 protocol.

On a secondary link, up to four hosts can be configured. The link is accomplished using a Type 1 or Type 2 Concurrent Communication Adapter and X.25 protocol.

Two secondary links can be used on most models of the 3174, making the total number of hosts accessible through secondary links eight. Some controller models support only one CCA (and therefore one secondary link).

Figure 2-4 on page 2-10 illustrates X.25 Single Link Multi-Host Support support through both primary and secondary links.
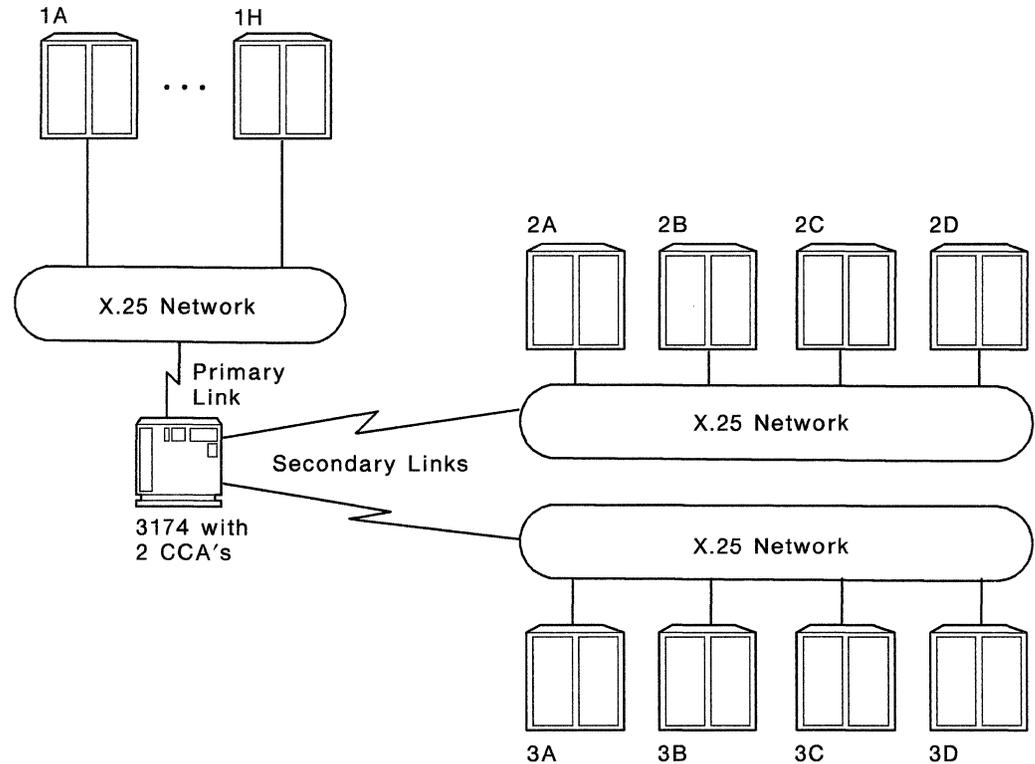
Figure   2-4. X.25 Single Link Multi-Host Support

Gateway

The 3174 can provide the gateway for devices in a Token-Ring Network or an Integrated Services Digital Network (ISDN). The 3174 supports either type of network independently or supports both types concurrently. The speed at which the networks operate may depend on customizing and the type of network.

The devices in the networks are configured as Downstream Physical Units (DSPUs). A gateway controller supports up to 250 DSPUs, except the Model 1L which only supports up to 140. The DSPUs are identified by mapping their addresses to unique host subchannel or SDLC addresses, with one subchannel or SDLC address reserved for the gateway controller.

Token-Ring Gateway

3174s customized as Token-Ring Gateway controllers support up to 250 DSPUs (except the Model 1L which only supports up to 140) attached to the Token-Ring. These DSPUs can include other 3174s or other PU2.0 devices. Data circulates on the ring at speeds of either 4Mbps or 16Mbps.

Through customizing, devices on the ring can access more than one host through either the controller's primary communication adapter or its Concurrent Communication Adapters. See "Multi-Host Support" on page 2-6 and "Multi-Host Gateway Support" on page 2-11.

ISDN Gateway

3174s customized as ISDN gateway controllers support up to 32 devices in an ISDN Network. The network supports PS/2s and operates at speeds of 64Kbps.

Through customizing, devices in the network can access more than one host when the gateway controller is a Model 12L or 22L. See "Multi-Host Support" on page 2-6 and "Multi-Host Gateway Support."

Multi-Host Gateway Support

Multi-Host Gateway Support is a microcode function that gives devices in a Token-Ring Network or ISDN Network access to multiple hosts through a gateway controller. The hosts for the Token-Ring Network can be attached on either the controller's primary or secondary link, but the link must be local SNA or remote SDLC. The hosts for the ISDN Network must be attached on the controller's primary link which must be local SNA. For example, Token-Ring or ISDN devices on a controller customized for ESCON Channel Single Link Multi-Host Support can access any of the eight possible channel-attached hosts.

A particular Token-Ring device, depending on the support provided by the device, may be able to access more than one of the gateway's hosts. For example, a Token-Ring device such as a 3174 Model 13R customized for Single Link Multi-Host Support could access up to 8 hosts through only one 3174 gateway. Figure 2-3 on page 2-9 shows an example of Multi-Host Gateway Support.

APPN Network Node

Advanced Peer-to-Peer Networking (APPN), is an enhancement to IBM's Systems Network Architecture (SNA) and type 2.1 (T2.1) node architecture. It allows inter-connection of systems of widely differing sizes into networks of a dynamic topology. An APPN network is easier to use, is more reliable, and provides more flexibility than existing networks. Figure 2-5 on page 2-12 is an example of an APPN network.

The 3174 APPN feature enhances the connectivity options of the 3174 Establishment Controller and its attached workstations. It provides network node-to-network node communication over the Token-Ring and NN-to-LEN host communication using SDLC, Token-Ring, and S/370 SNA channel. The 3174 provides APPN NN services to LEN end nodes and APPN end nodes and performs intermediate session routing of data for sessions that traverse it. The 3174 NN performs distributed searches of the network to locate remote LUs and calculates the best route based on Class of Service. It also provides route selection, directory, and network management services for APPN ENs.

To use APPN, VTAM, and NCP, requirements are:

    VTAM(TM) V3R2 or later for SDLC
    VTAM(TM) V3R3 or later for 4361, ES/9370, or VM S/370 channel
    VTAM(TM) V3R4 or later for MVS/ESA S/370 channel
    NCP V4R3.1 or later for 3725
    NCP V5R2.1 or V5R3 or later for 3720 or 3745
    APAR #VM45562 for VTAM V3R3
    APAR #VM45886 for VTAM V3R3
    APAR #VM45911 for VTAM V3R3.

APPN is supported on the following models:

1L, 1R, 2R, 3R, 11L, 11R, 12R, 13R, 21L, 21R, 23R
51R, 53R, 61R, 62R, 63R.
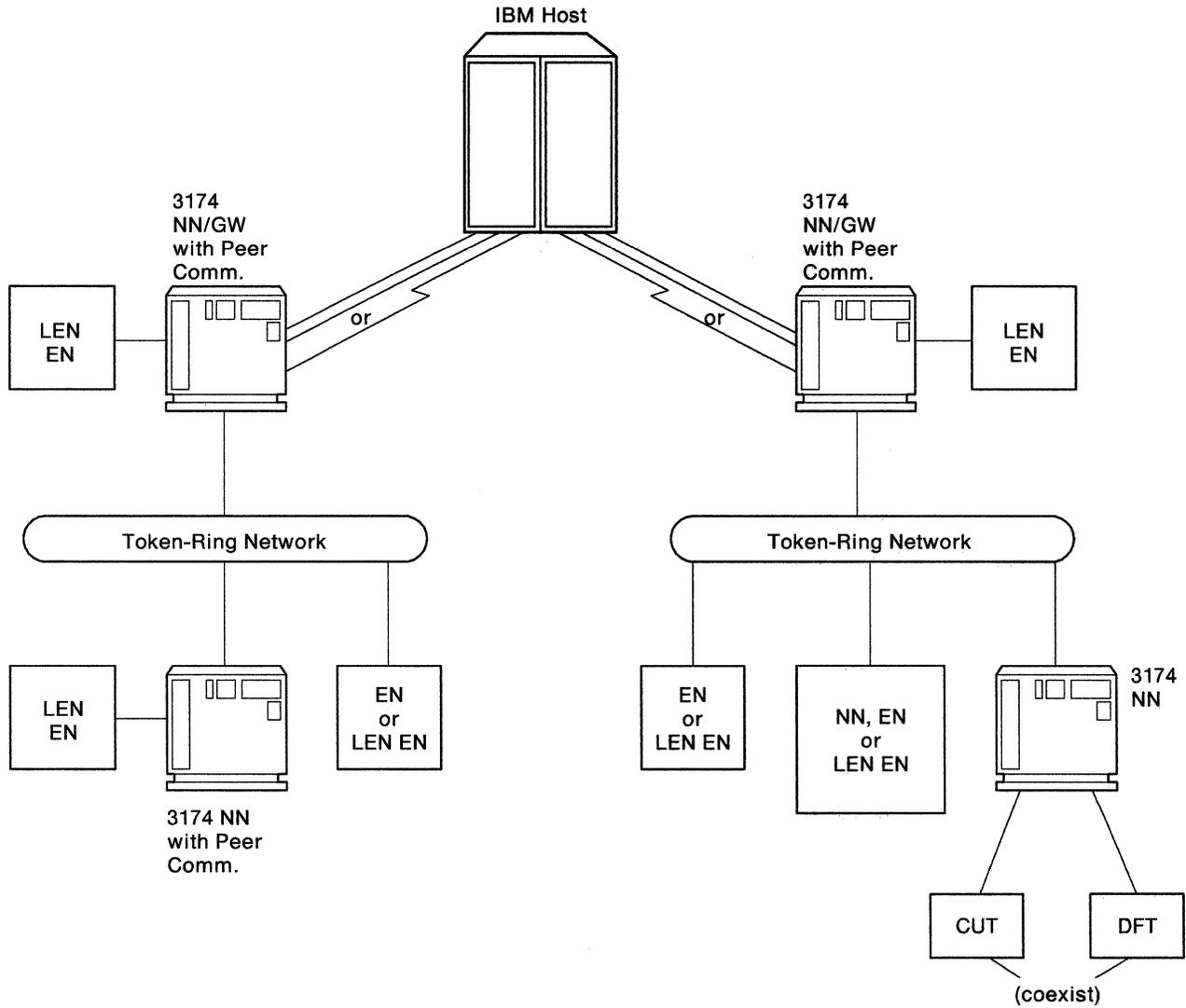
Legend:

NN = Network Node

EN = End Node

LEN EN = Low-Entry Networking End Node

Figure   2-5. Example of an APPN Network

3174 Peer Communication

3174 Peer Communication allows existing intelligent devices attached to a 3174 to form a 3174 Peer LAN segment that may be bridged to an IBM Token-Ring through the 3174 Establishment Controller. The 3174 Peer-segment is analogous to a LAN segment. The 3174 Peer Communication supports reporting links with up to four LAN Network Managers. 3174 Peer Communication support is in addition to the other functions your controller performs.

3174 Peer Communication provides a way for intelligent devices to:

- Communicate peer-to-peer
- Increase connectivity options
- Retain host connectivity
- Share resources, such as files, data bases, application programs, and printers
- Be managed from the IBM LAN Network Manager.

You can create a 3174-Peer segment with IBM personal computers (PCs) or Personal System/2* (PS/2*) computers attached with existing 3270 wiring to a 3174 Establishment Controller.

Peer Communication is supported on the following models:

1L, 1R, 2R, 3R, 11L, 11R, 12L, 12R, 13R, 21L, 21R, 22L, 23R
51R, 53R, 61R, 62R, 63R.

A possible 3174-Peer configuration is illustrated in
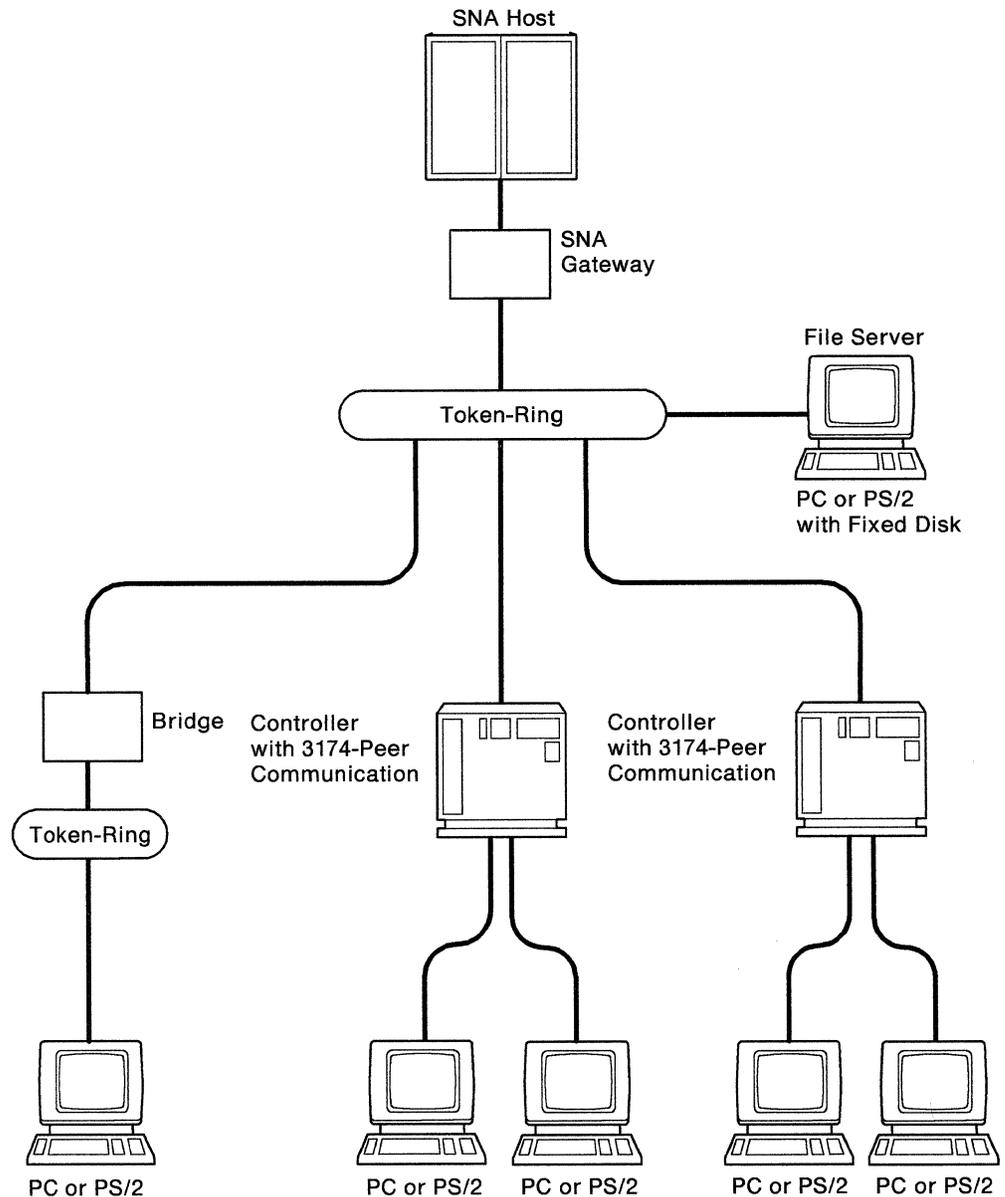
Figure 2-6. 3174-Peer Configuration

Note: Although Control Unit Terminals (CUTs) and other traditional devices can be attached to the 3174-Peer controller, only devices running 3174-Peer device drivers (3174-Workstation Peer Communication Support Program, P/N 96X5677, or equivalent) can use 3174 Peer Communication.

3174 Peer Communication supports LAN sessions between:

- Devices attached to the same 3174-Peer controller.

- A device attached to the 3174-Peer controller and a device connected to the same Token-Ring Network. (For example, a DSPU can be a 3174-Peer device with connectivity to a Token-Ring Gateway).

- Devices attached to two different 3174-Peer controllers, if both those controllers are connected to the same Token-Ring network.

To plan for 3174 Peer Communication, you must:

- Plan the microcode customization of Peer Communication.

- Plan the installation and customization of the appropriate device drivers (3174 Workstation Peer Communication Support, P/N 96X5677, or equivalent), on your PCs and PS/2s.

Customizing the microcode for Peer Communication, enables devices to communicate peer-to-peer and allows the controller to become a bridge to the Token-Ring. The controller connects devices that support an 802.2 interface, or a higher-level interface that utilizes the 802.2 interface. When higher-level interfaces are used, the same higher-level interface is required at each end of the connection.

For more information on planning for 3174 Peer Communication and its functions, see Chapter 13, "Planning for 3174 Peer Communication."

Terminal Attachment

Terminals can be attached to the controller in several ways. Some of the attachment methods are restricted to certain controller models. The number of terminals that can be attached also varies from model to model. Attachment methods include:

- Direct
- Terminal Multiplexer Adapters (TMAs)
- Fiber Optic Terminal Adapters
- IBM 3299 Terminal Multiplexers
- Asynchronous Emulation Adapters (AEA).

Direct

3270 Terminals can be attached directly to the ports on a Terminal Adapter (TA), which is installed in the controller during its manufacture. Depending on the controller model, a 9- or 4-port Terminal Adapter is installed. When the 3270 Port Expansion Feature is present, there will either be a total of eight Terminal Adapter ports or four (three for the first TA, and one for the second) depending on the 3174 model.

Terminal Multiplexer Adapters (TMAs)

The Terminal Multiplexer Adapter (TMA):

- Multiplexes the data streams from eight 3270 devices into a single coaxial cable

- Can be installed in large-cluster controllers (up to 4 per installed Terminal Adapter)

- Is attached to the Terminal Adapter with a short coaxial cable

- Provides 8 ports, allowing up to 32 terminals to be attached if 4 TMAs are installed or 64 terminals if 8 TMAs are installed.

Fiber Optic Terminal Adapter

The Fiber Optic Terminal Adapter provides for attaching 3299 Model 32 Terminal Multiplexers by means of fiber optic cable. This adapter attaches to the Terminal Adapter with coaxial cable and to the 32-port 3299 Terminal Multiplexer with fiber optic cable.

IBM 3299 Terminal Multiplexers

The 3299 Terminal Multiplexer:

- Multiplexes the data streams from up to eight or up to thirty-two 3270 devices into a single cable, depending on the multiplexer model

- Is attached to the Terminal Adapter with a coaxial cable, the IBM Cabling System, or Fiber Optic Cable, depending on the multiplexer model.

Asynchronous Emulation Adapter

The Asynchronous Emulation Adapter (AEA):

- Allows 3270 emulation from ASCII displays and printers as well as ASCII emulation from 3270 devices

- Has eight communication ports to which ASCII displays, printers, hosts, and modems can be connected

- Supports switched, direct, and non-switched terminal connections.

Display Compatibility Requirements

3290 compatibility with the host: If 3290 Information Panels are in the cluster, setup level 3 changes may be required to make the 3290 logical terminals compatible with their definition at the host, so that the host can communicate with them. Check with the system programmer. If setup level 3 changes are required after 3174 customizing is completed, you need to IML the Control disk before switching on the 3290 and going into setup level 3. DSL (downstream load) code is also required to make the 3290 operational. For more information, see the *3290 Information Panel Description and Reference*, GA23-0021.

Customization compatibility between the IBM 3270 Personal Computer and the 3174 Establishment Controller: If any 3270 Personal Computers are in the cluster, obtain a copy of the Information Worksheet used for customizing the IBM 3270 Personal Computer system diskette. The information on this worksheet should agree with the responses to the 3174 configuration questions. For more information, see the *IBM 3270 Personal Computer Introduction and Preinstallation Planning*, GA23-0179.

Host System Planning

You need to consider several areas for your host attachment.

- System definitions
- VTAM and NCP definitions
- VSE/SP2 considerations
- Response Unit (RU) size
- OEM ASCII Graphics support

- Failure information
- Response formats
- SOEMI support
- Central Site Change Management
- VM patches.

When planning to ensure that the host supports your establishment's needs, see Chapter 4, "Host System and 3174 Planning."

Microcode Customization

"Microcode customization" is the term used to describe the process of tailoring the operational code supplied by IBM with the controller to:

- Support the attaching displays and printers
- Support the features installed in the controller
- Identify the methods and protocols of host attachment that the controller will use.

For example, you customize to identify such things as:

- The number of hosts
- The number of ports used
- The addresses assigned to the ports
- Keyboard languages and layouts
- The number of host sessions for terminals
- The support provided for asynchronous communication
- The types of communication protocol.

This customization process consists of many tasks, but can be thought of as:

- Planning the customization
- Completing the worksheets
- Customizing the microcode on the Control disk.

Microcode customization and how to plan for it are explained further in Chapter 5. You should read that chapter before you plan for customization. You must also consider some of these items:

- Type of host attachment
- Multi-Host Support
- Alternate configurations
- Keyboard language support
- Country Extended Code Page
- Network Access Management
- Central Site Control Facility
- User-defined Terminal tables
- User-defined Translate tables
- Token-Ring/ISDN Gateway

- Port assignments
- Device Definition
- Central Site Change Management
- Keyboard modification
- Multiple sessions for terminals
- Downstream load microcode
- Response Time Monitor
- Local Format Storage
- APPN
- 3174 Peer Communication.

Type of Host Attachment

The types of host attachments were described earlier in this chapter. As part of your host attachment, you need to identify during microcode customization planning, the communication protocol you are using:

- BSC
- X.25
- Local Non-SNA
- Local SNA

- X.21 Switched
- Token-Ring Network
- SDLC.

Configuration question "101: Host Attachment" on page 6-5 identifies the protocol or sends you to the information that does.

Multi-Host Support

As described earlier, there are several types of Multi-Host Support. The desire to configure for multiple 3270 hosts is identified to the microcode by responding to question "101: Host Attachment" with an **M**.

Multi-Host Support requires that you plan the microcode customization by filling in worksheets for each host attachment. You can think of each host attachment as a separate controller configuration. You begin by identifying all the hosts and their characteristics on "Worksheet 2—Multi-Host Definition." Then you fill out worksheets for the primary link attachment (primary host first). When filling in these worksheets, you will respond to configuration questions that pertain to the entire link, or "controller configuration". These questions are not repeated on the worksheets for the secondary hosts on the link. After completing the worksheets for the primary host on a link, you fill out worksheets for each secondary host attachment on the link.

For example, you need to consider several things when planning for Multi-Host Support:

- Port Assignments
- Device Definition
- Multiple sessions for terminals
- Storage
- Response Time Monitor.

These are discussed later in this chapter.

Alternate Configurations

Depending on the types of communication adapters installed, certain models of the 3174 Establishment Controller can be configured to operate as different models. These different configurations are known as *alternate configurations* (see Table 1-3 on page 1-13).

To use one of the controllers listed in Table 1-3 on page 1-13 in an alternate configuration, you must configure a Control disk for each communication protocol.

Keyboard Language Support

The controller supports many languages. During planning, you will identify the keyboard language you wish to use when responding to configuration question "121: Keyboard Language." The languages supported by the controller are listed in Table 6-5 on page 6-21.

If you have a Concurrent Communication Adapter, you can specify the keyboard language that is to be used with the adapter. This language can be different than the language on your primary host links. For more information, see "139: Concurrent Communication Keyboard Language" on page 6-29.

Country Extended Code Page (CECP)

In addition to the basic keyboard language support, the controller provides Country Extended Code Page (CECP) support. CECP provides a larger definition of graphic characters and improves multilingual communication. Your response to configuration question 123 on page 6-21 indicates whether you wish to use CECP. If you do, you must also respond to question 121 with one of the CECP languages listed in Table 6-6 on page 6-22.

Network Asset Management

The Network Asset Management function supports host requests for vital product data from SNA-attached controllers and their devices. (Vital product data is information about a specific display station, such as its location or type.) These are devices that do not support regular vital product data architecture. The data is submitted through the Central Site Control Facility and NetView*.

Central Site Control Facility (CSCF)

The Central Site Control Facility enables you to perform online problem determination procedures from remote NetView-supported terminals. This facility eliminates the need to go to a terminal directly attached to the 3174 to perform an online test. Central Site Control Facility is also used for submitting vital product data to a host from an SNA-attached controller or device.

Note: CSCF requires NetView Release 3.0 of MVS/XA or VM/SP or higher.

User-Defined Terminal Tables (UDTs)

User-Defined Terminal tables are one of two groups of tables providing for communication between 3270 hosts and ASCII devices. Terminal tables enable the AEA feature to interpret and send sequences and commands to different ASCII station types emulating 3270 terminals. The AEA microcode provides terminal tables for several commonly used station types; you can define more tables to support other station types.

Refer to "Filling In Worksheet 32—Terminal Tables" on page 14-66 for an example of terminal table definition.

User-Defined Translate Tables (UDXs)

User-Defined Translate tables are the second group of tables used for communication between 3270 hosts and ASCII devices. Translate tables provide information about the character set supported by an ASCII station, the language configured for its 3174 controller, and matching symbols in each data stream to equivalent symbols in the other data stream. The AEA feature provides translate tables for commonly used stations; you can define more to support other stations.

Refer to "Filling In Worksheet 35—Translate Tables" on page 14-78 for an example of translate table definition.

Port Assignments

You need to identify port assignments for your terminals and printers during your customization planning. This is done by assigning host addresses to ports or by allowing the customizing program to assign them for you. Your response to configuration question 116 identifies how you want host addresses assigned. If you are planning for Multi-Host Support, you need to specify a separate port assignment for each host attachment. The planning information you need, and the responses for question 116, are located in Chapter 7, "Planning for Port Assignment."

Device Definition

Device Definition consists of four separate areas:

- Printer Authorization Matrix (PAM)
- Logical Terminal Assignment (LTA)
- Extended Vital Product Data (EVPD)
- Integrated Services Digital Network (ISDN) Definition.

PAM and LTA deal with the assignment of devices that connect to the network. EVPD deals with setting up information for providing vital product data for the controller and its attached devices. ISDN deals with the ISDN Adapter, port and channel definitions.

Printer Authorization Matrix (PAM) defines which printers the display stations in a cluster can use for local copy, host printing, and shared copy operations. During planning, you complete worksheets that identify the display stations in the PAM for the different copy operations.

Logical Terminal Assignment (LTA) identifies which host sessions individual terminals can access and allows you to assign a printer to one host. You do not need an LTA if you are not planning to configure for Multi-Host Support. Port Assignment is used to identify host sessions in such a case.

Extended Vital Product Data enables you to plan for sending vital product data from certain attached stations. Vital product data is information about a specific display station, such as its location or model type.

Integrated Services Digital Network (ISDN) Definition enables you to define the type of network for each ISDN Adapter installed in the controller. An ISDN number must be supplied for each device in the network. Depending on the type of network specified, additional information may be needed. Such information that may be needed includes specifying a semi-permanent connection and a TEI value.

The information you need to complete this phase of planning is located in Chapter 15, "Planning to Define Devices."

Central Site Change Management (CSCM)

By customizing for Central Site Change Management (CSCM), you can centrally distribute the customization information to the rest of the controllers in the network. This provides convenience and control.

Read the *Central Site Customizing User's Guide*, GA27-3868, before planning for CSCM. Once you have read that book, you can plan for CSCM using the information in Chapter 11 of this manual.

Keyboard Modification

The purpose of modifying keyboards is to create unique keyboard layouts that meet specific user applications. If you require layouts that are not standard, the information in Chapter 17, "Planning to Modify Keyboards," helps you plan for modified layouts.

Multiple Logical Terminal Sessions (MLT)

Multiple Logical Terminals (MLT) allows a terminal to have multiple sessions with one or more hosts. It is supported for both 3270 and ASCII terminals. Terminals can access different applications through a key sequence that switches between the different sessions.

Multiple Interactive Sessions

The 3174 Establishment Controller supports multiple sessions on some devices without using MLT support. The Multiple Interactive Sessions (MIS) capability allows DFT display stations to operate as multiple logical terminals. Refer to "Port Assignment Considerations" on page 7-4 for additional information about MIS.

Address assignment for multiple sessions is accomplished through customization questions 116 and 117. When assigning addresses to ports supporting DFTs, you should check the device's supporting documentation for information about the number and type of sessions supported for that DFT.

Downstream Load Microcode

Downstream Load (DSL) microcode is required for devices and features that need additional microcode to operate, for example, the IBM 3290 Display Panel and the Asynchronous Emulation Adapter. A DSL disk stores the diagnostics, bringup code, and operational microcode for displays and features that require additional microcode to operate.

You need to identify if there are any devices or features in your configuration that require DSL microcode. If there is a need to perform the procedure for merging DSL code refer to the *3174 Utilities Guide*, GA27-3863.

Response Time Monitor

The Response Time Monitor (RTM) function is a tool for network management, used to measure and evaluate response times. Response times can be measured for all display terminals that attach to the controller, but distributed function terminals (DFTs) require a special interface. See the *3174 Functional Description*, GA23-0218.

RTM is defined by the response given to configuration question 127, which is explained in Chapter 9, "Planning for Response Time Monitor (RTM)."

Local Format Storage

Local Format Storage (LFS) provides for host-controlled loading of formats into 3174 storage and for presenting the formats. This feature is supported on any CUT device or any ASCII device operating in CUT emulation mode.

This feature helps improve system response time by enabling the 3174 to display stored formats when requested, thus relieving the host of repeatedly transmitting the format data to the controller.

LFS is defined by the response given to configuration question 179, which is explained in Chapter 6, "Planning to Configure."

APPN

The 3174 APPN feature enhances the connectivity options of the 3174 Establishment Controller and its attached workstations. It provides network node-to-network node communication over the Token-Ring, NN-to-LEN host communication by SDLC, Token-Ring, and S/370 SNA channel, and NN services for LEN ENs and APPN ENs on the Token-Ring.

3174 Peer Communication

3174 Peer Communication provides peer-to-peer communication among devices connected to a 3174 Establishment Controller through 3270 Connection Adapters or 3278/3279 Emulation Adapters. 3174 Peer Communication provides an additional communication function for intelligent devices whose current uses are primarily host-interactive communication.

Microcode Migration

Periodically, IBM makes available upgraded versions of the Utility and Control diskettes that include new functions, such as the ability to handle a new type of display station. Each upgrade is assigned a microcode release level.

When migrating from one release of microcode to the next, consider:

- Microcode Upgrade utility
- RPQs
- Downstream Load code
- Patches
- Configuration questions not supported in the previous release
- Keyboard modification.

Chapter 5, "Microcode Customization Overview," contains more information on these considerations.

Part 2. General Planning

Chapter 3. Planning for Storage

Chapter 4. Host System and 3174 Planning

Chapter 3. Planning for Controller Storage

An Overview of Controller Storage Planning

Before you start planning, you need:

* "Worksheet 49—Storage Requirements" on page A-64.

* A knowledge of the features and functions that will be included in your configuration, including any RPQs.

* To know the amount of storage installed in your controller. Table 3-1 shows base and maximum storage amounts supported by each controller model. Base storage is the minimum amount of storage that can ship in the controller; maximum storage is the largest amount of storage that can be reached using combinations of storage expansion features.

Important: 3MB is the minimum amount of storage required to support Configuration Support C microcode.

Table 3-1. Base and Maximum Storage Supported in 3174 Models

Model	Base Storage	Maximum Storage
1L, 1R, 2R, 3R	1MB	4MB
11L, 11R, 12L, 12R, 13R	2MB	6MB
21L, 21R, 22L, 23R	2MB	6MB
51R, 53R	1MB	3MB
61R, 62R, 63R	2MB	6MB

Certain functions may require that storage expansion features be installed in the controller. You need to plan for controller storage if your configuration includes any of the following:

* Multiple Logical Terminals
* Central Site Change Management
* Asynchronous Emulation Adapter
* Local Format Storage
* AEA Large Screen Support
* Multi-host Support
* 3270 Port Expansion Feature
* APPN
* Token-Ring/ISDN Gateway
* Peer Communication
* RPQs with additional storage requirements.
  (See your RPQ documentation to determine if additional storage is needed.)

If sufficient storage is **not** installed in the controller or adapter to support the features and functions for your planned configuration, then the support for the configuration you planned is deconfigured (function does not operate) once the controller has been IMLed. A minimal configuration will be in effect to allow for the configured SNA host link, CSCM, alerts, and on-line test capability for RAS. In a minimal system, the following is deconfigured if customized:

MLT
AEA
3270 Port Expansion Feature
Concurrent Communication Adapter
Multi-Host Support

Token-Ring/ISDN Gateway Support
Local Format Storage
Peer Communication
APPN (See note 1).

Notes:

1. The requested APPN support is reduced to the point where only the 1A Host link is serviced.

2. If you have not planned for microcode customization, you may wish to do so before planning your controller's storage. While planning microcode customization, you identify the features and functions required for your configuration.

Storage Planning Procedure

Planner: Use the following steps to determine how much storage is required for your controller's configuration.

Step 1 Locate and make a copy of "Worksheet 49—Storage Requirements" on page A-64.

Step 2 Determine the features, functions, and RPQs that your configuration supports. A Base configuration requires at least 2050KB.

    a. Single Link Multi-Host Support over the ESCON Channel with 4KB RU ability requires the same storage per host function as for single link controllers without ESCON Channel attachment.

       Use the storage numbers for 4KB RU Support (Local Models) in Table 3-2 on page 3-7 for ESCON Channel Gateway Support using 4KB RU ability.

    b. Determine your storage requirement for MLT support for all 3270 and ASCII terminals. See "Determining MLT Storage Requirements" on page 6-15.

    c. If you are planning for AEA MLT, please note that the 216KB requirement is *in addition to* the amount of storage required to support MLT. For example, if you plan to have Level 6 of MLT support, and you plan to provide MLT for ASCII terminals, add 1536KB and 216KB into your storage requirement total.

    d. See "179: Local Format Storage" on page 6-34 for information about local format storage.

    e. If you are planning for 3174 Gateway, see "Storage Requirements for DSPUs" on page 3-6.

    f. For RPQs write in the amount of storage required. See the documentation supplied with the RPQs.

    g. If you are planning for the 3270 Port Expansion Feature and you have included the 159K for Multi-Host Support, then you must use 505K as the storage requirement for the 3270 Port Expansion Feature.

    h. If you are planning for APPN or Peer Communication, refer to "Worksheet 49—Storage Requirements" on page A-64 for storage amounts required.

Step 3 In the Totals column, write in the storage requirements for each feature and function that is supported in your configuration.

Step 4 After entering all the storage requirements for your configuration into the Totals column, add these figures and write the result next to Total Storage Required at the bottom of the worksheet. (Ensure that you have added in the 2050KB required for Base.)

Step **5** Consult the following table to determine how much storage (in megabytes) is required to support your configuration. Enter the result on the worksheet next to Storage Required in MB.

If Total Storage Required in KB	MBs Required
= 3072 or less	3MB
= 3073 to 4096	4MB
= 4097 to 5120	5MB
= 5121 to 6144	6MB

For example, if the Total Storage Required equals 3150, then 4MB of controller storage is required.

Step **6** Ensure that your controller contains sufficient storage by comparing the storage requirements for the functions you want configured with the physical amount of storage installed in the controller. If the storage installed in the controller is less than the storage required for the functions you want, you need to add storage or leave some function unconfigured. To obtain additional storage, contact your IBM representative.

Storage Requirements for DSPUs

To determine the additional storage required for DSPUs for a gateway controller, the following steps should be taken:

1. Determine if the desired number of DSPUs is supported by the type of Token-Ring Adapter and/or the number of ISDN Adapters.

   - The 4 Mbps Token-Ring Adapter supports up to 140 Token-Ring DSPUs.

   - The 16/4 Mbps Token-Ring Adapter supports up to 250 Token-Ring DSPUs.

   - Each ISDN Adapter allows up to 8 ISDN DSPUs to connect to the 3174 Gateway.

     - Up to 32 DSPUs (4 ISDN Adapters) are supported by Models 11L, 11R, 12L, 12R, 21L, 21R, and 22L.

     - Up to 24 DSPUs (3 ISDN Adapters) are supported by Models 1L, 1R, and 2R.

     - Up to 16 DSPUs (2 ISDN Adapters) are supported by Models 61R and 62R.

2. Determine if the total number of DSPUs (Token-Ring plus ISDN) is supported by the controller model.

   - Models 1L, 1R, and 2R support up to 140 DSPUs.

   - Model 51R supports up to 72 Token-Ring DSPUs.

   - Models 11L, 11R, 12L, 12R, 21L, 21R, 22L, 61R, and 62R support up to 250 DSPUs.

3. Determine whether your configuration will include DSPUs on both primary and secondary (CCA) links, on the primary link only, or on the secondary links only.

   Note: The secondary links support Token-Ring DSPUs only. They do not support ISDN DSPUs.

4. Select the appropriate table based on the maximum RU size supported on the primary link. See "Response/Request Unit (RU) Size" on page 4-16 for information on RU sizes. See Table 3-2 on page 3-7 for 4KB RU Gateway Support and Table 3-3 on page 3-8 for 8KB RU Gateway Support.

5. Find the line in the table that contains the lowest range that includes the number of DSPUs you have.

   Note: The DSPU storage requirements are independent of the type of DSPU (Token-Ring or ISDN), with one exception. For a local model with 4KB RU support and only ISDN DSPUs, up to 32 ISDN DSPUs are supported with 512KB storage. See Table 3-2.

For example, suppose you plan for DSPUs on primary and secondary links. Find the line in the table that encompasses the number of secondary link DSPUs while still accommodating the number of primary link DSPUs. So, if you were planning for 10 DSPUs on the primary link and 35 on the secondary link of a local model controller, you would need 1016KB of storage. Ten primary link DSPUs fit into the first range of 1-20 under **Primary**, but 35 DSPUs do not fit in the first **CCA** range of 1-32. By going to the next line, you can meet both DSPU requirements and determine that you need 1016KB of storage.

Or suppose you were planning for 95 DSPUs on the primary link and 72 DSPUs on the secondary link of a local model controller. In this case, the primary link DSPUs require the higher range (and the greater amount of storage). Seventy-two secondary link DSPUs fit into the second **CCA** range of 1-72, but 95 DSPUs don't fit in the second **Primary** range of 1-60. By going to the next line, you meet both requirements and determine that you need 1528KB of storage.

Table 3-2. Storage Requirements for DSPU Combinations (4KB RU Gateway Support). Values are in KB (1024 bytes).

DSPUs				Storage Required
Primary Only	**CCAs Only**	**Primary and CCAs**		
		Primary	**CCAs**	
(Local Models)				
1 – 28*	1 – 100	1 – 20	1 – 32	512
29 – 72	1 – 100	1 – 60	1 – 72	1016
73 – 116	1 – 100	1 – 95	1 – 100	1528
117 – 140	1 – 100	1 – 130	1 – 100	2040
141 – 200	1 – 100	1 – 180	1 – 100	2552
201 – 250	1 – 100	1 – 230	1 – 100	3064
(Remote Models)				
1 – 72	1 – 100	1 – 40	1 – 50	512
73 – 140	1 – 100	1 – 116	1 – 100	1016
141 – 250	1 – 100	1 – 200	1 – 100	1528

* 1—32 for ISDN DSPUs.

Table 3-3. Storage Requirements for DSPU Combinations (8KB RU Gateway Support). Values are in KB (1024 bytes).				
DSPUs				**Storage Required**
Primary Only	**CCAs Only**	**Primary and CCAs**		
		Primary	**CCAs**	
(Local Models)				
1 − 20	1 − 100	1 − 12	1 − 32	512
21 − 50		1 − 38	1 − 72	1016
51 − 80		1 − 59	1 − 100	1528
81 − 100		1 − 90	1 − 100	2040

Chapter 4. Host System and 3174 Planning

An Overview of Host System and 3174 Planning

You must consider several things when planning for the host to ensure that it supports your network. This chapter notes host programming considerations for the IBM 3174 Establishment Controller, offers tips for coding macros, and provides information on planning and customizing Downstream Physical Units (DSPUs).

It is assumed that you have data stream and host programming experience. This chapter offers information on coding but does not explain programming operations. Some of the terminology used in this chapter can be found in the glossary, but if you need detailed information, you may need to refer to your host application documentation and the *3174 Functional Description*, GA23-0218.

The following areas should be considered for your host applications:

- System definitions
- VTAM and NCP definitions
- VSE/SP2 considerations
- Response Unit (RU) size
- OEM ASCII Graphics support
- Failure information
- Response formats
- SOEMI support
- Central Site Change Management
- VM patches.

In addition to this chapter, Appendix D contains examples of VTAM/NCP definitions for the 3174.

Considerations for Support of ASCII Graphics

If you are planning to customize for supporting ASCII graphics workstations, certain prerequisites apply to your system. They are listed in "IBM GDDM ASCII Graphics Support."

Several of the prerequisite items provide the ability to perform functions other than ASCII graphics (such as file transfer). "Other Support" on page 4-4 explains this information.

IBM GDDM ASCII Graphics Support

ASCII graphics refers to the ability of GDDM* to drive ASCII workstations using an LU2 OEM data structured field in a 3270 data stream. The function of the 3174 controller in this mode is to transparently pass data between the host and the ASCII device. This capability is sometimes referred to as LU2 transparency.

If your host is running a Virtual Machine/System Product (VM/SP) release, *and* you are planning customization for a 3174 to support OEM ASCII graphics workstations along with IBM GDDM, you need:

- VM/SP Release 6 or later
- APAR #VM37424 for VM/SP Release 6
- An IBM GDDM release that supports OEM ASCII graphics functions (see note).

Note: IBM intends to provide GDDM drivers for specific OEM ASCII graphics workstations attached to the 3174.

If the host is **not** running a VM/SP release, you need an IBM GDDM release that supports OEM ASCII graphics functions (see note).

If an ASCII device is to participate in OEM ASCII graphics support, the device must be supported in two ways: it must be a standard ASCII graphics device (support can be through a User-Defined Terminal table), and it must be supported by the appropriate IBM GDDM release. If graphics support is provided through a User-Defined Terminal table, you must provide a Graphics Query Reply attribute at UDT customization. (See "Filling In Worksheet 32—Terminal Tables" on page 14-66 for more information about the Graphics Query Reply.)

Other Support

You may be planning for graphics support other than ASCII graphics, or for plotter use, or for file transfer programs. If this is the case, certain prerequisites apply to your system.

If your host is running a Virtual Machine/System Product (VM/SP) release, *and* the 3174 for which you are planning customization supports LU2 Transparency (the application uses Write-Structured Fields or OEM data-structured fields with a device), you need:

- VM/SP Release 6 or later
- APAR #VM37424 for VM/SP Release 6
- Your own file transfer, plotter, or graphics support programs in the host and/or workstation.

Note: In order for a 3174 ASCII device to participate in LU2 Transparency, the device must be supported by the application. Also, the User-defined Terminal table used with the device must have a Graphics Query Reply attribute specified.

Considerations for 3270 Gateway

The 3174 Establishment Controller may be customized as a gateway to allow devices attached to a Token-Ring Network or ISDN to communicate with a SNA host. The 3270 Gateway converts Token-Ring or ISDN protocols and frames to certain SNA protocols and request units. The Token-Ring and ISDN devices are downstream physical units (DSPUs) and are PU Type 2.0.

The Token-Ring 3270 Gateway is available on 3174 Models 1L, 1R, 2R, 11L, 11R, 12L, 12R, 21L, 21R, 22L, 51R, 61R, and 62R. The ISDN 3270 Gateway is available on the same models except for the Model 51R. Both the Token-Ring and ISDN 3270 Gateway may co-exist on the same 3174 Establishment Controller provided the controller model supports both gateways and has a Token-Ring adapter and at least one ISDN Adapter. (Additional storage may be required for either or both gateways. Refer to "Storage Requirements for DSPUs" on page 3-6.)

A 3174 Establishment Controller with the 3270 Gateway function is defined at the host as an SNA channel-attached or telecommunication-attached controller.

When the 3270 Gateway is customized, a list of Token-Ring Network or ISDN DSPUs to be serviced by the gateway is defined. If DSPUs have to be added or deleted, the gateway customization must be updated to reflect the new configuration. 3174-Peer stations that are DSPUs appear to the 3270 Gateway as stations that are attached to the Token-Ring network.

Each 3174 Model 3R, 13R, 23R, 53R, and 63R that is attached to a Token-Ring Network is also defined as an SNA channel-attached or telecommunication-attached controller. These controllers appear to the host system as downstream physical units (DSPUs).

A single 3174 controller can provide gateway functions to more than one host using the Multi-Host Gateway support. In this case, each host attachment should be customized as a separate gateway. For each host, you must define the list of Token-Ring Network or ISDN devices that are to be routed to that host.

The 3270 Gateway is supported by:

- ACF/VTAM under VM, MVS, and VSE
- NetView Version 1 or higher.

Segmenting

Sometimes request/response units (RUs) sent to network terminals are too large for optimal transfer over the connecting link. In such cases, the information units are divided into smaller elements to facilitate transmission over the link. This process is called *segmenting.*

The gateway performs outbound and inbound segmenting when:

- The size of an outbound RU exceeds the frame size customized for the DSPU. (For Token-Ring Network devices, the frame size is customized. See configuration questions "940: Ring Address Assignment" on page 16-10 and "941: Ring Transmission Definition" on page 16-14. For ISDN devices, the frame size is not customized and is fixed at 1033 bytes.)

- The inbound frame from a DSPU to a local gateway exceeds the host read channel program size or 1033 bytes, whichever is smaller.

- The inbound frame from a DSPU to a remote gateway exceeds 457 bytes.

System Definitions Used with the Gateway Function

The following sections provide coding tips for macros and show valid system definitions for use with the Gateway function.

MVS/SP Definitions

An IODEVICE macro must be coded for the 3174 Model 1L, 11L, 12L, 21L, and 22L gateway and for each DSPU. The macro should be coded as follows:

- The UNIT parameter of the IODEVICE macro must be coded

```
3174/3791L - for Models 1L, 11L, and 21L
3174       - for Models 12L and 22L
```

- The ADDRESS parameter of the IODEVICE macro allows specification of multiple Token-Ring Network or ISDN devices.

- A single IODEVICE macro should be coded, with the ADDRESS parameter specifying multiple devices.

VM/SP Definitions

The following examples are valid definitions for the 3174 Models 1L, 11L, 12L, 21L, and 22L acting as 3270 Gateways and for the Token-Ring Network or ISDN DSPUs. These definitions can be used if the gateway is attached to a virtual guest machine (for example, VSE/VCNA), or if the gateway feature is attached to the native VTAM directly under VM.

Note: The definition examples in this chapter are valid as of the release of this manual. However, they depend on release levels of the associated macros and may not work for your code. They are intended only as examples.

For the Gateway:

```
RDEVICE ADDRESS=E40,DEVTYPE=3705,ADAPTER=TYPE4,MODEL=H8,    *
    CPTYPE=NCP
```

For the Downstream Physical Units (DSPUs):

```
RDEVICE ADDRESS=E41,DEVTYPE=3705,ADAPTER=TYPE4,MODEL=H8     *
    CPTYPE=NCP
RDEVICE ADDRESS=E42,DEVTYPE=3705,ADAPTER=TYPE4,MODEL=H8     *
    CPTYPE=NCP
RDEVICE ADDRESS=E43,DEVTYPE=3705,ADAPTER=TYPE4,MODEL=H8     *
    CPTYPE=NCP
RDEVICE ADDRESS=E44,DEVTYPE=3705,ADAPTER=TYPE4,MODEL=H8     *
    CPTYPE=NCP
RDEVICE ADDRESS=E45,DEVTYPE=3705,ADAPTER=TYPE4,MODEL=H8     *
    CPTYPE=NCP
```

For the Gateway:

```
RCTLUNIT ADDRESS=E40,CUTYPE=3705,FEATURE=16-DEVICE
RCHANNEL ADDRESS=E,CHTYPE=BLKMPXR
```

Tips for coding macros:

- The FEATURE parameter of the RCTLUNIT macro specifies the maximum number of Token-Ring-attached DSPUs supported by a single 3174 Model 1L, 11L, 12L, 21L, or 22L with the gateway feature installed. The value given in the FEATURE parameter must be a multiple of 16. For the maximum number of DSPUs supported by the gateway feature, the parameter must be coded:

  FEATURE = n-DEVICE where n stands for the maximum number of nodes plus 1 (n must be a multiple of 16).

- The value given in the ADDRESS parameter of the RCTLUNIT macro must end with 0, as in ADDRESS = 5C0.

- The RCTLUNIT macro defines the 3174 Model 1L, 11L, 12L, 21L, or 22L as CUTYPE = 3705.

- The RDEVICE macro defines the 3174 Model 1L, 11L, 12L, 21L, or 22L and each Token-Ring or ISDN device as DEVTYPE = 3705.

- In the IOCP generation in the IODEVICE macro, each 3174 Model 1L, 11L, 12L, 21L, or 22L and each Token-Ring or ISDN device are defined as follows:

  ```
  3791L - for Models 1L, 11L, and 21L
  3174  - for Models 12L and 22L
  ```

A RDEVICE macro must be coded for the gateway itself and for each DSPU.

Note: If there are more DSPU definitions in the 3174 gateway than VM RDEVICE macro definitions, attempts to bring up the gateway will lead to a VTAM hang-up.

VSE Definition

VSE/SP2.1 does not automatically recognize and generate ADD statements for a locally attached 3174 Model 1L, 11L, 12L, 21L, or 22L. You must manually include ADD statements as in the following example:

For the gateway:

```
ADD CUU,3791L,EML    (SNA)
ADD CUU,3277,EML     (NON-SNA)
```

For the DSPUs:

```
ADD E41,3791L,EML
ADD E42,3791L,EML
ADD E43,3791L,EML
ADD E44,3791L,EML
ADD E45,3791L,EML
```

The emulation parameter (EML) is necessary to inform VSE/SP2.1 that the 3174 Model 1L, 11L, 12L, 21L, or 22L is to be handled as a 3274 Model A41.

Channel Type UCW Definition

For a gateway, unit control words (UCWs) must be set up according to the channel type:

Channel	3174 SNA	3174 Non-SNA	3174 Model 1L, 11L, or 21L with Gateway
370 byte	Nonshared	Shared	Shared
370 block	Nonshared	Shared	Shared
370 XA byte	Nonshared	Shared	Nonshared
370 XA block	Nonshared	Shared	Shared or Nonshared*

*It is highly recommended that Shared be used.

VTAM Definition

If *n* Token-Ring Network or ISDN devices are supported through a single 3174 Establishment Controller with the 3270 Gateway feature, perform the VTAM system definition as if there were *n* + 1 SNA or SDLC controllers attached. For VTAM Version 3.1.1, the SECNET parameter of the PU macro must be set to YES (SECNET = YES) for all *n* downstream physical units, but not for the 3270 Gateway feature itself.

A subchannel or SDLC address must be defined for each DSPU attached to a Token-Ring Network or ISDN. The 3174 Establishment Controller with the 3270 Gateway feature that is being defined must also have a subchannel or an SDLC address assigned, and it must be the lowest subchannel or SDLC address. The range of subchannel or SDLC addresses assigned for the Token-Ring devices must follow the 3174 Establishment Controller address. The range for the ISDN devices follows that for the Token-Ring devices. The complete address range for the 3174 Establishment Controller, Token-Ring devices, and ISDN devices must be contiguous.

Note: These subchannel addresses must be a subset of or in a range equal to those defined in the IOCP and host system generation.

VTAM Definition Example: Figure 4-1 on page 4-8 illustrates the system definition parameters used in defining a 3174 Model 1L with the gateway feature and a Token-Ring-attached 3174 Model 3R to an MVS/VTAM host system. Related customization questions are also illustrated. In this example, the I-frame size of 2042 bytes is used. The default of 1033 bytes is used for the inbound frame size. Note that the VTAM IOBUF size and the MAXBFRU on the PU macros were chosen to accommodate an inbound frame of this size. Defaults were used for window sizes and the MAXIN value for the Model 3R.

Example Configuration[1]   Definition Considerations

VTAM Start Parameters

```
IOBUF = (baseno,270,.....)
```

VTAM Local SNA Major Node (SYS1. VTAMLST):

```
      VBUILD TYPE = LOCAL
PU    CUADDR = 2E0, MAXBFRU = 4, . . . .
:     (LU definitions for Model 1L workstations)
PU    CUADDR = 2E1, SECNET = YES, MAXBFRU = 4, . . . .
:     (LU definitions for Model 3R workstations)
```

MVS System Generation Macros:

```
      IODEVICE  UNIT = 3791L,
      ADDRESS = (2E0, 2)
```

Gateway Feature Customizing Questions:

```
104    = E0 (low subchannel address)
105    = E1 (high subchannel address)
150    = 10 (Token-Ring Gateway)
900    = 4000317402E0 (Token-Ring Gateway address)
940:   Ring @ = 4000317402E1 (3174-3R Token-Ring Adapter address)
941:   F  = 3 (Frame size = 2042)
       W  = 2 (Default window size)
```

3174-3R Customizing Questions:

```
106 =   4000317402E1 04 (3174-3R Token-Ring Adapter address and SAP)
107 =   4000317402E0 04 (Token-Ring Gateway address and SAP)
382 =   1033   (Matches VTAM Read Channel Program Size)
383 =   2      (Default)
```

Workstations

[1] 3174 Model 1L Attachment to an MVS Host at Channel Address 2E0 with One 3174 Model 3R Attached to the Token-Ring Network

Figure   4-1. Configuration Example for 3174 Model 1L with the IBM Token-Ring Gateway

NCP Definition

Generally, NCP definitions follow the same guidelines as the VTAM definitions described in "VTAM Definition" on page 4-7. Some coding tips for NCP are listed below:

- A PU macro should be defined for each DSPU; in addition, one PU macro is needed for the 3174 controller with the gateway feature.

- The addresses in the PU macro should match those defined in VTAM and, therefore, are contiguous.

- Segmenting is done by the 3174 when the MAXDATA parameter is set to a value greater than the frame size specified for the DSPU.

- The SERVLIM parameter on the LINE macro directly affects the speed at which the SDLC links are established with PUs defined at the gateway. This parameter specifies the number of complete regular scans of the normal (active links) service order table before one line on the status (inactive links) service order table is serviced.

  The status service order table is scanned more frequently with a low value for the SERVLIM parameter than with a high value. With a low value specified, or by taking the default, the links are established more quickly, but performance is degraded for active links by processing the status service order table more frequently. With a high value specified, performance for active links is less affected, but the speed at which new links are established is reduced.

- The 3174 gateway can operate on an NCP line that is set up for simultaneous send and receive mode of operation: DUPLEX=FULL on the GROUP macro, ADDRESS=(xxxx,FULL) on the LINE macro. However, each PU associated with the gateway must be defined for alternate send and receive operation (DATMODE=HALF) on the PU macro. This combination of attributes allows the NCP to send data to one DSPU while receiving data from another DSPU and should improve overall performance.

- The NCP can be configured to perform Group Polling to the PUs associated with a 3174 gateway. Configuring this way improves performance by reducing the amount of unproductive polling by the NCP. Group Polling is activated at the NCP by defining a common group poll address for the DSPUs (GP3174 option of the NCP PU or LINE macro).

  Not all versions of NCP support Group Polling. Refer to "912: Group Poll Address" on page 16-8 for more information.

Figure 4-2 on page 4-10 shows that the NCP MAXDATA size of 521 is used. The ISDN frame size, by default, is 1033 bytes. The NCP MAXDATA frame size and the ISDN frame size do *not* need to match.

Example Configuration*   Definition Considerations

NCP Generation Macros:

```
          GROUP  LNCTL = SDLC,  DIAL = NO,  SERVLIM = 4
   name   LINE  ADDRESS = (128,FULL)
   name   PU     ADDR = E0, MAXDATA = 521, DATAMODE = HALF,
                 GP3174 = E5
   .
   name   LU     (normal sequence of LUs for type of PU)
   .
   .
   name   PU     ADDR = E1, MAXDATA = 521, DATAMODE = HALF,
                 GP3174 = E5
   .
   name   LU     (normal sequence of LUs for type of PU)
   .
   .
```

Gateway Feature Customizing Questions:

```
104   = E0 (low SDLC address)
105   = E1 (high SDLC address)
150   = 01 (ISDN Gateway)
912:  E5 (Group Poll Address)
PUID for address E1 = 000E1
```

PS/2 Configuration:

```
PUID = 000E1
```

*3174 Model 1R attachment to an NCP with one ISDN device attached to the ISDN Network

Figure   4-2. Configuration Example for 3174 Model 1R with the IBM ISDN 3270 Gateway

Considerations for 3174 APPN Network Node (NN)

The 3174 NN with the APPN feature active (question 510 = 1) is defined at the host as an SNA channel-attached, telecommunication-attached or Token-Ring attached T2.1 node.

The 3174 NN is boundary attached to the host (NCP or VTAM). To define a 3174 NN controller to the host, the PU statement for the 3174 in VTAM/NCP requires a new parameter, XID = YES. For example:

```
     name    PU    ADDR = ....., XID = YES
```

This new parameter, XID = YES, indicates that the host (primary side of the connection) sends an XID3 indicating T2.1 link establishment. To define an independent LU 6.2 to VTAM/NCP, the LOCADDR parameter of the LU definition statement must be set to zero (LOCADDR = 0).

Since the host and the 3174 require T2.1 definition, consideration must be made for the order of the definition. A T2.0 link connection is established unless both the host and the 3174 definitions indicate T2.1 node. For Token-Ring and SDLC host attachment, the 3174 and host may be defined in any order. For channel attachment, the 3174 and host definitions must be made concurrently. The following combinations will fail at link establishment:

3174 Channel-Attached

- Host VTAM definition indicates that the 3174 PU is PU2.0 but 3174 definition (question 510 = 1 and 242 = 1) indicates T2.1.

- Host VTAM definition indicates that the 3174 PU is T2.1 but 3174 definition (question 510 = 0 and 242 = 0) indicates T2.0.

Independent LUs in one APPN subnetwork may communicate with independent LUs in a host or through the subarea to independent LUs in a disconnected APPN subnetwork. For these independent LUs to communicate to or through a subarea, APPN nodes must have connectivity to an APPN network node that is boundary attached to the subarea. A 3174 NN with the APPN feature that has the Wildcard Routing option (question 612 = 1) is a boundary attached NN that can provide a route to the subarea. See Chapter 12, "Planning for APPN" on page 12-1 for further explanation of wildcard and host considerations.

Each independent LU in an APPN network that requires subarea connectivity may have to be defined to the subarea with the PU definition for the boundary attached APPN NN. This requirement is based on the release of VTAM and VTAM definition is required. In Figure 4-3 on page 4-12, the independent LUs requiring subarea connectivity in ENC, ENE, LEN ENA, may need to be defined under the PU for 3174 NNB.
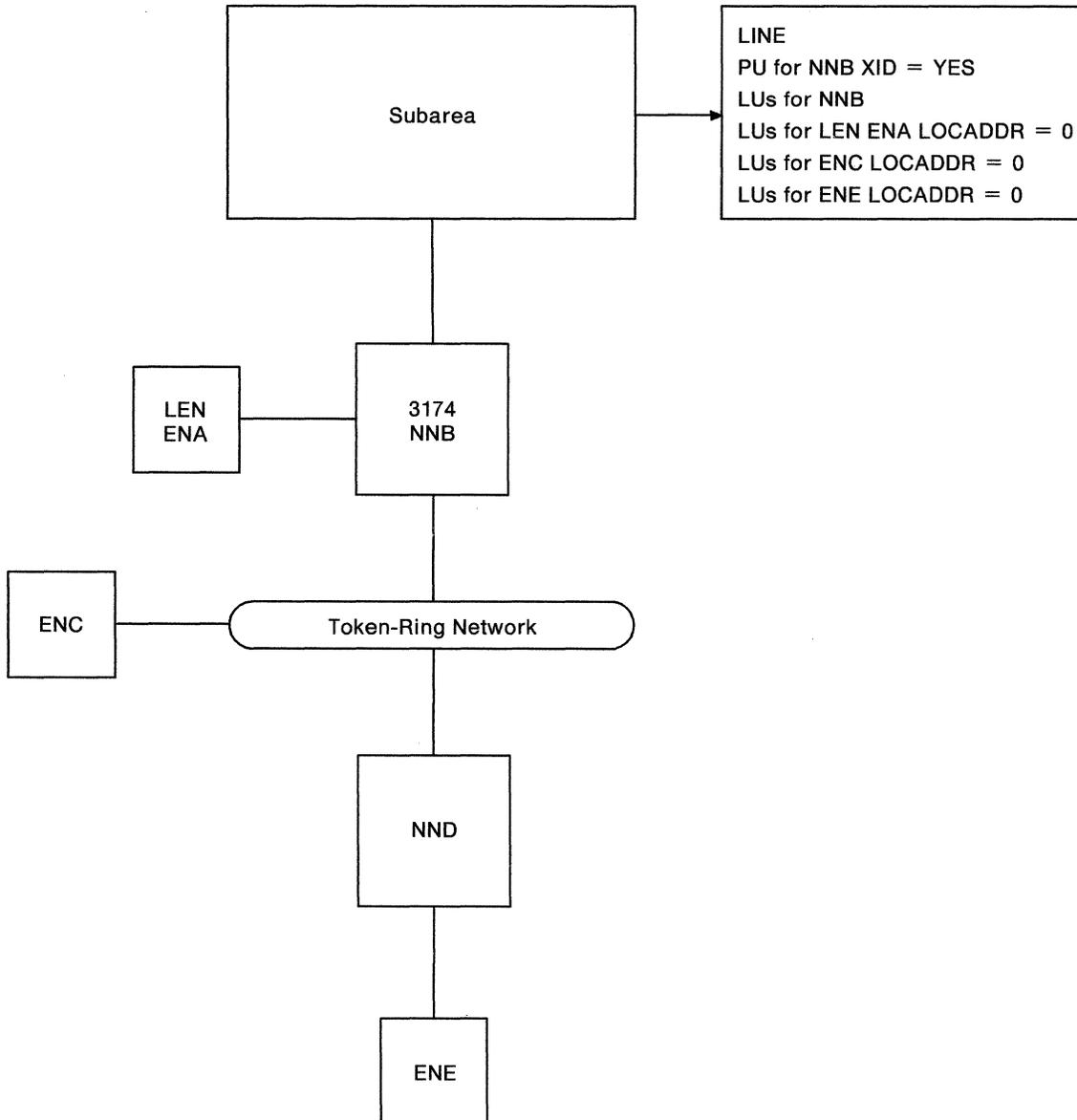
Figure   4-3. APPN Independent LUs Defined in Subarea

The independent LUs that may have sessions from their APPN network through a subarea network to independent LUs in another APPN network, should address the following considerations in their host VTAM/NCP definitions:

- A mode name specified in the MODETAB parameter of the LU or associated PU definition statement.

- The VTAM Mode Table (MODETABL) updated with an entry (MODEENT) for the mode name specified on or associated with the LU definition. This entry should specify a COS Name.

- The VTAM Class-of-Service Table (COSTAB) updated with an entry for the COS Name specified in the Mode Table.

- All APPN nodes must have corresponding Mode Name and COS Name definitions to those that are defined to the host.

3174 APPN NN and Token-Ring Gateway features can coexist. See "Gateway" on page 12-21 for further details. In this configuration:

- The host VTAM/NCP definitions for DSPUs remain unchanged.

- The 3174 3270 Gateway customization for DSPUs remain unchanged (providing 3174 memory restrictions are not present).

- The host VTAM/NCP definition for the 3174 PU must be modified as previously stated. Independent LU definitions must also be included with this PU definition.

3174 Downstream Physical Units

IBM 3174 Models 3R, 13R, 23R, 53R, and 63R attach to the Token-Ring Network and communicate with a host through a gateway. Because these models communicate with a host through a gateway, they are referred to as downstream physical units (DSPUs).

The gateway can be an IBM 3174, 3720/3725/3745, AS/400, or 9370. However, host definitions for the 3174 DSPU differ according to the gateway type.

A DSPU appears to the host access methods and applications as a PU type 2.0. When using Single Link Multi-Host Support, a 3174 may appear as multiple (up to eight) DSPUs.

During the customization of DSPUs, you respond to configuration questions that define the address of the gateway and the characteristics of the link. These configuration questions are listed below. However, there are other questions that must be given consideration when customizing your DSPU. For more information on the configuration questions, see Chapter 6, "Planning to Configure."

- "100: 3174 Model Designation"
- "101: Host Attachment"
- "106: Token-Ring Network Address and Service Access Point of the 3174"
- "107: Token-Ring Network Address and Service Access Point of the Gateway"
- "215: Physical Unit Identification (Controller)"
- "382: Transmit I-Frame Size"
- "383: Token-Ring Network Maximum Out"
- "384: Ring Speed of the Token-Ring Network."

Appendix C provides examples of planning for gateways and DSPUs.

SNA Considerations for the 3174

How LU-1 Pacing Overruns are Handled

For the 3174, device dependencies occur because a printer is slower than the display. You can control this discrepancy through the use of *pacing*. When you define your system definition, you can establish a pacing count that determines the number of normal flow request RUs that flow before a pacing response is required to allow the next group of *n* RUs to continue. This pacing protocol ensures that waiting RUs or chains are not stacked in the 3174 link buffers.

When the 3174 detects a pacing overrun, it rejects the chain on which the overrun was detected with a -R(0801), purges the printer buffer, and sends UNBIND type 0F (Cleanup) to the host to terminate the session.

SNA SSCP/PU Sessions

The 3174 and the host system use SSCP/PU sessions to allow exchange of information between the access method application and the 3174. The 3174 operates with duplex protocols on the SSCP/PU session in compliance with SNA.

Alerts

Alerts are high-priority events requiring immediate attention. The 3174 SNA alert function sends problem determination information, collected by the 3174 controller or entered by an operator, to the hardware monitor component of the NetView program.

When Single Link Multi-Host Support has been configured, you can designate any of the hosts on the primary link as the 3174 alert control point. A host designated as such receives hardware and microcode alerts. For more information, see configuration question "221: 3174 Alert/CMIP Control Point" on page 6-37.

Machine Type Identification

When NetView receives an alert, it uses the machine type number to identify the source of the alert.

The type number is "3174" and will be included as 4 bytes of EBCDIC data in controller alerts and as 2 bytes of hexadecimal data when a sense ID is issued.

Error Identification Data

In addition to the error code (nnn) associated with the type of controller failure, the 3174 is able to supply information that can be correlated to the part number and card location of the failing field replaceable unit (FRU) or FRU group. The information is in the form of TYPE and LOCATION data. TYPE data either is derived from 1 byte of information supplied by each card or is assigned by the controller for other failing components, such as cables. This information indicates both the type and change level of the card. TYPE data is 4 characters long. LOCATION data is 2 characters long and indicates the location of the failing FRU.

The 3174 also provides additional failure information on certain classes of SNA data stream errors. This information is called *error detail* and is returned as an additional qualifier.

The 3174 requires certain programs at the specified levels for central site problem determination.

- For all models, except those with the optional 3270 Gateway feature, the following programs are required:

  - NPDA Version 3 Release 2 with:

    - APAR #PP43332 (PTF UP90223) for MVS/370
    - APAR #PP43337 (PTF UP90224) for MVS/XA
    - APAR #VM22413 (PTF UV90110) for VM
    - No Program Temporary Fixes (PTFs) required for VSE.

- The Response Time Monitor, a base IBM 3174 function, is supported by NLDM, Release 2, for VM/SP (with or without HPO).

Common Management Information Protocol (CMIP) Event Report Support

The sending of CMIP event reports is an OSI Network Management function supported by the 3174 when customized for ISDN 3270 Gateway. CMIP event reports contain information about counters that are managed by the ISDN Adapter. The reports are sent unsolicited to the the host when a counter event occurs. Counter events include counters reaching threshold, counter thresholds wrapping, a call terminating, and a port on the adapter deactivating. The reports are only sent when Question "220: Alert/CMIP Event Report Function" on page 6-36 has a non-zero value.

Netview Version 2 Release 2 is required at the host to interpret these reports.

When Single Link Multi-Host Support is customized, you can designate any of the hosts as the Alert/CMIP control point. A host designated as such receives CMIP event reports that contain counters for D-channel events. For more information, see Question "221: 3174 Alert/CMIP Control Point" on page 6-37.

3174 REQMS/RECFMS Support

The Request Maintenance Statistics (REQMS) command is sent by the SSCP to a 3174 when the Network Problem Determination Application (NPDA) requests PU performance statistics. In return, the 3174 sends a Record Formatted Maintenance Statistics (RECFMS) response. This RECFMS data is recorded at the host by the Network Communications Control Facility (NCCF).

The following table shows what types of REQMS commands are supported. The 3174 rejects unsupported REQMS commands with the negative response X'080C'.

REQMS Type	3174 Support:			
	SDLC	X.25	SNA Channel	Token-Ring Network
1	√	√		
2	√			
3	√			
5	√	√	√	√

The formats for the 3174 RECFMS can be found in *3174 Customer Problem Determination*, GA23-0217.

Node ID Block Number for RECFMS

The 3174 returns a block number of X'048' (decimal 72) in RECFMS headers. The block number of X'048' has been assigned by architecture and is authorized for use in RECFMS only. The block number for XID is X'017'.

NetView RECFMS

The CTRL command allows the NetView operator to retrieve link test results, summary error counter, and release level data from 3174 SNA controllers. When the NetView operator issues a CTRL command, the NetView program formats a Request Maintenance Statistics (REQMS) record and sends it to the specified controller. The 3174 responds to the request by sending to the NetView program an RECFMS record containing the information requested by the operator; the NetView program displays this information to the requesting operator. For more information about issuing the CTRL and REQMS commands, refer to *NetView*

Operation, SC30-3364. For more information about viewing RECFMS data, refer to the *NetView Hardware Problem Determination Reference*, SC30-3366.

Response/Request Unit (RU) Size

This section provides details about RU sizes for channel attachment and SDLC/X.25 attachment.

SNA Channel Attachment

Inbound and outbound RU sizes depend on several things:

- configuration environment
- 3174 model
- method of device attachment.

The maximum RU sizes for Models 12L and 22L are 8192 bytes inbound and 8192 bytes outbound.

For all other 3174 channel models, the maximum RU sizes are 4096 bytes outbound and 2048 bytes inbound.

Initialization Parameters: The 3174 requires that the host channel program accommodate an inbound RU of 256 bytes. For a T2.1 channel connection, the inbound RU size is 512 bytes. The channel control word (CCW) carrying the *connect* function will be rejected with unit-check status (sense = NI) unless the following criteria are met.

The *size* of the host buffer cannot be less than 78 bytes or greater than 1066 bytes. The *size* of the host buffer multiplied by the *number* of host buffers must be large enough to accommodate:

- The Link Header (LH) (4 bytes minimum, 32 bytes maximum)
- The Transmission Header (TH)
- The Request Header (RH)
- At least 256 bytes of data (RU).

Using ACF/VTAM as an example, the *size of host buffers* comes from the ACF/VTAM START option specifying the *bufsize* value of the IOBUF buffer pool for OS/VS systems (LFBUF for DOS/VS systems).

The *number of host buffers* comes from the MAXBFRU operand of the physical unit (PU) statement defining the controller under a Local SNA Major Node (VBUILD TYPE = LOCAL).

SDLC/X.25 Attachments

The maximum outbound RU size within a segment for the 3174 is 512 bytes.

XID 1 Support

To allow the primary station to determine that the 3174 has the capability to support a 512-byte RU size, XID 1 is supported. See Table 4-1 for the hexadecimal value and meaning of each byte.

Table 4-1. XID 1 Format		
Byte	**Value**	**Meaning**
0	X'12'	ID format/PU type
1	X'14'	Length
2-5	X'017-----'	Block number (bits 0-11), ID number (bits 12-31, determined by customization)
6,7	X'0000'	Reserved
8	X'00' (SDLC) X'01' (X.25)	Link station and connection protocol flags (00 = half-duplex, 01 = duplex)
9	X'10'	Link station segment assembly
10,11	X'0209'	Maximum I-field length: 521 bytes
12	X'00'	SNA link profile
13	X'00'	Initialization mode option (SIM and RIM are not supported)
14,15	X'0000'	Reserved
16	X'07' (SDLC) X'01'-'07' (X.25)	Modulus 8, the number of I-frames received before acknowledgment. Determined by customization variable.
17	X'00'	Reserved
18	X'01'	Length of controller address
19	X'__'	Controller address (determined by customization)

Note: XID 1 for the 3174 X.21 Short-Hold Mode function is the same as defined by the 3274 X.21 Short-Hold Mode RPQ.

BIND Extensions

You should be aware of information on BIND extensions. See the *3174 Functional Description* for this information.

Support of IPDS Printers

This section lists host programming notes related to the support of Intelligent Printer Data Stream (IPDS) printers. For detailed information about IPDS printers, refer to the *3174 Functional Description.*

SNA Protocol

- IPDS printers operating with Systems Network Architecture (SNA) protocol are identified as logical units type 1 (LU-1).

- The BIND command sent to establish an LU-1 session in which IPDS will be used must indicate "FM Headers Allowed" (byte 6, bit 1 = 1).

- If End Bracket (EB) is used with a function management (FM) data chain containing IPDS structured fields, IPDS mode will be implicitly terminated following the processing of "last-in-chain," *resulting in the loss of printer-generated IPDS ACK/NACKs occurring at "last-in-chain."*

  To prevent this loss, EB should never be used to terminate IPDS mode. Instead, an FMH-1 containing DESSEL = EDS, DSP = IPDS should be used. If the bracket is also to be terminated, EB may be used in the chain carrying the FMH-1.

- A printer placed in LU-1 IPDS mode by receipt of an FMH(BDS, IPDS) may generate an NACK (for an IR, EC, or other exception condition) before CD is received. If this condition occurs, the controller sends SIGNAL (00010000) to the host application as a request for "send state." If CD is not received before an FMH(EDS) is received, the controller returns a negative response (1005) to the FMH(EDS) RU, meaning "Send-state requested following receipt of FMH(BDS), but CD not received prior to the receipt of FMH(EDS)."

BSC and Channel Protocol

The following items deal with host acknowledgment of an ACK/NACK reply.

- For the inbound transmission of an IPDS ACK/NACK reply at *data chain end* or *data chain only* (or implied only), valid host acknowledgments are the same as allowed for inbound transmission of Query Reply — for example, an E/W or E/W Alternate (with or without a WCC) or a WSF (with or without structured fields).

- For inbound transmission of an IPDS ACK after *data chain start* but before *data chain end*, the only valid acknowledgments are WSF, E/W (WCC = Reset), and E/W Alternate (WCC = Reset).

  Using the WSF command with *data chain continue* or *data chain end* as the host acknowledgment allows continuation of the in-chain state and IPDS mode.

- Using the E/W (WCC = Reset) or E/W Alternate (WCC = Reset) command as the host acknowledgment will result in **termination of the in-chain state and IPDS mode.**

Refer to the appropriate product description manual for additional information, for example, the *4224 Printer Product and Programming* manual, GC31-2551.

Serial Original Equipment Manufacture Interface (SOEMI) Support

Serial Original Equipment Manufacture Interface (SOEMI) support is included in the 3174 base function. This function is available with the non-SNA channel attachment only (Models 1L, 11L, 12L, 21L, and 22L). The SOEMI function extends device-attachment capabilities to a variety of industry devices of independent manufacturers, for engineering, scientific, and manufacturing environments. A protocol based on structured fields provides you with programming flexibility.

The SOEMI support does not affect the operation of devices attached to other ports of the controller. On a Write command (X'01'), the 3174 presents channel-end (CE) status after the command and data have been accepted, followed by device end (DE) when the controller is free to process other commands.

On the 4361 Workstation adapter, CE and DE are presented together on a Write command.

Sense ID Command for Non-SNA Channel Attachment

The Sense ID command requests data transfer to the host. The 3174 controller sends 4 bytes of data, which contain the controller type and model, for all device addresses except those to which the SOEMI is attached.

For SOEMI addresses, 7 bytes of data are sent with the attached device type and model contained in bytes 4−6.

For Models 12L and 22L, the bytes of data are:

- For all addresses except SOEMI: X'FF 31 74 1D 00 00 00 00 40 72 00 60'
- For all SOEMI addresses: X'FF 31 74 1D BA 00 01 00 40 72 00 60'.

For other models, the bytes of data are:

- For all addresses except SOEMI: X'FF 31 74 1D'
- For SOEMI addresses: X'FF 31 74 1D BA 00 01'.

Central Site Change Management (CSCM)

CSCM provides the facility to electronically distribute 3174 microcode and customizing data to the 3174s in an SNA network. It operates in conjunction with NetView Distribution Manager (NetView DM), which is an application program running on ACF/VTAM in an S/370 processor. The architected SNA protocols used to carry the data through the network include:

- LU Type 6.2
- SNA File Services
- SNA Management Services
- SNA Distribution Services (SNA/DS).

For detailed information on CSCM, see the *Central Site Customizing User's Guide*, GA27-3868.

Note: CSCM is supported only on the primary host on the primary link. However, the customization data and/or microcode for other host attachments can be distributed through the primary host's attachment.

Microcode Requirements

The central site library controller and the network controllers must be at microcode release A4.0/S4.0 or higher.

System Software Requirements

NetView DM Version 1, Release 2 or higher, may be installed on any IBM processor capable of operating with MVS, ACF/VTAM, or ACF/TCAM.

For more information on NetView DM, see *IBM NetView Distribution Manager*:

- *Planning*, SH19-6589
- *Operation*, SH19-6592
- *Diagnosis*, LY19-6293
- *Installation*, SH19-6590

- *User's Guide*, SH19-6602
- *Messages and Codes*, SH19-6595
- *General Information*, GH19-6587.

CSCM VTAM Definitions

Network and LU names must be defined in VTAM and the 3174 microcode. In addition, LU names must also be defined in NetView DM. You define these names in the 3174 microcode when you respond to "501: Network ID (NETID)" and "502: Logical Unit Name (LUNAME)."

The Network ID is used to identify a given network and is defined in the VTAM start parameters. These parameters are kept in the SYS1.VTAMLST in the member ATCSTRxx (xx is any two installation-defined characters, normally 00). The Network ID is defined by the statement "NETID =." The name specified for the Network ID in VTAM and in the 3174 microcode must match (see page 11-5 for valid naming conventions).

LU names are used to identify a controller within a network. For VTAM, they are defined in the SYS1.VTAMLST (see "3174 PU/LU Specifications for PU Type 2.0" on page D-8 for an example of a CSCM LU definition). In NetView DM, they are defined during the node definition. The name specified for the LU name in VTAM, the 3174 microcode, and NetView DM, must match (see page 11-6 for valid naming conventions).

When the APPN feature is active, the LU 6.2 used by CSCM may be an independent LU on a T2.1 link to VTAM versus a dependent LU on a T2.0 link to VTAM. See "502: Logical Unit Name (LUNAME)" on page 11-6 and "511: APPN Control Point Name (CPNAME)" on page 11-7 for specification details.

Microcode Customization Planning

Read Part 1 and Chapter 5 of this book if you are planning microcode customization for the first time. If you are experienced at planning microcode customization, you may want to skim those chapters before you begin the following procedure.

Planner: During this procedure, you leave these steps and go to the planning sections of this book that contain the information you need to fill out the worksheets. Once the worksheets that are required for a step are completed, return to this procedure to complete the next step.

The worksheets are located in Appendix A. Each worksheet directs you to the chapter that contains the planning information you need.

Step 1 Fill out "Worksheet 1—Host Attachment" on page A-3. The information you need to fill out this worksheet starts on page 6-4.

Step 2 On Worksheet 1 you specified a response to question 101. Depending on that response, fill out one of the following worksheets:

If Question 101-Host Attachment	Fill Out Worksheets
= 1 - BSC	3
= 2 - SDLC	4, 14
= 3 - X.25	5, 13, 14
= 4 - Non-SNA (Channel)	6
= 5 - SNA (Channel)	7, 14
= 6 - X.21 Switched	8, 14
= 7 - Token-Ring Network	9, 14
= M - Multi-Host Support	2

The information you need to fill out worksheets 3—9 starts on page 6-9. When filling in Worksheet 2, start on page 6-5.

*Planner: If you **did not** fill out Worksheet 2, proceed to step 4.*

Step 3 Complete this step **only** if you filled out Worksheet 2.

Depending on the response you specified in the "Host Attach" field for the primary host on the primary link (1A), fill out one of the worksheets in the following table.

If the Primary Host's Attachment Field	Fill Out Worksheets
= 1 - BSC	3
= 2 - SDLC	4, 14
= 3 - X.25	5, 13, 14
= 4 - Non-SNA (Channel)	6
= 5 - SNA (Channel)	7, 14
= 6 - X.21 Switched	8, 14
= 7 - Token-Ring Network	9, 14

Write in **1A** in the "Host ID" field on the top of the worksheet.

Step 4 Consult the following table to determine if you have responded to a question that requires additional planning. If not, read the following ***"Planner"*** note to determine where to proceed.

If on Worksheets	Question	Fill Out Worksheets
3 through 9	116 1 or 2	11A & 11B
3 through 9	127 nonzero	12
4 or 7	150 = 10	45, 46, 47
	150 = 01	45, 48
	150 = 11	45, 46, 47, 48
	150 = 00 and 510 = 1	45

Planner: *If you **are not** planning for Multi-Host Support, go to step 7. If you are planning for Multi-Host Support, complete the remaining steps.*

Step 5 Each additional host attachment requires separate worksheets. The worksheets that you fill out depend on the link attachment and on the communication protocol. For each additional host attachment, fill out the worksheets indicated. (Be sure to include the host identifier on each worksheet.)

If the Communication Protocol Is	Fill Out Worksheets
BSC	3S
SDLC and/or X.21 Nonswitched	4S
X.25	5S, 13S
SNA (Channel)	7S
X.21 Switched	8S
Token-Ring Network	9S

Step 6 For each worksheet you filled out in step 5, consult the following table to determine if you have responded to a question that requires additional planning. (If not, go to step 7.) Be sure to include the host identifier on each worksheet.

If on Worksheets	Question	Fill Out Worksheet
3S, 4S, 5S, 7S, 8S, or 9S	116 = 1 or 2	11A & 11B
3S, 4S, 5S, 7S, 8S, or 9S	127 = nonzero	12
4S	150 = 1	45, 46, 47
7S	150 = 10	45, 46, 47
	150 = 01	45, 48
	150 = 11	45, 46, 47, 48

Step 7 If you filled out Worksheet 14 and responded to question 510 with a 1, then a minimum level of APPN support will be in affect. If you wish to exceed this level of support, fill out the worksheets indicated.

To Define	Fill Out Worksheets
APPN Node Definition	15, 16, 17
Class of Service (COS)	18, 19, 20 (A&B), 21

Step 8 If you wish to have one or more of the following features supported, fill out the worksheets indicated.

To Support	Fill Out Worksheets
Peer Communication	22, 23, 24
Asynchronous Emulation Adapter	25 through 37
Modified Keyboards	Keyboard 1—5

Step 9 If you wish to Define Devices, fill out Worksheet 38. Depending on responses specified on Worksheet 38, fill out the worksheets indicated.

To Define	Fill Out Worksheets
Printer Authorization Matrix (PAM)	39
Logical Terminal Assignment (LTA)	40
Extended Vital Product Data (Extended VPD)	41
Integrated Systems Digital Network (ISDN)	42, 43, 44

Step 10 Give the completed worksheets to the person who will customize the Control disk. If you have planned for Multi-Host Support, group the worksheets by their host identifier before giving them to the customizer.

Part 3. Microcode Customization Planning

Chapter 5. Microcode Customization Overview

What Is Microcode Customization?

Microcode customization consists of many tasks that, when completed, result in a Control disk that is customized to:

- Support the attaching displays and printers
- Support the features installed in the controller
- Identify the methods and protocols of host attachment that the controller will use.

For example, you customize the Control disk for such things as:

- The number of hosts
- The number of ports used
- The addresses assigned to the ports
- Keyboard languages and layouts
- The number of host sessions for terminals
- The support provided for asynchronous communication
- The types of communication protocol.

The major tasks that must be completed to customize a Control disk are:

- Planning the customization
- Completing the worksheets
- Running the customization utilities.

In order to get the "big picture" of Microcode Customization and a description of the many features and functions that can be customized, refer to "Microcode Customization" on page 2-17.

Planning the Customization

There are two suggested methods that you can use to plan. Both are described on divider tabs and either method will guide you through the planning process.

- The divider page labeled **"Microcode Customization Planning"** has a step-by-step procedure printed on it that will guide you through the microcode customization process. It is highly recommended that you follow this procedure the first few times that you plan.

- The divider page labeled **"Worksheet Summary"** lists the worksheets that must be filled out to plan the specific areas of your configuration. This method is suggested for those who are familiar with microcode customization planning and have been through the process previously.

Planning the microcode customization involves reading the information in the planning chapters and completing the required worksheets. When planning, you select responses to configuration questions that define the hardware and software configuration in the cluster, the functions the controller provides, and the methods of host attachment. Then, you record the responses you select on the configuration worksheets, which are in Appendix A.

There are several planning phases that make up microcode customization:

- Planning to Configure
- Planning for Port Assignment
- Planning for CECP
- Planning for Response Time Monitor
- Planning for X.25
- Planning for Central Site Change Management
- Planning for the Asynchronous Emulation Adapter
- Planning to Define Devices
- Planning for the Gateway
- Planning to Modify Keyboards
- Planning for APPN
- Planning for Peer Communication.

The first planning phase, "Planning to Configure," is required the rest are optional. Each planning phase has a chapter devoted to it, which contains the information you need for planning the phase. Chapters 6 through 15 contain this planning information.

Completing the Worksheets

The worksheets are provided to help plan and record customizing information. Blank copies of these worksheets are located in Appendix A. You are authorized to make as many copies as you need. However, to avoid confusion, copy only the worksheets you will be using. The information printed on the divider page labeled "Worksheet Summary" helps you determine which of the worksheets are needed for your configuration.

On the configuration worksheets, the only questions presented are those that apply to the specific configuration for which you are planning. The configuration questions are numbered (098, 099, 100, and so on) and cover all 3174 model types and host attachments.

As customizing planner, you record responses to the configuration questions on these worksheets. The customizer in turn uses the completed worksheets to fill in the customization panels displayed during the customization utilities.

Only read the questions shown on the worksheet. Select your responses, and write them in the boxes. Some questions have a default response printed under the box. To tell the customizer the default is to be used, circle it and leave the box blank. (The microcode automatically supplies the default unless you specify a different choice.)

138 - ☐   Circle
     ⓪ — default response

Each worksheet tells you where to find the planning information, has a list of the question numbers, and provides a short description of each question.

After you have completed all the worksheets required for your configuration, give the completed worksheets to the person who customizes the Control disk. The *3174 Utilities Guide* explains how to enter this configuration information on the disk.

Customizing the Control Disk

Customizing is performed at a display station attached to port 26-00 of the controller. This display station is referred to as a "customizing display station."

When a Control disk is customized, options are selected from the "Master Menu" and the "Customize Control Disk Menu" (see the *3174 Utilities Guide*). Initially, the Configure option is selected and performed. In addition, there may be a need to select and perform one or more of these customizing options:

- Merge DSL
- Copy Files
- Microcode Upgrade
- Media Management
- Define Devices
- Identify Customizing Keyboard

- Merge RPQ
- Modify Keyboards
- Define AEA
- Initializing a Fixed Disk
- Define APPN Node
- Define Class of Service
- Define 3174-Peer.

The *3174 Utilities Guide* contains more information and the procedures for performing these options.

As the procedures for customizing the Control disk are performed, a series of panels appearing on the screen display a number of questions. The customizer types in the responses to those questions using the information recorded on the configuration worksheets. The 3174 writes these responses to the Control disk. After a Control disk has been customized, it can be reconfigured if the hardware or software configuration is changed.

Planning to Reconfigure

At a later date, you may want to reconfigure (change some responses to the configuration questions). The planning process for reconfiguring and configuring is the same, except for the following:

- Port Assignment
- RTM
- X.25 Options.

Port Assignment

If you have changes to make to the Port Assignment, see "Changing Port Assignments" in Chapter 7. The table under that heading explains how to fill out "Worksheet 11—117: Port Assignment".

RTM

If you have changes to make to the Response Time Monitor, see "Changing the RTM Specifications" in Chapter 9. The table under that heading explains how to fill out the RTM Worksheet.

X.25 Options

If you have changes to make to the X.25 Options, see "Changing the X.25 Options" in Chapter 10. The table under that heading explains how to fill out the X.25 Options Worksheet.

Customization Records

Setting up a record-keeping system now can save you time later. If you do the customizing for dozens—or hundreds—of controllers, it is recommended that you keep several records of the controller customizations. You can use one or more of the following methods to keep records of your customization:

- Local copy
- Configuration worksheets
- Duplicate diskettes
- Central Site Customizing procedure.

Local Copy

The local copy function is an easy-to-use tool for keeping records. You can have the customizer print a copy of each customization panel on the display screen as soon as the responses have been entered and verified. Then you can organize a set of these customization records in controller serial number order and keep them together in a binder or in a file drawer.

It is recommended that you store a copy of these records in or near the controller. When there is a problem with the controller, the controller operator and the IBM service representative need these records.

The *3174 Utilities Guide* contains the procedure for printing a local copy.

Configuration Worksheets

If you do not plan to have the customizer use the local copy function, you can keep records by photocopying the completed worksheets. You can organize these customization records in order according to their controller serial numbers and keep them together in a binder or in a file drawer.

Duplicate Diskettes

Making a duplicate of all your diskettes is highly recommended. The duplicate diskette can be used as a backup for the original disk.

To make a duplicate Utility or Control diskette, use the Full Copy or Copy Customizing Data option. The procedure for these Copy options is in the *3174 Utilities Guide*.

You should identify any diskettes that you duplicate. Affix a label to the upper portion of the diskette. The label identifies the diskette type by name. In addition, you may wish to write a unique designation of your own on the label.

Customization Tips

There are several methods that you can use to manage customization data, speed up customizing, and make customizing easier:

- Using the Copy procedure to manage customization data
- Pattern Control diskettes
- Central Site Customizing
- Microcode Migration.

Using the Copy Procedure to Manage Customization Data

You can manage your customization data by using the Copy procedure and mailing the diskettes to your remote sites.

If you distribute your customization data on diskettes, there are several situations when you will be concerned with the management of the diskettes in your network:

- When controllers are initially installed
- When Microcode Upgrade diskettes are received
- When changes are made to existing configurations.

These situations require that you perform the Customize Control Disk procedure, or the Microcode Upgrade procedure, or combinations of both. The *3174 Utilities Guide* contains these procedures.

The following method is suggested if you have one or more of the above situations and wish to use the copy procedure to manage customization data.

Step **1** Prepare a master diskette. If possible, test the master diskette by performing an IML on it and running a controller with it before copies are made. Be sure to resolve all problems before making copies.

Step **2** Use the Copy function to make copies for the other 3174 controllers in your network. (Some configuration questions are unique to a given controller. Be sure to tailor each copy for its intended controller.) Complete and attach a diskette identification label to each copy.

Step **3** Use a reusable shipping container to send the customized diskettes to the controller for which they were made. Enclose copies of the completed panels or the worksheets that were used for customizing. You may want to include a note to the location personnel telling them to insert the diskette, close the diskette drive, and perform an IML on their controller. Also instruct them to return the reusable shipping container, with the old diskettes, to your machine's location.

Step **4** Maintain a record of the diskettes in your network to show the diskette type and release level, and the date that the diskette was installed.

For additional information on the IML and Copy Files procedures, see the *3174 Utilities Guide*.

Pattern Control Diskettes

To speed up customizing, you can have the customizer create "pattern" Control diskettes. A pattern Control diskette contains a standard hardware and software configuration used for more than one cluster. Once a pattern diskette is created, copies can be made by performing the Copy procedure in the *3174 Utilities Guide*.

For example, one pattern diskette could apply to clusters that have the following configuration:

- 3174 Model 1R
- SDLC protocol
- No distributed function terminals (DFTs)
- No port assignment table
- No Printer Authorization Matrix (PAM)
- Control microcode at the current microcode release level.

Another pattern diskette could be made for clusters that have this configuration:

- 3174 Model 1L
- Local non-SNA host attachment
- Display stations with modifiable keyboards
- A port assignment table
- A PAM with printers used for local copy assigned to ports 26-01,26-02, and 26-03
- Control microcode at the current microcode release level.

Central Site Customizing

Central Site Customizing is an option that can be chosen from the "Master Menu" (see the *3174 Utilities Guide*). By choosing this option, controller microcode can be tailored for each controller in a network at the central site.

There are several advantages to using the Central Site Customizing option:

- You can manage customizing throughout the network by generating customized Control disks from a central database.

- You can minimize the need for customizing expertise throughout the network by concentrating it at the central site.

- You can save customizing time by relying on a few trained people located at the central site who are thoroughly familiar with customizing, especially Central Site Customizing.

- Record-keeping is enhanced because information can be quickly and easily retrieved from the database. Also, updating of the database is easy to accomplish.

Central Site Customizing is intended primarily for customers whose networks contain more than 25 controllers, but it may be used in smaller networks as well. See the *Central Site Customizing User's Guide*, GA27-3868, for more information.

Microcode Migration

At some date, you may want to upgrade the Control and Utility microcode that you are currently using. Upgraded microcode can provide you with increased support or function, such as the ability to handle a new type of display or printer. Each upgraded version of microcode is assigned a new release level.

Migrating from one release level to another requires that you use the Microcode Upgrade utility. (The *3174 Utilities Guide* describes the Microcode Upgrade procedure.) Microcode Upgrade transfers the customization data from an already-customized Control disk onto a higher-level Control disk. This utility saves you time, because you do not have to plan again or respond to the configuration questions that were supported by the previous release of microcode.

There are however, several things to keep in mind when planning for Microcode Upgrade. These tasks must be performed on the new Control disk after the upgrade:

- Responding to questions not supported in the previous release
- Merging RPQs
- Merging DSL microcode
- Copying patches.

The procedures for performing these tasks are in the *3174 Utilities Guide*.

Another consideration is the effect of Microcode Upgrade on modified keyboard layouts for some keyboard models. If you have modified a Converged (122-key) keyboard or an Enhanced Typewriter keyboard and plan to upgrade the modified layouts, you may want to do further keyboard modification after the upgrade. "Restrictions" on page 17-4 contains specific information about Microcode Upgrade and keyboard modification. If you decide to perform further keyboard modification, Chapter 17, "Planning to Modify Keyboards" contains the information you need.

Chapter 6. Planning to Configure

Configuration Questions

Before you start planning, you need:

- The configuration worksheets in Appendix A. These worksheets help to determine which configuration questions you should answer.

- Completed site planning worksheets.

- Information about the display stations and printers you want to attach to the controller.

- Information from your system programmer about responses to some of the configuration questions.

- The *3174 Character Set Reference*, GA27-3831, if you plan to change keyboard layouts.

Some, but not all, of the following configuration questions appear on the worksheets you are instructed to fill out while performing the procedure printed on the divider page labeled "Microcode Customization Planning." The questions that appear depend on the types of host communication (your response to "101: Host Attachment" on page 6-5). Read and respond to only the questions that appear on the worksheets.

Planner: The following information for questions 098, 099, 100, and 101 is needed to complete step 1 of the procedure printed on the divider page labeled "Microcode Customization Planning." **You must answer questions 100 and 101.** *Locate "Worksheet 1—Host Attachment" on page A-3. Write your responses to questions 098, 099, 100, and 101 on the worksheet.*

098: Online Test Password

Response: Up to eight alphanumeric characters.

The default response is underscores.

A response to this question is optional. You should respond if you plan to use the following online tests:

- Online Test 9, Option 9 to update 3174-Peer Status
- Online Test 9, Option 10 to update the 3174-Peer Bridge Profile
- Online Test 9, Option 12 to update the LAN Manager Profile
- Online Test 9, Option 13 to re-open the Token-Ring Adapter
- Online Test 12, Option 6 to wrap a port on the AEA
- Online Test 12, Option 7 to test the cable attached to a port on the AEA
- Online Test 14, Option 1 to IML the 3174
- Online Test 14, Option 2 to set the time of the 3174 internal clock
- Online Test 16, Option 5 to change the error thresholds for a ISDN port
- Online Test 16, Option 6 to wrap a port on the ISDN Adapter.

The following online tests do not require a password but will have password protection if you respond to this question:

- Online Test 5, Option 2 to update Controller Vital Product Data
- Online Test 5, Option 4 to update Port Vital Product Data.

For additional information on the online tests, see the *3174 Customer Problem Determination*.

This password must not be the same as a standard NetView or VTAM command (as defined by a CLIST). If a password duplicating a command is defined, NetView will recognize it when online tests are invoked through CSCF. NetView will execute the password as a command, and the online test will never be executed.

When responding to this question with a password, do not precede the password with blanks and do not enter blanks between characters.

099: Product Assistance Data

Response: Up to 68 alphanumeric characters.

A response to this question is optional. It is designed to provide you with a way to record the names and telephone numbers of a person to contact if there is a problem with the controller. You may leave blanks wherever you have not written an alphanumeric character.

100: 3174 Model Designation

Response:

01L	12L	23R
01R	12R	51R
02R	13R	53R
03R	21L	61R
11L	21R	62R
11R	22L	63R.

Enter the actual model number or the alternate configuration model number of the controller you plan to customize. See "Alternate Configurations" on page 1-13 for the alternate configurations that can be used.

The default response is XXX.

Notes:

1. All models that have the Token-Ring 3270 Gateway feature installed can be customized as the gateway controller in the primary or alternate configuration unless your alternate configuration is for models 03R, 13R, 23R, 53R, or 63R.

2. The 3174 Model 21H is used *only* on the ES/9000 and should be customized as a 21L. It is functionally the same as a Model 21L.

3. If you plan to have two configurations for your controller (for example, a Model 11L configuration and an alternate configuration for a Model 11R), only one set of configuration parameters and microcode can be easily managed with Central Site Change Management. This is due to a requirement that both controller configurations must have the same Network ID and LU names.

   You can convert from one host connection type to another using Central Site Change Management, provided you have taken the appropriate measures to accommodate the restrictions defined above. However, because coordination of 3174 and VTAM changes can be complex, we do not recommend trying to maintain multiple configurations for a controller in a Central Site Change Management environment.

101: Host Attachment

Response:

1	= BSC	5	= SNA (Channel)
2	= SDLC (See notes)	6	= SDLC (X.21 Switched)
3	= X.25	7	= Token-Ring Network
4	= Non-SNA (Channel)	M	= Multi-Host Support.

The default response is X.

Notes:

1. To use the Gateway feature, respond with 2, 5, or M.

2. Option 2 (SDLC) represents SDLC architecture on V.24/V.35 interfaces (either switched or leased) **or** SDLC architecture on X.21 interface that is *nonswitched*. If you want X.21 *switched*, use option 6.

3. A sheet of X.21 and X.25 Keyboard Labels (Order No. SX23-0285) may be shipped with the 3174 controller. Provide one set of these labels from the sheet for each display station keyboard using X.21 or X.25 host attachment.

Use the following table to determine what responses for question 101 are valid with the model you designated for question 100.

Table 6-1. Valid Question 101 Responses

If Response to Question 101 is:	Response to Question 100 Can Be:
1	01R, 11R, 21R, 51R, 61R
2	01R, 02R, 11R, 12R, 21R, 51R, 61R, 62R
3	01R, 02R, 11R, 12R, 21R, 51R, 61R, 62R
4	01L, 11L, 12L, 21L, 22L
5	01L, 11L, 12L, 21L, 22L
6	02R, 12R, 62R
7	03R, 13R, 21R, 23R, 53R, 63R
M	01L, 01R, 02R, 03R, 11L, 11R, 12L, 12R, 13R, 21L, 21R, 22L, 23R, 51R, 53R, 61R, 62R, 63R

Responding with **M** indicates that you wish to have multiple 3270 host attachments. Before you continue planning, read "Multi-Host Support" on page 2-6 and "Microcode Customization" on page 2-17, if you have not done so already.

Multi-Host Support requires that you plan the microcode customization by filling in worksheets for each host attachment. Think of each attachment to a host as a separate controller configuration.

If you respond with **M**, fill out "Worksheet 2—Multi-Host Definition" (Figure 6-1).
This worksheet is used to identify the hosts and their characteristics.

```
┌─────────────────────────────────────────────────────────────────────┐
│                _____ Multi-Host Definition _____                │
│                                                                       │
│                                                                       │
│  Host      Adapter     Host      Hardware    Include                  │
│   ID        Type      Attach      Group      In IML    Host Descriptor│
│                                                                       │
│   1A                    —                               _____   │
│   2A         —          —           —          —        _____   │
│   3A         —          —           —          —        _____   │
│    —                                           —        _____   │
│    —                                           —        _____   │
│    —                                           —        _____   │
│    —                                           —        _____   │
│    —                                           —        _____   │
│    —                                           —        _____   │
│    —                                           —        _____   │
│    —                                           —        _____   │
│    —                                           —        _____   │
│    —                                           —        _____   │
│    —                                           —        _____   │
│    —                                           —        _____   │
│    —                                           —        _____   │
│    —                                           —        _____   │
│    —                                           —        _____   │
│                                                                       │
└─────────────────────────────────────────────────────────────────────┘
```

Figure   6-1. An Example of Worksheet 2 — Multi-Host Definition

The columns on "Worksheet 2—Multi-Host Definition" are described below.

Host ID   A two-character identifier for each of the hosts. The first
character is numeric and identifies the specific host link. The
second character is alphabetic and identifies one of multiple
hosts on that link.

A host ID beginning with the number "1" represents a host on
the primary link. There can be only one primary link between
a controller and upstream hosts, but up to eight hosts can be
accessed over that primary link, depending on the
configuration. The second character in the host ID
differentiates between the hosts (A-H).

A host ID beginning with a "2" or "3" represents a host on a
secondary link. A secondary link uses Concurrent
Communication Adapters (CCAs), and some 3174 models can
have two secondary links. Up to four hosts can be accessed
over one secondary link, depending on the configuration. The
second character in the host ID differentiates between the
hosts (A-D).

Regardless of whether it is on a primary link or a secondary link, only one primary host can be configured for each link. The letter "A" in the host ID identifies the primary host. Therefore, the primary hosts are identified as 1A, 2A, and 3A. Secondary hosts are identified as 1B, 1C, 1D, 1E, 1F, 1G, 1H, 2B, 2C, 2D, 3B, 3C, and 3D.

Note: When planning for Single Link Multi-Host Support, prioritize the hosts by alphabetic order (xA hosts have highest priority, then all other hosts on that link).

Adapter Type

This field is for Concurrent Communication Adapters. It identifies the adapter type:

1 = Type 1 Concurrent Communication Adapter
2 = Type 2 Concurrent Communication Adapter.

See "Concurrent Communication Adapter" on page 2-7 if you need more information on the adapter types.

Host Attach

This identifies the type of host attachment for each link. The primary host on the primary link (1A) has the following possibilities:

1 = BSC   5 = SNA (Channel)
2 = SDLC   6 = SDLC (X.21 Switched)
3 = X.25   7 = Token-Ring Network.
4 = Non-SNA (Channel)

Notes:

1. Respond with 3, 5, or 7 for Single Link Multi-Host Support.

2. To use the Gateway feature, respond with 2 or 5.

3. See Table 6-1 on page 6-5 for a listing of which responses are valid based on the model specified in question 100.

The primary hosts on secondary links (Host IDs 2A and 3A) have the following possibilities:

Type 1 CCA:
1 = BSC   3 = X.25
2 = SDLC (see note 2)

Type 2 CCA:
2 = SDLC   6 = SDLC (X.21 Switched)
3 = X.25

Notes:

1. Respond with 3 for X.25 Single Link Multi-Host Support.

2. Respond with 2 if planning for Token-Ring 3270 Gateway support.

Hardware Group The possible responses to these fields are hardware groups 51 and 52. You determine your response by identifying how the CCAs are physically plugged into the available card slots. Card slots are numbered; the CCA plugged into the card slot with the lowest number is assigned hardware group 51.

If you use only one CCA, it must be assigned hardware group 51.

Include In IML This field specifies whether a host is to be included in the IML (initial microcode load). Possible responses are:

0 = No
1 = Yes.

If you only want to use a host at certain times, fill out the worksheets for the host attachment and have the customizer respond to this field with 1. Once the customization data has been entered for the host, the response can be changed to 0. When you want to use the host, change the 0 to 1 and re-IML the controller.

Note: To use secondary hosts on secondary links, you must include the primary hosts (2A and 3A) on those links in the IML. The primary host on the primary link is included by default.

Host Descriptor This optional field is used to describe each host. The description can contain up to 20 characters. If filled in, the description appears in the operator information area (OIA) of displays accessing the host.

The proper functioning of devices that are emulating control unit terminals (CUTs) may depend on the display of the following indicators:

- ASCII device emulation mode
- Programmable Symbol Indicators
- Character Set, Color, and Highlighting
- Shift Indicators
- Caps Lock area
- Extended Graphics.

The Host Descriptor may overlay these indicators. In such a case, you can ensure proper functioning by not specifying a Host Descriptor.

Planner: If your response to question 101 was:

- *1, 2, 3, 4, 5, 6, or 7, return to the divider page labeled "Microcode Customization Planning." See step 2 to determine the next worksheet you need to fill out.*

- *"M," return to the divider page labeled "Microcode Customization Planning." See step 3 to determine the next worksheet you need to fill out.*

104: Controller Address

Response: The two-character hexadecimal address.

The default response is XX.

Ask the system programmer at the host system location for this hexadecimal address. The host system recognizes this as the input/output (I/O) address.

For BSC: Obtain the polling address (in hexadecimal) for this controller from the system programmer at the host site. *Be sure that it is the polling address, and not the line address.* Use Table 6-2 on page 6-10 to convert the BSC polling address to the controller address (for example, if the BSC address [EBCDIC] is 4E, then the controller address is 14). Do **not** convert the hexadecimal address to a decimal number, and be sure to ask the system programmer if the address is EBCDIC or ASCII.

Because it is standard practice to send the address twice, the system programmer may give you a "double address" (for example, 4040). Use only the first two digits (for example, 40).

For SDLC: If the host access consists of VTAM/NCP, specify the controller address on the ADDR operand of the NCP's PU statement.

For X.25: This is the X.25 secondary station address.

For Non-SNA (Channel): The host system recognizes this as the lower (base) I/O address of the range of I/O addresses assigned to the terminals attached to the controller. If 16 or fewer devices (including ASCII) are attached, the following controller addresses are valid: 00, 10, 20, 30, 40, 50, 60, 70, 80, 90, A0, B0, C0, D0, E0, F0. If more than 16 devices (including ASCII) are attached, the following controller addresses are valid: 00, 20, 40, 60, 80, A0, C0, E0.

For SNA (Channel): This controller address represents the I/O address of the SNA physical unit.

For Gateway (Token-Ring and/or ISDN): The host system recognizes this as the lower (base) I/O address.

For X.21 Switched: If the host access consists of VTAM/NCP, specify the controller address on the ADDR operand of VTAM's switched PU statement.

Table 6-2. Conversion of BSC Polling Addresses into Controller Addresses

BSC Hexadecimal Polling Address		Controller Address
EBCDIC	ASCII	
40	20	00
C1	41	01
C2	42	02
C3	43	03
C4	44	04
C5	45	05
C6	46	06
C7	47	07
C8	48	08
C9	49	09
4A	5B	10
4B	2E	11
4C	3C	12
4D	28	13
4E	2B	14
4F	21	15
50	26	16
D1	4A	17
D2	4B	18
D3	4C	19
D4	4D	20
D5	4E	21
D6	4F	22
D7	50	23
D8	51	24
D9	52	25
5A	5D	26
5B	24	27
5C	2A	28
5D	29	29
5E	3B	30
5F	5E	31

105: Upper Limit Address

Response: Two-character hexadecimal address. The system programmer at the host system location will supply this address.

For SDLC and SNA (Channel) without the Gateway Feature: 00 is the only valid response.

For Non-SNA: The upper limit address indicates the range of consecutive I/O addresses assigned to the terminals attached to the controller.

Note: For Non-SNA, if this response is 00, the response to question 116 cannot be 0. If this response is nonzero, the response to question 116 must be 0.

For the Gateway (Token-Ring and/or ISDN): The upper limit address indicates the range of consecutive subchannel addresses (for local models) or SDLC station addresses (for remote models) assigned to the Token-Ring and/or ISDN Downstream Physical Units (DSPUs) communicating to this host through the gateway controller. The addresses defined at the host must begin with the gateway controller address and must be followed by the addresses assigned to the Token-Ring DSPUs. Immediately following the Token-Ring addresses are the addresses for the ISDN DSPUs. The complete range of addresses (gateway, Token-Ring, and ISDN) must be defined contiguously at the host access method.

As an example: You have a Token-Ring Network with 30 DSPUs and an ISDN network with 10 DSPUs for a total of 40. The address of the controller you are customizing is 10. Your response to question 104 would be 10, since that is the lower limit in the range of addresses. To find the response to question 105, the upper limit in the range of addresses, add the number of DSPUs (in hexadecimal). There are 40 DSPUs (28 hexadecimal). Therefore, the upper limit address is 38. See the following example.

```
┌─── Example ──────────────────────────────────────────────────────┐
│ Decimal 40 (number of devices) = 28 hexadecimal                   │
│                                                                   │
│    10 hexadecimal (the controller address)                        │
│  + 28 hexadecimal (number of devices)                             │
│    ─────────────────────────────────────                          │
│  = 38 hexadecimal (the upper limit address)                       │
└───────────────────────────────────────────────────────────────────┘
```

DSPU Considerations:

1. Up to 250 DSPUs (Token-Ring or ISDN) are supported on a gateway controller regardless of the number of host attachments. The DSPUs may be assigned to one primary host or spread across several primary and secondary hosts.

2. Up to 50 Token-Ring DSPUs are supported on each CCA.

3. See "Storage Requirements for DSPUs" on page 3-6 for complete DSPU planning guidelines.

106: Token-Ring Network Address and Service Access Point of the 3174

Planner: Questions 106 and 107 apply to 3174 controllers **without** the 3270 Gateway feature that attach to the Token-Ring Network.

Response: A 12-character hexadecimal address and a 2-character hexadecimal service access point.

Address:
The address can be either a locally administered address, a universal address, or all zeros. A locally administered address is in the following format:

    4000 XYYY YYYY

where X and Y are the user-assigned portion of the locally administered address. Note that X should not be greater than X'7'.

A universal address is in the following format:

    WWWW WWZZ ZZZZ

W = the ID of the adapter manufacturer (for example, IBM's ID is 10005A).
Z = the unique address portion of this adapter's universal address.

Warning: When the product permits you to enter either type of address, the suggested choice is a locally administered address. If the universal address is used and the Token-Ring Adapter is replaced, the 3174, as well as the gateway, will have to be recustomized with the new address.

Service Access Point:
The default is 04. If you are not using Single Link Multi-Host Support, respond with the default. Your response must be a multiple of 4 ranging from X'04' to X'EC'.

When using Single Link Multi-Host Support, you can access additional hosts through a single gateway (if supported) by specifying additional service access points (SAPs). Usage of the SAP depends on the capabilities of the gateways. If you are using Single Link Multi-Host Support, you may have to specify a SAP other than the default. See Appendix E for examples of using the SAP.

If using a T2.1 link connection for APPN on the primary host, respond with the default, 04.

Notes:

1. The universal address is used if you respond with all zeros.

2. When filling in the worksheets for secondary hosts on the primary link (1B—1H), the address portion of this question does not have to be answered. The response provided for the primary host (1A) is automatically transferred to the secondary hosts during the customizing procedures.

3. If the gateway that you are using is a 372x, you must define the Token-Ring Network addresses as locally administered addresses using dial digits (digits that can be dialed on the telephone) 0 through 9 **only**. The 372x should be connected by way of telephone lines.

4. The response to question 106 and 107 cannot be the same.

5. If question 650 = Y (3174-Peer Support) and question 651 = Y (Bridge Support), then the 3174-Peer Port Address Range defined in question 660 will be 4000 XXXX XX00 to 4000 XXXX XX3F (where X is the user assigned portion of the address). In such a case, question 106 cannot be set equal to any of the values in this range or 4000 XXXX XX FF.

Ask your network planner for this address and service access point.

107: Token-Ring Network Address and Service Access Point of the Gateway

Response: A 12-character hexadecimal address and a 2-character hexadecimal service access point.

Address:
The address can be either a locally administered address or a universal address. A locally administered address is in the following format:

4000 XYYY YYYY

where X and Y are the user-assigned portion of the locally administered address. Note that X should not be greater than X'7'.

A universal address is in the following format:

WWWW WWZZ ZZZZ

W = the ID of the adapter manufacturer (for example, IBM's ID is 1000 5A).
Z = is the unique address portion of this adapter's universal address.

Service Access Point:
The default is 04. If you are not using Single Link Multi-Host Support, respond with the default. Your response must be a multiple of 4 ranging from X'04' to X'EC'.

When using Single Link Multi-Host Support, you can access additional hosts through a single gateway (if supported) by specifying additional service access points (SAPs). Usage of the SAP depends on the capabilities of the gateways. If you are using Single Link Multi-Host Support, you may have to specify a SAP other than the default. See Appendix E for examples of using the SAP.

If using a T2.1 link connection for APPN on the primary host, respond with the default, 04.

Notes:

1. If the gateway that you are using is a 372x, you must define the Token-Ring Network addresses as locally administered addresses using dial digits (digits that can be dialed on the telephone) 0 through 9 **only**. The 372x expects to be connected by way of telephone lines.

2. The response to this question cannot be all zeros, nor can it be the same as the response to question 106.

3. If question 650 = Y (3174-Peer Support) and question 651 = Y (Bridge Support), then the 3174-Peer Port Address Range defined in question 660 will be 4000 XXXX XX00 to 4000 XXXX XX3F (where X is the user assigned portion of the address). In such a case, question 107 cannot be set equal to any of the values in this range or 4000 XXXX XX FF.

Ask your network planner for this address and service access point.

108: Unique Machine Identifier

Response: Seven alphanumeric characters. We recommend that you use the controller's serial number as the unique machine identifier. The serial number is located on the front panel of the controller and consists of 7 alphanumeric characters.

If the controller's serial number is not available or you prefer not to use it, you may enter your own unique machine identifier of 7 alphanumeric characters. You may enter 0 − 9, A − Z, null, or space for the 7 characters.

110: Multiple Logical Terminals (MLTs) Storage Support

Planner: This question has two parts. You must provide a nonzero response to this question if you are planning for Multi-Host Support (question 101 = M). In answering this question, you are allocating MLT storage for all host IDs on this link.

The default response is 0 0000, which is no MLT.

A nonzero response to either part of this question allows you to configure control unit terminal (CUT) display stations or ASCII display stations emulating CUT displays to use multiple host sessions. If you respond to either part of this question with a nonzero value, the other part of the question must be zero.

Response to first part of question: **0** 0000

Nonzero response: 1 to 8 allocates a preset amount of 3174 storage to support MLT. The preset amount ranges from 64KB to 2688KB.

	Host ID	Valid Nonzero Response
Models 1L through 23R	1A	1 to 8
Models 51R, 53R, 61R, 62R, 63R	1A	1 to 8
Concurrent Communication Adapters	2x and 3x	1 or 2

Response to second part of question: 0 **0000**

Nonzero response: 0001 − 2784 allocates that amount of 3174 storage in kilobytes to support MLT.

Valid responses are:

	Host ID	Minimum Response	Maximum Response
Models 1L through 23R	1A	0001 KB	2784 KB
Models 51R, 53R, 61R, 62R, 63R	1A	0001 KB	2784 KB
Concurrent Communication Adapters	2x and 3x	0001 KB	0128 KB

See "Determining MLT Storage Requirements" on page 6-15 if you wish to specify a nonzero response to either part of question 110.

Determining MLT Storage Requirements

To determine what your MLT storage requirements are, fill in the following worksheets as required for your configuration:

Worksheet 10A (Ports 26-00 – 26-31)
Worksheet 10B (Ports 27-00 – 27-31)
Worksheet 10C (Ports 21-00 – 23-07).

These worksheets are located in Appendix A, "Configuration Worksheets."

The following steps explain how to fill out each worksheet.

Step 1 In the Device Type/Screen Size column, specify the device and screen size for each controller port that has a CUT or ASCII display attached to it (for example, CUT 24 × 80).

3270 Devices with the Extended Function Feature (Feature 6) can support different screen sizes. For these devices, the SNA host can send a Bind command to change the screen size. Therefore, if the host attachment type is SDLC, X.25, SNA, SDLC (X.21 Switched), or Token-Ring Network, you must ensure there is enough storage for the largest screen that could be selected on the Bind. For example, the device might be set up to support 24 × 80 and the Bind command could change this to 32 × 80. (If your host applications do not support screen size changes, set Q126 Bit 5 = 1 and select the storage amount required for the screen size that the device will be set up for).

The following shows which setup options display station users must select in order to get the Extended Function Feature:

- 3180 displays — Model IDs 6-9

- 3191, 3192 displays — the Extended Function Model IDs (i.e. 2+, 3+, 4+, or 5+)

- 3471 (Model B), 3472 (all models except G) displays — a keyboard type other than 78EMU (3278 Emulation Mode).

Step 2 **For 3270 Devices only:** In the EAB? column, specify whether the CUT display stations have extended attribute buffers (EABs). Specify a "Y" or "N" (Yes or No).

Step 3 In the Number of Sessions column, specify the number of host sessions for the listed devices. *The maximum is 5 sessions.*

If you are calculating the MLT level for:

- A primary link (Host ID 1A), include both the 3270 host sessions for that link and ASCII host sessions.

- A secondary link (Host ID 2A or 3A), include only 3270 host sessions for that link.

Notes:

a. Each 3270 host session requires a host address. Local Non-SNA and BSC controllers are permitted a maximum of 32 host addresses.

b. You not have to add any storage for printer sessions or Distributed Function Terminals (DFTs).

Step **4** To determine how much storage to reserve for each listed device, refer to:

- Table 6-3 if you are not using Multi-Host Support.
- Table 6-4 on page 6-17 if you are using Multi-Host Support.

Write in the amount of storage required for each device in the MLT Storage Required column.

Table 6-3. MLT Storage Specification without Multi-Host Support. Values are in KB (1024 bytes).

Cut or ASCII Device Screen Size	Number of Sessions				
	1	2	3	4	5
CUT/24 × 80	0	0	2	4	6
CUT/24 × 80 with EAB	0	4	8	12	16
ASCII/24 × 80	0	0	2	4	6
ASCII/30 × 80	0	4	8	12	16
ASCII/32 × 80					
CUT/32 × 80					
CUT/43 × 80					
CUT/27 × 132					
CUT/32 × 80 with EAB	0	12	20	28	36
CUT/43 × 80 with EAB					
CUT/27 × 132 with EAB					

Note: If you are planning storage for ASCII Tektronix 4205s or UDT tables for which transparency is being defined, you must add additional storage. Base the additional storage amounts on screen size. If the display is 24 × 80, add 2KB more of storage; if the display is 30 × 80 or 32 × 80, add 4KB more of storage. If you are planning for only one logical session on an ASCII display station, no additional storage is required. This applies regardless of Multi-Host Support.

Table 6-4. MLT Storage Specification with Multi-Host Support. Values are in KB (1024 bytes).

CUT or ASCII Device Screen Size	Number of Sessions				
	1	2	3	4	5
CUT/24 × 80	0	0	0	0	2
CUT/24 × 80 with EAB	0	0	4	8	12
ASCII/24 × 80	0	0	2	4	6
CUT/32 × 80	0	0	4	8	12
CUT/43 × 80					
CUT/27 × 132					
ASCII/30 × 80	0	4	8	12	16
ASCII/32 × 80					
CUT/32 × 80 with EAB	0	8	16	24	32
CUT/43 × 80 with EAB					
CUT/27 × 132 with EAB					

Step 5 After calculating the amount of storage each device requires for MLT support, add these amounts to determine the total amount of MLT storage required. *Write this amount on the totals line at the bottom of the MLT Storage Required column.*

Step 6 If you filled out more than one worksheet, add the amount from the totals line of each worksheet to arrive at the total amount of MLT storage you require.

• If you wish to specify an exact amount of MLT storage, write the amount with leading zeroes next to question 110 on the host attachment worksheet.

• If you wish to specify an MLT level, use the following chart and *considering future expansion,* determine which level of MLT support you should select.

If the total storage required is	Select MLT level
1KB to 64KB	1
65KB to 128KB	2
129KB to 512KB	3
513KB to 896KB	4
897KB to 1152KB	5
1153KB to 1536KB	6
1537KB to 2048KB	7
2049KB to 2688KB	8

Figure 6-2 on page 6-18 shows an example of an MLT Worksheet that was completed using the values from Table 6-4.

Controller Port Number	Device Type/ Screen Size	EAB? Y/N	Number of Sessions	MLT Storage Required (KB)
26-00	CUT/24 × 80	Y	3	4
26-01	DFT/variable	N	3	0
26-02	CUT/24 × 80	N	5	2
26-03	CUT/43 × 80	Y	4	24
26-04	CUT/32 × 80	N	5	12
26-05	CUT/27 × 132	Y	4	24
26-06	CUT/43 × 80	Y	5	32
26-07	CUT/24 × 80	N	3	0
21-01	ASCII/30 × 80	N	2	0
21-02	ASCII/24 × 80	N	5	2
			Total MLT Storage Required:	100

Figure   6-2. An Example of Calculating MLT Storage

In this example, 100KB is the total amount of storage required. Level 1 reserves only up to 64KB and would therefore be insufficient. Level 2 of MLT reserves up to 128KB, which would be sufficient, but considering eventual expansion, you may decide to choose Level 3 support (512KB) or higher.

MLT-Related Considerations

- If your response to either part of question 110 is nonzero, you cannot respond to question 116 with 0 on the worksheet for the primary host attachment.

- For information on port addressing of the Multiple Logical Terminals (MLTs), see Chapter 7, "Planning for Port Assignment."

- If you are configuring for Multi-Host Support, see Chapter 15 for information on defining host sessions for terminals.

- If you are using MLT on ASCII devices, you must answer question 703 with a 1.

116: Individual Port Assignment

Response: One to four alphanumeric digits.

The four digits of this response are grouped into two pairs. The first (leftmost) pair represents the assignment of 3270 addresses. The second pair represents the assignment of AEA addresses.

Note: Depending on your configuration, you may not be specifying all four digits; you may have a one, two, or four-digit response. However, placement of the digits is crucial, so please read the following description carefully.

The default response is 0.

For Port Assignment, you define addresses for terminals attached to the Terminal Adapter, not for PCs or controllers attached to the Token-Ring. Therefore, if you want to customize for any devices that are not attached to the Token-Ring, you should plan to customize for Port Assignment.

If your response is **0**, **1**, or **2**, write your response in the leftmost box and leave the second box blank.

0	=	1 address per 3270 port; individual addresses are automatically assigned.
1	=	You assign the number of addresses for each port; individual addresses are automatically assigned.
2	=	You assign the individual addresses.
SX	=	X is the number of addresses per 3270 port; individual addresses are automatically assigned. X is 1 to 5.
AY	=	Y is the number of addresses per AEA port; individual addresses are automatically assigned. Y is 1 to 5.

Enter 0 if you:

- Want one 3270 address per port automatically assigned.
- Do not want to plan for port assignment.
- Do not want any AEA addresses assigned.

Enter 1 or 2 if you:

- Plan to assign port addresses on a port-by-port basis.
- Answered either part of question 110 with a nonzero response.
- Plan to have ASCII devices access 3270 hosts (AEA must be present).
- Plan to use DFTs with multiple interactive sessions. (The 3290 Information Panel and the 3270 Personal Computer are some of the DFTs with multiple interactive sessions capability.)

Enter SX if you:

- Want to specify the number of addresses (1 to 5) to be assigned to each 3270 port.

- Want to specify the same number of addresses for all 3270 ports and have the individual addresses automatically assigned.

- Do not plan to have ASCII devices access 3270 hosts.

- Answered either part of question 110 with a nonzero response.

- Plan to use DFTs with multiple interactive sessions.

Responses S1—S5 are allowed only on SNA host attachments.

The above responses do not result in AEA port address assignment. To plan for assignment of AEA addresses:

Enter SX AY if you:

- Want to specify the number of addresses to be assigned to each 3270 port and the number of addresses to be assigned to each AEA port.

- Want to specify the same number of addresses for both 3270 and AEA ports (X=Y).

- Want to have the individual addresses automatically assigned.

- Answered questions 110 and 703 with nonzero responses.

- Plan to have ASCII devices access 3270 hosts.

Important:

1. The maximum number of addresses that can be assigned is 253. The customizing utility prioritizes the assignment of addresses. Be sure that the number of addresses you select in this question does not exceed 253. Otherwise, either some ports do not get any addresses or they get fewer addresses than you requested.

2. Do not respond to the AY part of this question if:

   The host is non-SNA

   The 3174 model number is 53R.

3. If the response to question 101 = M, the second part of question 116 appears only for the 1A primary host.

See Chapter 7, "Planning for Port Assignment," if you require more information to determine your response.

117: Port Assignment

This is a panel that appears during the Configure procedure if you respond to question 116 with 1 or 2. Chapter 7, "Planning for Port Assignment," contains the planning information you need to fill out the worksheet for this panel. Port assignment for 3174-Peer devices is referred to in question 660.

118: Port Address

This panel appears on the screen after the 117 panel if you opt to assign your own addresses; if you select automatic address assignment, this panel appears after the customizer responds to question 116. It displays the assigned port addresses in hexadecimal. The customizer cannot enter information on this panel.

121: Keyboard Language

Planner: The response given for this question must correspond to that given when defining translate tables. See "Worksheet 35—Translate Tables Definition" on page A-50 for information. If the responses differ, unpredictable results may occur.

If you plan to answer question "123: Country Extended Code Page Support" with a 1 (CECP Support), you **must** use one of the valid CECP languages in Table 6-6 on page 6-22 when responding to this question.

Response: Two digits that represent the keyboard language that will be used in this cluster.

The default response is 01 (U.S. English).

Notes:

1. The *3174 Character Set Reference*, GA27-3831, contains the code pages for the supported languages.

2. The keyboard languages listed in bold type in Table 6-5 can be used for communication to ASCII devices. For more information, see "Terminal Tables and Translate Tables" on page 14-17.

3. If one of the languages shown in regular type (not intended for support of ASCII devices) is selected for ASCII communication, the language provided will be U.S. English.

Table   6-5. Keyboard Languages Supported

01 = English (U.S.)[1]	**28 = Portuguese**
02 = English (U.S.) ASCII-7[1][2]	**29 = Canadian Bilingual**[1]
03 = Austrian/German	**30 = French**
04 = Belgian	33 = English (U.S.) ASCII-International[3]
05 = Brazilian	34 = English (U.S.) ASCII-8[4]
07 = Danish	35 = Cyrillic
09 = Finnish	36 = Greek
14 = International	37 = Icelandic
15 = Italian	38 = ROECE[5] Latin
16 = Japanese English	39 = Turkish
17 = Japanese Katakana	40 = Yugoslavic
19 = Spanish	**41 = Swiss-French (New)**
21 = Spanish-Speaking	**42 = Swiss-German (New)**
22 = English (UK)	**43 = Belgian (New)**
23 = Norwegian	46 = Thai
24 = Swedish	**47 = Netherlands**
25 = EBCDIC World Trade	48 = New Greek

[1] Alternate Keyboard Selection (132) is valid only with these languages.
[2] Available on remote models only. Does not support Extended Data Stream.
[3] Available only on BSC, local SNA, and local non-SNA.
[4] Available only on SDLC and X.25.
[5] Regional Office for Eastern and Central Europe.

123: Country Extended Code Page Support

Response:

0 = No CECP Support
1 = CECP Support (see Note 1).

The default response is 0.

If you respond to this question with a 1 (CECP Support), a larger definition of graphic characters than previous code pages will be supported, and the ability for multilingual communication will be improved.

Warning: Answering this question with a 1 can result in a loss of data integrity and cause unexpected characters to appear on the screen. You should read Chapter 8, "Planning for Country Extended Code Page," before responding to this question with a 1.

Warning: Answering this question with a 1 results in a loss of the Mono Case function on 3192 Models C, D, and F.

Notes:

1. You must answer question 121 with one of the valid CECP (Country Extended Code Page) languages from Table 6-6 on page 6-22 if you plan to respond to question 123 with a 1.

2. If you respond to this question with a 1 and to question 139 with 00 or 01 for the CCA host attachment, CECP code pages are used for CCA-attached hosts.

3. See Chapter 8, "Planning for Country Extended Code Page," for the supported devices.

4. ASCII devices customized for CECP support cannot provide the Field Mark or Dup characters.

The languages supported by CECP are listed in Table 6-6. Beside each language name is the 2-digit response that is used when responding to "121: Keyboard Language."

Table 6-6. CECP Languages Supported

01 = English (U.S.)	24 = Swedish
03 = Austrian/German	28 = Portuguese
07 = Danish	29 = Canadian Bilingual
09 = Finnish	30 = French
15 = Italian	37 = Icelandic
19 = Spanish	41 = Swiss French (New)
21 = Spanish-Speaking	42 = Swiss German (New)
22 = English (UK)	43 = Belgian (New)
23 = Norwegian	47 = Netherlands

Note: The *3174 Character Set Reference*, GA27-3831, contains the code pages for the supported languages.

125: Miscellaneous Feature Options (A)

Response: Eight digits (0 or 1).

0 = No
1 = Yes.

The default response is 00000000.

Specify digits 1 – 8 as either a 0 or 1. Digits are numbered from left to right.

Note: Digits 3 and 5 through 7 cannot be specified on the worksheets for secondary host attachments.

Digit	Description
1	Dual-Function Clear Key
2	Unsupported Control Code Translate
3	Clicker Option
4	Command Chaining
5	PS Load Altered Screen
6	File Transfer Aid
7	Background Alarm
8	Deferred Keystroking (Remote SNA Only)

Digit 1 - Dual-Function Clear Key: Specify this digit as 1 to prevent the Clear key from putting a 3278, 3279, or 3180 display station into the default screen size mode.

Warning: Specifying this digit as 1 causes the Clear key to operate contrary to the definition given in the *IBM 3270 Information Display System Data Stream Programmer's Reference*, GA23-0059. Host applications written to conform with the *Data Stream Programmer's Reference* may react unpredictably.

Digit 2 - Unsupported Control Code Translate: Specify this digit as 1 to translate the following interface codes into a hyphen character (EBCDIC X'60'):

01 through 04, 06, 07, 09, 0A, 0B, 0E, 0F, 10, 14, 16, 17, 18, 1A, 1B, 1F
20 through 27, 2A, 2B, 2D, 2E, 2F
30 through 3B, and 3D.

During READ operations, the hyphen character code returns to the host instead of the original code.

Notes:

1. Additionally, interface codes 3F and FF are replaced by hyphens on devices without the Extended Attribute Buffer (EAB).

2. The above codes are reserved for future use in the IBM 3270 Data Stream. Host applications that transmit these codes as data with a write-type command or within an outbound 3270DS structured field are not in conformance with the *Data Stream Programmer's Reference* and may encounter unpredictable results.

Specifying this digit as 0 (default) causes the controller to reject the interface codes and display a PROG 402 in the operator information area of the display station, which receives a message containing one of the unsupported interface codes. Pressing the RESET key clears the PROG 402 from the screen. Also, an Erase Write or Erase Write Alternate command from the host application clears the PROG 402 from the screen.

Digit 3 - Clicker Option:

0 = Keyboard clicker is *off* when the display station is turned on.
1 = Keyboard clicker is *on* when the display station is turned on.

Digit 4 - Command Chaining:

0 = Command Chaining is on.
1 = Command Chaining is off.

Performance may be downgraded if you specify this digit as a 1.

Digit 5 - PS Load Altered Screen: Specifying a 1 inhibits screen flashing during a load PS.

Digit 6 - File Transfer Aid: The operation of DFT devices is not affected by this option.

A response of 1 is required for:

* Operation of the IBM Personal Computer with an IBM 3278/79 emulation card or equivalent performing file transfer. This includes the IBM 3270 Personal Computer operating in CUT mode.

* Operation of the 3814 Switching Management System.

* Operation on the AEA using FTTERM* (IBM File Transfer/Terminal Emulator Program or OS 2 Extended Addition File Transfer).

If 1 is specified, the operation of other CUT (non-IBM PC) devices may be degraded.

Digit 7 - Background Alarm:

0 = Background alarm is allowed.
1 = Background alarm is disabled for background sessions.

This option has effect only when question 110 (MLT) has been configured with a nonzero response.

Each MLT display has one foreground session and one or more background sessions. The foreground session is the one currently displayed on the terminal screen; the others are background sessions. Host updates to background sessions may include sounding the alarm. This option allows the background alarms to be disabled.

Note: This alarm is automatically disabled if digit 6 (File Transfer Aid) receives a response of 1.

Digit 8 - Deferred Keystroking - Remote SNA:

0 = Deferred keystrokes are discarded between segments within a request unit (RU).
1 = Deferred keystrokes are processed between segments within a request unit (RU).

Note: Performance is degraded if you respond to this question with a 1.

126: Miscellaneous Feature Options (B)

Response: Eight digits (0 or 1).

0 = No
1 = Yes (See note).

Note: For Digit 3, specifying 0 causes Type Ahead to remain enabled; specifying 1 causes Type Ahead to be disabled.

The default response is 00000000.

Digit	Description
1	Reserved
2	Coax Timeout Period
3	Type Ahead
4	Enhanced Screen Support for 3270 CUT Devices (SNA only)
5	Bind Support
6	Reserved
7	Reserved
8	Reserved

Digit 1 - Reserved: The first digit is reserved.

Digit 2 - Coax Timeout Period: The Coax Timeout Period is used by the controller to ensure timely responses from attached devices. Specifying the second digit as 1 increases the timeout period from 50 microseconds (the default) to 100 microseconds.

Specify 1 for the second digit if:

- You have devices attached through products that increase the coax delay past 50 microseconds (for example, a 5209 Link Protocol Converter).

- Original Equipment manufacturer (OEM) multiplexers or devices are attached to the controller.

Warning: If you operate in a stressful keystroking environment (many devices, rapid keystroking) and you have the AEA feature, specifying this digit as 1 may result in lost keystrokes.

Digit 3 - Type Ahead: Specifying a 1 inhibits the Type Ahead function on 3270 CUT and ASCII terminals. Specifying a 0 allows the Type Ahead function. This function allows buffering of keystrokes for the display while the controller is waiting for the host to respond or unlock the keyboard.

Digit 4 - Enhanced Screen Support for 3270 CUT Terminals (SNA Only): When set to a **1**, the 3174 sends data to a terminal after a complete SNA chain is received. When set to a **0** the 3174 sends data to a terminal after complete segments are received. If the host link is operating at a slow speed, data sent to a terminal in segments can cause choppy screen presentation.

Digit 5 - Bind Support: This applies *only* to SNA Hosts on the 3174 and affects *only* CUT devices with Extended Function Feature (EFF), also known as Feature 6, that have multiple sessions.

If a 0 (default) is specified, the 3174 will accept a Bind to a device with EFF that specifies a screen larger than the device had been defined when set up. For example, a 3472 set up as a Model 2 (24 x 80) will have a Bind specifying a screen size of 43 x 80 accepted.

If a 1 is specified, the 3174 will handle devices with EFF the same as it handles devices without EFF relative to Bind processing. For example, the Bind is only accepted if the number of rows is less than or equal to the rows in the model size.

Note: The answer to this question will affect the amount of MLT storage that is required for devices with the Extended Function Feature. Refer to "110: Multiple Logical Terminals (MLTs) Storage Support" on page 6-14 for more information about MLT storage and the Extended Function Feature.

Digits 6 through 8 - Reserved: These digits are reserved.

127: Response Time Monitor (RTM) Definition

Response: Two digits. If one digit is zero, the other must also be zero.

The default response is 00 (no RTM support).

Note: If your response to this question is nonzero, you **must** fill out "Worksheet 12—128: RTM."

Turn to Chapter 9 for information on planning for RTM, how to fill out the worksheet, and the possible responses to question 127. Your system programmer will help you select your responses.

128: RTM Boundaries and Interface Specification

During the Configure procedure, this host-related panel appears if your response to question 127 was nonzero. Chapter 9, "Planning for Response Time Monitor (RTM)," has the planning information you need to fill out the worksheet for this panel.

132: Alternate Base Keyboard Selection

Planner: *This question is valid only if question 121 was given a response of 01 or 29.*

Response: Four digits (A value of 0, 1, or 2 for each).

    0 = No
    1 = Yes (keyboard without numeric lock)
    2 = Yes (keyboard with numeric lock—valid for 8K1038 and 8K1158 keyboards only).

The default response is 0000.

Note: For a description of numeric lock, see "Numeric Lock Feature Option" in the *3174 Functional Description*, GA23-0218.

Your response to question 132 specifies the alternate keyboard layouts (if any) that you want configured in the system. If you leave question 132 set to the default, the layout of the keyboards attached to the controller is used.

Base keyboards 8K0808 and 8K0932 are mutually exclusive and replace the standard Base Typewriter keyboards. Base keyboard emulators use the Base Typewriter layout in their emulation; therefore, any change to the Base Typewriter layout affects the Base keyboard emulators. For this reason, ASCII display stations used for 3270 terminal emulation (or any other emulators) may lose some of their functions.

Base keyboard 8K1038 can be used in addition to the other Base keyboards. Base keyboard 8K1158 replaces all of the standard Base APL keyboards.

To determine which keyboards you have, refer to Table 6-7 on page 6-27, which lists the microcode RPQs associated with the different keyboards. For visual identification of keyboards 8K0808, 8K0932, 8K1038, or 8K1158, refer to the *3174 Character Set Reference*.

Digit	Description
1	8K0808 Base Keyboard
2	8K0932 Base Keyboard (3178-C4)
3	8K1038 Base Keyboard (3178-C3)
4	8K1158 Base Keyboard

Notes:

1. Base keyboards 8K0808, 8K0932, 8K1038, and 8K1158 do not require RPQ microcode to operate.

2. Responding with a 1 to digit 3 (8K1038) and digit 4 (8K1158) results in the PF keys being operational in the lower shift position.

Table 6-7. Microcode RPQ Numbers Associated with Keyboards		
Microcode RPQ Numbers	**Supported?**	**Response**
8K0809	Yes	First digit = 1
8K1162	Yes	First digit = 1
8K0931	Yes	Second digit = 1
8K1034	No	See 8K1230
8K1035	No	See 8K1255
8K1163	Yes	Second digit = 1
8K1164	No	For Typewriter keyboard see 8K1230
	Yes	For APL keyboard fourth digit = 1
8K1165	No	For Typewriter keyboard see 8K1255
	Yes	For APL keyboard fourth digit = 2
8K1166	No	See 8K1164
8K1230	Yes	Third digit = 1
8K1231	No	See 8K1255
8K1245	No	See 8K1255
8K1255	Yes	Third digit = 2

136: Standard Keyboard Layouts

Planner: Answer questions 136, 137, and 138 only if the 3174 cluster includes a display station that has a Converged or Enhanced keyboard that is operating in native mode. For additional information on modifying keyboards, see Chapter 17, "Planning to Modify Keyboards."

Most keyboards are modifiable in native mode; see your terminal user's guide for instructions on setting up your terminal.

Response: Four digits (0 or 1).

    0 = No
    1 = Yes.

The default response is 0000.

Digit	Description
1	Converged Typewriter keyboard
2	Converged APL keyboard
3	Converged Data Entry keyboard
4	Enhanced Typewriter keyboard

By using the Modify Keyboards procedure, you can create as many as four modified versions of these layouts. However, the total number of keyboard layouts (standard and modified) that you select to use for any cluster cannot exceed 4 (a combination of responses to questions 136 and 137).

Your response to this question specifies the standard keyboard layouts that you want configured in the system. Enter a 1 in the response field for each standard keyboard layout that you want configured in the system. If you specify all four standard keyboard layouts here (response = 1111), you cannot select any modified keyboard layouts in question 137.

For illustrations of the standard layouts, refer to the *3174 Character Set Reference.*

137: Modified Keyboard Layouts

Response: Four digits (0 or 1).

0 = No
1 = Yes.

The default response is 0000.

See the "Planner" note under question 136.

Digit	Description
1	Keyboard ID: A
2	Keyboard ID: B
3	Keyboard ID: C
4	Keyboard ID: D

Your response to question 137 specifies the modified keyboard layouts that you want configured in the system. Each layout consists of a keyboard/keypad combination that you can identify with the letter A, B, C, or D. You define the modified layout that the keyboard ID represents by performing the Modify Keyboards procedure in the *3174 Utilities Guide.* See Chapter 17, "Planning to Modify Keyboards," for directions for defining a modified layout.

Enter a 1 in the response field for the IDs that you either plan to define or have already defined. This configures the layout assigned that ID in the system.

Note: The total number of keyboard layouts selected in questions 136 and 137 cannot exceed 4.

138: Standard Keypad Layouts

Planner: This question applies only to standard, Converged, or Enhanced keyboards in native mode (see your terminal user's guide). If the keyboard is being operated in emulation mode, this question does not apply for these display stations.

Response:

0 = National Language Numeric Keypad
1 = Data Entry Keypad
2 = Program Function Keypad.

The default response is 0.

See the "Planner" note on page 6-27.

These responses specify the type of keypad to be used with the standard keyboard layouts you selected in question 136. If you selected one to four types of keyboard layouts in question 136, you can select one keypad here to be used with all of them.

For visual identification of these keypads, see "Numeric Keypads" in the *3174 Character Set Reference.*

139: Concurrent Communication Keyboard Language

Planner: *This question applies only to host attachments through Concurrent Communication Adapters.*

Response:

    00 = Same language used for the 1A host
    01 = English (U.S.)
    02 = English (U.S.) ASCII-7.

The default response is 00.

Your response specifies the keyboard language that is to be used for all host attachments through a Concurrent Communication Adapter.

Notes:

1. You must respond to question 139 with 00 if you did not respond to question 121 with 01 or 02 while planning for the primary link attachment.

2. You must respond to question 139 with 01 if the communication protocol of your secondary link attachment is X.21 and you responded to question 121 with 02 while planning for the primary link attachment.

3. You cannot respond to question 139 with 02 if the communication protocol of your secondary link attachment is X.21 and you responded to question 121 with 01 while planning for the primary link attachment.

4. You cannot send compressed Program Symbols data (question 165 = 1) if you respond to question 139 with 02.

5. If you provide a nonzero response to question 139, DFT devices cannot communicate with the 3270 host attached through the Concurrent Communication Adapter.

6. If you modify a keyboard for the language used on the primary host attachment on this link, when that workstation operates in a logical terminal session on the CCA, it will **not** have the modified keyboard; it will have the standard (unmodified) one *if a different language was selected when responding to this question.*

141: Magnetic Character Set

Response:

    A = None
    B = Numeric
    C = Alphanumeric (auto entry for secure data only)
    D = Alphanumeric (auto entry for all data).

The default response is A.

Your response specifies the type of magnetic character set (if any) that has been installed.

Note: Your response must be A if your response to question 121 was 35 (Cyrillic), 38 (ROECE), 40 (Yugoslavic), or 46 (Thai).

150: Gateway (Token-Ring and ISDN)

Response: Two digits (0 or 1)

The default response is 0 0.

Digit 1:

0 = This controller does not act as a Token-Ring Gateway to this host.
1 = This controller does act as a Token-Ring Gateway to this host.

Digit 2:

0 = This controller does not act as an ISDN Gateway to this host.
1 = This controller does act as an ISDN Gateway to this host.

Notes:

1. You cannot respond with a 1 to either digit of this question if your response to question 105 is 00.

2. On the secondary SDLC panel, digit 2 does not appear. Use only 1 digit for your Token-Ring Gateway response.

If you respond with a 1 for:

• Digit 1, fill out "Worksheet 45—Common Network," "Worksheet 46—Ring Address Assignment," and "Worksheet 47—Ring Transmission Definition."

• Digit 2, fill out "Worksheet 45—Common Network" and "Worksheet 48—ISDN PUID Assignment," and respond to question 190.

165: Compressed Program Symbols

Response:

0 = Do not send compressed Programmed Symbols data.
1 = Send compressed Programmed Symbols data.

The recommended setting for 3174 remote models is 1.
The recommended setting for 3174 local models is 0.

Note: If you are planning a secondary host attachment through a Concurrent Communication Adapter, you cannot respond to question 165 with 1 if you responded to question 139 with 02.

Compressing data on a locally attached 3174 could degrade performance. For distributed function terminals, you do not need to specify a 1. For more information on compressed Programmed Symbols data, see the *3174 Functional Description*, GA23-0218.

166: Attribute Select Keypad

Response:

A = Attribute Select Keypad not in use
B = Attribute Select Keypad in use **without** numeric lock
C = Attribute Select Keypad in use **with** numeric lock.

The default response is A.

For visual identification of the Attribute Select Keypad, see the *3174 Character Set Reference*.

Note: Your response must be A if your response to question 121 was 35 (Cyrillic), 38 (ROECE Latin), 40 (Yugoslavic), or 46 (Thai).

168: Additional Extension-Mode Key Definition (Personal Computers)

Planner: Answer this question only if the 3174 has personal computers (PCs) attached that use 3270 CUT mode emulation programs and either:

* *The MLT function will be used, or*
* *The ASCII emulation function will be used.*

Response:

```
0 =  No additional extension-mode key is defined
1 =  Home key is the additional extension-mode key
2 =  Print ID key (IDENT) is the additional extension-mode key.
```

The default response is 0.

Many 3270 terminal emulation programs that run on PCs do not completely emulate all the keystrokes available on a 3278 or 3279 CUT display station; for example, many key sequences that require an ALT Shift are ignored by the emulation program and are not sent to the 3174. Therefore, an additional extension mode (similar to an ALT Shift) is required so that PCs with 3270 emulation programs can use the 3174 MLT change-screen and ASCII-emulation functions.

The response to this question defines an additional key used to enter keyboard extension mode. For possible alternatives to defining this additional extension-mode key, see the *3174 Terminal User's Reference for Expanded Functions*, GA23-0332.

A response of 1 or 2 to this question changes the function of either the Home key or the Print ID key on 3278 and 3279 keyboards as well as on keyboards that emulate the 3278 or 3279 keyboards. For that reason, do not specify a nonzero response unless the additional function is required to support a PC 3270 emulation program providing CUT mode operation. If the Home key is selected as the additional extension-mode key, Home must be pressed twice in order to perform the function normally associated with this key. The Print ID key is affected in the same way if it is selected as the additional extension-mode key.

The Home key is the recommended extension-mode key; Home is normally an unshifted key on PC keyboards and provides easier operator access.

Note: This question affects all Base keyboards (for example, 3278 or 3279 keyboards) and all keyboards emulating 3278 type keyboards. It does not affect IBM Converged or Enhanced keyboards unless those keyboards are used in 3278 or 3279 emulation mode.

173: Distributed Function Terminal (DFT) Options

Response: Eight digits (0 or 1).

    0 = No
    1 = Yes.

The default response is 00000000. Digits are numbered from left to right. The DFT devices include:

- IBM 3179 G Color Graphic Display Station
- IBM 3192 G Color Graphics Display Station
- IBM 3193 Display Station
- IBM 3194 Display Terminal
- IBM 3290 Information Panel
- IBM 3270 Personal Computer
- IBM InfoWindow Graphics-5 3472 Display Station.

If you do not have one of these devices, use the default.

Digit	Description
1	Enable Local Copy Format Controls
2	Automatic Form Feed before Local Copy
3	Automatic Form Feed after Local Copy
4	Reserved
5	Reserved
6	Field Intensity Option
7	Field Intensity Option
8	Update Panel before Allowing Buffer Change

Digit 1 - Enable Local Copy Format Controls: DFT devices generate an SNA-character-string data stream to perform a local copy operation to a printer. If the printer does not have Save/Restore Format capability and is operated in shared mode (in shared mode, local copy operation is permitted between brackets of a host communication), there is a possibility that the local copy operation will destroy the format controls established by the host program. Appropriate specification of this digit establishes format controls. If a printer supports Save/Restore Format, this option has no effect: the DFT device will send format controls.

If this digit is set to 0 (default), the DFT device will not send format controls to a printer that lacks Save/Restore Format capability. Set this digit to 0 for those operating environments where the host program does not reestablish format controls with each Begin Bracket. This is true for SNA only. Note that the format of the local copy output depends on the format controls established by the operator and/or host program.

When this digit is set to 1, the DFT device will send format controls to the printer even though the printer lacks Save/Restore capability. This enables the local copy output to duplicate, as closely as possible, the character image being copied from the DFT device. Set this digit to 1 for those operating environments where the printer is not operated in shared mode and/or the host program reestablishes format controls with each Begin Bracket.

Digit 2 - Automatic Form Feed before Local Copy:

- Specify this digit as 0 if you do *not* want the printer to generate an automatic form feed before a local copy operation is performed via the DFT data stream.

- Specify this digit as 1 if you want the printer to generate an automatic form feed before a local copy is performed via the DFT data stream.

Digit 3 - Automatic Form Feed after Local Copy:

- Specify this digit as 1 if you want to generate an automatic form feed after a local copy operation is performed via the DFT data stream.

- Specify this digit as 0 if you do *not* want to generate an automatic form feed after a local copy operation is performed via the DFT data stream.

Digits 4 and 5 - Reserved: The fourth and fifth digits are reserved and defaulted to 0.

Digits 6 and 7 - Field Intensity Options - 3290: Use the sixth and seventh digits to specify the field intensity option.

- Specify these digits as either 00 or 11 if you want the 3290 to underscore all fields carrying the field intensity attribute.

- Specify these digits as 01 if you do *not* want the 3290 to underscore or display in reverse video the fields carrying the field intensity attribute.

- Specify these digits as 10 if you want the 3290 to display in reverse video the fields carrying the field intensity attribute.

Digit 8 - Update Panel before Allowing Buffer Change - 3290: Specify this digit as 0 if you want the 3290 to suspend panel updating to process a host transmission. If this digit is set to 0, under high-data-rate conditions the host messages placed in the display buffer may be overlaid with new data before they are displayed on the panel.

When this digit is set to 1, the contents of the display buffer must be displayed on the panel before new data can be placed in the display buffer. Set this digit to 1 when the 3290s are being used as system consoles or for other applications where potentially high message rates are possible and the user must visually interpret all data sent by the host.

175: Distributed Function Terminal (DFT) Password

Response: A six-digit numeric password.

Define a six-digit password. This password is used in 3290 setup level 3 every time permanent changes are made to the 3290 logical terminal definition table. The default is 000000. For more information, see the *3290 Information Panel Description and Reference*, GA23-0021, or the *3290-2 Information Panel Description and Reference*, GA23-0241.

176: BSC Enhanced Communication Option: Distributed Function Terminals

Response:

    0 = No
    1 = Yes.

The default response is 0.

To specify a 1, you must have distributed function terminals attached to the 3174.

In addition:

- Your system programmer should confirm that your host system is capable of handling enhanced 3270 BSC protocols in response to outbound transmissions of BSC WACK (wait before transmit acknowledgment).

- You use one of the following IBM licensed programs, which support BSC WACK:

  - ACF/NCP Version 1, Release 2 or higher (CICS/VS and IMS/VS using VTAM or TCAM and ACF/NCP are supported)

  - ACF/VTAM with Communication Adapter Support (4331, 4361, and 9370)

  - CICS/VS Version 1, Release 6 and higher using BTAM

  - VM/370 SP, Release 3 and higher.

If you use IMS/VS with BTAM, TCAM, or ACF/TCAM with the Communication Controller's Emulation Program (EP), you must specify 0.

Consult with your system programmer for this information. Be sure that the licensed programs you use are at compatible release levels and support the required display functions.

179: Local Format Storage

Response: Three digits.

The default response is 0 0 0.

Digit 1 - Enable Local Format Storage (LFS) feature:

0 = No LFS feature.
1 = Formats can be loaded to an LFS storage buffer, which is reserved for this host.
2 = This response is valid only for hosts other than 1A. If this digit is specified, that host can present formats. The 1A host manages the formats.
3 = This response is valid only for hosts other than 1A. If this digit is specified, that host can present formats *and* load them into its own storage buffer or just present formats that are managed by host 1A.

Note: If the response for this digit is a 2 or 3 for hosts other than 1A, the LFS feature must be enabled on the 1A host.

Digit 2 - Mode of Operation for Operator-selected Formats:

0 = Operator-selected formats is disabled for this host.
1 = Operator-selected formats is enabled for this host.

This response must be 0 if the LFS feature is not selected (digit 1 = 0).

Digit 3 - Amount of storage to be allocated for Local Format Storage on each Host Connection:

- 0 = No storage allocated
- 1 = 64K
- 2 = 128K
- 3 = 256K

- 4 = 512K
- 5 = 1024K
- 6 = 1536K.

The response for this digit must be 0 if digit 1 is 0 or 2.
The response for this digit must **not** be 0 if digit 1 is 1 or 3.

190: Number of ISDN DSPUs

Response: Two hexadecimal characters 00 through 20.

The default response is 00.

Your response indicates the number of DSPUs that may connect to the ISDN Adapters in the controller.

The number of ISDN Adapters defined in "Worksheet 42—ISDN Adapter Definition" on page A-57 must be sufficient to support the number of ISDN DSPUs defined in your response to question 190. Each ISDN Adapter allows up to 8 ISDN DSPUs to connect to the controller. The number of ISDN Adapters is dependent on the controller model.

- Up to 32 ISDN DSPUs (4 ISDN Adapters) are supported by Models 11L, 11R, 12L, 12R, 21L, 21R, and 22L.

- Up to 24 ISDN DSPUs (3 ISDN Adapters) are supported by Models 1L, 1R, and 2R.

- Up to 16 ISDN DSPUs (2 ISDN Adapters) are supported by Models 61R and 62R.

Planner: Use your response to this question along with the PUID for question 215 to complete "Worksheet 48—ISDN PUID Assignment" on page A-63.

213: Between Bracket Printer Sharing

Response:

0 = No Between Bracket Printer Sharing
1 = Between Bracket Printer Sharing allowed.

The default response is 1.

Select 0 if you are not using local copy or if all printers on the Printer Authorization Matrix are defined in "local mode" (you do not want the host to use the local copy printers for direct print operations). Select 1 if some printers on the Printer Authorization Matrix are defined in "shared mode" (some printers are shared for both local copy and host printing).

For more information on local copy, see Chapter 15, "Planning to Define Devices."

215: Physical Unit Identification (Controller)

Response: Five alphanumeric characters.

The default response is 00000.

The physical unit identification (PUID) is a 5-character hexadecimal code; the only valid characters are A—F and 0—9. Each PUID in a network should be unique.

You can obtain the PUID from the system programmer. The PUID identifies the controller to the host in response to an XID command. The PUID is required for switched connections.

220: Alert/CMIP Event Report Function

Response:

0 = No alert function
1 = Alert function without operator-generated alert message capability
2 = Alert function with operator-generated alert message capability from port 0 of HG 26 or HG 27 only
3 = Alert function with operator-generated alert message capability from all ports[1].

For responses 1, 2, or 3, when using an ISDN Gateway (your response to question 150 = 01) the CMIP Event Report function is active.

The default response is 0.

CMIP is not supported on secondary links.

If you are planning to specify Token-Ring Error Alerts (905 = 0 or 1), you should select 1, 2, or 3 for this question.

Alert is an SNA-only function that requires the NetView program, Version 1.1 or higher, at the host. If Alert has been specified, the 3174 will attempt to send, to the host, alert data for all errors that have not affected the integrity of the host adapter, the 3174 processor, control storage, or the control program itself. The 3174 sends alert data, based on the controller status codes it generates, in a session between a system services control point (SSCP) and a physical unit (PU). The alert information flows to the NetView program. The NetView program determines which alert data is significant and maintains a data base of alert information based on the filters in effect for devices throughout the network. The NetView program data base is used for problem determination and failure isolation.

An operator-generated alert message is a skeleton message called up by an operator, who fills it in with installation-specific information. For an operator-generated alert message to be processed correctly, the NetView program at the host must be set up to receive the message. See the *3174 Functional Description* for details on sending an operator-generated alert message.

When customized for ISDN Gateway, the CMIP Event Report function is also enabled and disabled through this question. Netview Version 2 Release 2 is

---

[1] Distributed function terminals cannot issue an operator-generated alert message.

required at the host to interpret CMIP Event Report Data. See the *3174 Functional Description* for details on the CMIP Event Report function.

221: 3174 Alert/CMIP Control Point

Planner: This question applies only to hosts on the primary link through Single Link Multi-Host support.

Response:

0 = This host is not the alert or CMIP control point for the 3174
1 = This host is the alert control point for the 3174.

When using an ISDN Gateway (your response to question 150 = 01), this host is the CMIP Event Report Control Point.

The default response is 0.

Your response determines whether or not the host you are planning for will be the alert control point. A host designated as the alert control point receives hardware, microcode, and LU-LU alerts. A host not designated as such only receives alerts pertaining to LU-LU sessions.

When customized for an ISDN Gateway, your response determines whether or not the host you are planning for will be the CMIP Event Report Control Point also. A host designated as the CMIP Event Report Control Point will receive all CMIP Event Reports of counters associated with the ISDN D-channel. See the *3174 Functional Description* for details on the CMIP Event Report function.

Notes:

1. Only one host can be designated as the Alert/CMIP Event Report control point.

2. The primary host becomes the alert control point when question 220 = nonzero for the primary host and question 220 = nonzero and question 221 = 0 for all secondary hosts on the link.

3. If question 220 = nonzero for any secondary host attachment and 220 = 0 for the primary host, then an Alert/CMIP Event Report control point must be designated (question 221).

4. If question 221 = 1, then your response to question 220 must be nonzero.

5. If there is not enough controller storage to support a secondary host that has been designated as the Alert/CMIP Event Report control point, then the secondary host is deconfigured. The primary host becomes the Alert/CMIP Event Report control point by default.

222: Support of Command Retry

Planner: *Configuration questions 222, 223, 224, and 225 pertain only to 3174 Models 1L, 11L, and 21L. If you are planning for a remote 3174 model, continue with question 310.*

Table 6-8 on page 6-39 lists the customizing parameters and host systems for which the 3174 Models 1L, 11L, and 21L are supported. The information in this table applies to SNA and non-SNA attachments. Refer to Table 6-8 when answering questions 222, 224, and 225.

Response:

    0 = No support of command retry
    1 = Support of command retry.

The default response is 0.

Select the command retry option only if the 3174 is connected to a channel equipped with the command retry feature. The system programmer can supply this information. With this function, when certain error conditions are detected, the 3174 can request the channel to retry a command.

The following information explains the contents of Table 6-8 on page 6-39.

Command Retry:
If command retry is enabled, the 3174 initiates a retry request for all Bus Out parity checks detected during write data transfer sequences.

Data Transfer Modes:
The channel adapter in the 3174 can transfer data in these different modes:

- Data Chained Interlocked (DCI) — Interlocked single tag
- High-Speed Transfer (HST) — Interlocked double tag
- Data Streaming — 1.25Mbps or 2.5Mbps.

Channel Burst Size:
The 3174 transfers data in an interlocked mode at a rate of 1.25 megabytes, or 0.8 microsecond per byte. The channel burst size default value is 32. The consequences of specifying larger burst sizes can be determined only by calculating the critical wait times of other controllers and devices attached to the same byte multiplexer channel. Exceeding the wait times of the other devices may cause them to overrun and/or otherwise degrade their performance. Consult with your account systems engineer if you are not able to determine what burst size should be set.

The burst size selected for operation on a block multiplexer channel does not affect the data transfer rate, because a block channel forces burst mode.

Table 6-8. Host-Channel Attachment Information

Host System and Channel Type	Command Retry (Question 222)	Mode of Data Transfer (Question 224)	Channel Burst Size (Question 225)
4331 Byte Multiplexer	No	High-Speed Transfer	32
4331 Block Multiplexer	Yes	High-Speed Transfer	NA
4341 Byte Multiplexer	Yes	High-Speed Transfer	32
4341 Block Multiplexer	Yes	High-Speed Transfer	NA
4361 Byte Multiplexer	Yes	High-Speed Transfer	32
4361 Block Multiplexer	Yes	High-Speed Transfer	NA
4381 Byte Multiplexer	Yes	High-Speed Transfer	32
4381 Block Multiplexer	Yes	High-Speed Transfer	NA
303x Byte Multiplexer	No	Normal Transfer	32
303x Block Multiplexer	Yes	High-Speed Transfer	NA
308x Byte Multiplexer	No	High-Speed Transfer	32
308x Block Multiplexer	Yes	High-Speed Transfer	NA
3090 Byte Multiplexer	No	High-Speed Transfer	32
3090 Block Multiplexer	Yes	High-Speed Transfer	NA

223: Attention Delay Value

Response: A two-digit number that represents the delay value in whole milliseconds. The response range is 10−99.

The default response is 10.

See the "Planner" note on page 6-38.

The attention delay function increases the probability of including more than one path information unit (PIU) per read channel program and reduces the number of unsolicited attentions presented to the channel. This function queues inbound data during the specified delay period and then presents one attention at the end of the delay period. The system programmer can supply this information.

Note: Attention delay is not implemented for the Token-Ring Network 3270 Gateway function. Any response entered for this question has no effect when the gateway feature is used.

224: Mode of Data Transfer

Response:

0 = Interlocked mode; normal data transfer
1 = Data streaming mode*; 1.25Mbps
2 = Interlocked mode; high-speed data transfer
3 = Data streaming mode*; 2.5Mbps.

The default response is 2.

*If you are using data streaming, the IOCP must be changed from PROTOCL = D on the control unit macro to PROTOCL = S.

See the "Planner" note on page 6-38.

Select option 2 if the 3174 connects to a channel equipped with the high-speed transfer feature. The system programmer can supply this information.

225: Channel Burst Size

Planner: This question is applicable for byte multiplexer channel operation only.

Response:

0 = 002 bytes per burst	4 = 032 bytes per burst
1 = 004 bytes per burst	5 = 064 bytes per burst
2 = 008 bytes per burst	6 = 256 bytes per burst
3 = 016 bytes per burst	7 = 512 bytes per burst.

The default response is 4.

See the "Planner" note on page 6-38.

For byte multiplexer channel attachment, a response of 7 provides optimal 3174 performance. A lower value may be required, however, for overall byte multiplexer channel operation when other controllers share the same channel. See a system programmer familiar with system tuning for assistance in selecting an appropriate value for the system configuration.

Planner: If you are filling in

- *Worksheet 3, 3S, 4, 4S, 5, 5S, 7, 7S, 8, 8S, 9, or 9S, continue responding to the following configuration questions that appear on your worksheet.*

- *"Worksheet 6—Non-SNA (Channel)," return to the divider page labeled "Microcode Customization Planning." See step 4 to determine the next worksheet to fill out.*

You may also refer to the divider page labeled "Worksheet Summary" to determine where to proceed next.

Keep records of your configuration using one of the methods described under "Customization Records" on page 5-6.

240: Controller Logical Address

Planner: This question applies to Models 12L and 22L only.

Response: A single alphanumeric character in the range of 0-9 and A-F.

The default response is 0 on the 1A host; on other hosts, the default response is X. If you are customizing for a controller other than a Model 12L or 22L, take the default response to this question.

This address identifies the logical controller to its upstream host.

Note: This value needs to correspond to the CUADD parameter of the CNTLUNIT macro of the IOCP.

Planner: If you are filling in

* *Worksheet 7S, you have completed this worksheet. Return to the divider page labeled "Microcode Customization Planning." See step 5 to determine if there are additional worksheets to be filled out.*

* *Worksheet 3, 3S, 4, 4S, 5, 5S, 7, 8, 8S, 9, or 9S, continue responding to the following configuration questions that appear on your worksheet.*

241: RU Maximum Size

Planner: This question applies to Models 12L and 22L only.

Response:

    0 = 4KB RU maximum
    1 = 8KB RU maximum.

The default response is 0.

This question defines the maximum amount of data that can be received in a single RU across the ESCON Channel. If you are customizing a controller other than a Model 12L or 22L, take the default response to this question.

242: Link Type

Planner: This question does not apply to Models 12L or 22L.

Response:

    0 = T2.0 for PU2.0 traffic
    1 = T2.1 for T2.1 and PU2.0 traffic.

The default response is 0.

The value specified determines if the host link will carry PU2.0 or both PU2.0 and T2.1 traffic to the host. If a response of 1 is selected, then your response to Question 510 must be a 1 (APPN). Refer to Chapter 4, "Host System and 3174 Planning" on page 4-1 for VTAM definitions which must match.

Planner: If you are filling in "Worksheet 7—SNA (Channel)" on page A-12, you have completed this worksheet. Return to the step that instructed you to fill out this worksheet and determine where to proceed next.

310: Connect-Data-Set-to-Line (CDSTL) Operation

Response:

0 = Operation on a nonswitched line, **or**
Operation on a switched line in the US or Canada, **or**
Operation in data terminal ready/data set ready (DTR/DSR) mode in
countries other than Canada, **or**
Connection via the CCITT V.35 interface, **or**
Connection using X.21 or X.25
1 = Connection on a switched line via the CCITT 108.1 interface operating in
the connect-data-set-to-line (CDSTL) mode.

The default response is 0.

313: NRZ or NRZI Encoding

Response:

0 = Use nonreturn to zero (NRZ) encoding
1 = Use nonreturn to zero inverted (NRZI) encoding.

The default response is 0.

This parameter must be compatible with the host system communication controller
and/or the modem. Specify NRZI encoding only for SDLC host communication.
Ask the system programmer which response you should specify.

317: Telecommunication Facilities

Response:

0 = Nonswitched facilities
1 = Half-duplex SNBU operation (IBM Modems 3872, 3875,
or equivalent[2] only)
2 = Switched networks.

The default response is 0.

Notes:

1. Respond to question 317 with the default if your connection to the host does not
require a modem.

2. You cannot respond with 1 for a host attachment through a Concurrent
Communication Adapter.

3. A response of 1 is not valid for Models 11R, 12R, 21R, 61R, and 62R.

4. A response of 2 is not valid for BSC host attachment.

---

[2] Half-duplex SNBU operation provided by modems other than IBM 3872, 3875 or equivalent is supported. In this
case, respond to questions 317 and 340 with 0 on a separate Customized Control disk. IML this backup control
disk when the primary operation fails.

To respond to this question, you need to know:

- Whether the modem in your installation is operating in *duplex* or *half-duplex* in its primary facility, **and**

- Whether the modem is operating in *duplex* or *half-duplex* in its secondary facility, **and**

- The type of communication line that is being used (nonswitched or switched).

Use Table 6-9 to determine your response.

Table 6-9. Response Selection for Question 317

Primary Modem Operation	Secondary Modem Operation	Communication Line Type	Response	Further Requirements
Duplex	Duplex	Nonswitched	0	None
Half-duplex	Half-duplex	Nonswitched	0	None
Duplex	Half-duplex	Nonswitched	0	Backup Control Disk*
Duplex or Half-duplex	Duplex or Half-duplex	Switched	2	None

*On the backup Control disk, respond to question 340 with a 0.
For IBM 3872, 3875, or equivalent modems, respond to question 317 with a 1.
Otherwise, responses to all other customization questions should be the same on both Control disks.

0 = Nonswitched facilities: Select this response for operation via modem or direct-connection attachment to certain hosts or communication controllers such as a 3710, 3720, 3721, 3725, 3726, 4361, or 8100 where a modem is not required.

1 = Half-duplex SNBU operation: Select this response for the backup Control disk configuration when the 3872, 3875, or equivalent modem supports half-duplex RTS protocol on the secondary facility and supports full-duplex RTS protocol on the primary facility. For modems other than 3872, 3875, or equivalent, select 0 as your response.

2 = Switched networks: Select this response for operation in point-to-point mode on the public switched telephone network (PSTN). (A response of 2 is not valid for links using BSC or the gateway function.)

318: Full- or Half-Speed Transmission
Response:

    0 = Full-Speed Transmission
    1 = Half-Speed Transmission.

The default response is 0.

Enter a 0 if full-speed transmission operation is desired. Enter a 1 if half-speed transmission operation is desired.

If the speed capability can be controlled by the local or host modem, it is recommended that a 0 be entered and that the modem control the speed. (This parameter must be compatible with the host system communication controller and/or the modem.)

If the 3174 controls the capability to operate in either full-speed or half-speed mode, two Control disks can be generated, one for full-speed operation and one for half-speed operation. (See the Copy procedure in the *3174 Utilities Guide*, GA27-3863.) To switch speeds, IML the other Control disk.

Note: To determine if the operating speed can be controlled by the modem, refer to the documentation for your modem.

332: X.25 Options

This host-related panel appears during the Configure procedure if your response to question 101 was 3 or if you have multi-host support. The responses entered on this panel customize the microcode for primary hosts (1A, 2A, and 3A) for X.25 support. Chapter 10, "Planning for X.25," contains the planning information needed to fill out "Worksheet 13—X.25 Options" on page A-24.

This panel will appear considerably different for secondary hosts than for primary hosts. For these hosts (1B-1H, 2B-2D, and 3B-3D), the panel contains a subset of X.25 questions and goes with "Worksheet 13S—Secondary X.25 Options" on page A-25. Chapter 10, "Planning for X.25," contains the necessary information.

340: RTS Control Response Options

Response:

0 = Controlled Request-to-Send (RTS)
1 = Permanent Request-to-Send
2 = BSC special controlled Request-to-Send.

The default response is 0.

To respond to this question, you need to know:

* Whether the modem in your installation is operating in *duplex* or *half-duplex* in its primary facility, **and**

* Whether the modem is operating in *duplex* or *half-duplex* in its secondary facility, **and**

* The type of communication line that is being used (nonswitched or switched)

* Whether your network is SDLC or BSC.

Use Table 6-10 to select your response.

Table 6-10. Response Selection for Question 340

Primary Modem Operation	Secondary Modem Operation	Protocol	Response	Further Requirements
Duplex	Duplex	SDLC or BSC	1	None
Half-duplex	Half-duplex	SDLC or BSC	0	None
Half-duplex	Half-duplex	BSC	2[1]	None
Duplex	Half-duplex	SDLC or BSC	1	Backup Control Disk[2]

[1]If the host modems use the NEW SYNC feature, selecting 2 may cause transmission errors. If you are in doubt about whether your host modems use the NEW SYNC feature, enter a 0.
[2]On the backup Control disk, respond to question 340 with a 0; for IBM 3872, 3875, or equivalent modems, respond to question 317 with a 1. Otherwise, responses to all other customization questions should be the same on both Control disks.

Planner: If you are filling in

- *Worksheet 4, 4S, 5, 5S, 8, 8S, 9, or 9S, continue responding to the following configuration questions that appear on your worksheet.*

- *"Worksheet 3—BSC," return to the divider page labeled "Microcode Customization Planning." See step 4 to determine the next worksheet to fill out.*

- *"Worksheet 3S—Secondary BSC," return to the divider page labeled "Microcode Customization Planning." See step 5 to determine if you need to fill out worksheets for additional host attachments before continuing with the next step.*

You may also refer to the divider page labeled "Worksheet Summary" to determine where to proceed next.

Keep records of your configuration using one of the methods described under "Customization Records" on page 5-6.

360: X.21 Switched Retry

Response:

00	=	X.21 Switched feature not in use, **or** Retry not in use
01 – 99	=	Number of times to retry an incoming or outgoing call after the initial attempt is unsuccessful.

The default response is 00. You must use a two-digit response. Where necessary, use a leading zero (for example, 04 for 4 retries).

361: X.21 Switched Retry Timing

Response:

00	=	X.21 Switched feature not in use, **or** Retry not in use
01 – 20	=	Two-digit number that specifies the number of seconds between the retries specified in question 360.

The default response is 00. You must use a two-digit response. Where necessary, use a leading zero (03 for 3 seconds).

362: X.21 Switched Options

Response: Eight digits (0 or 1). 0 = No 1 = Yes

The response to this question determines how X.21 keyboard options can be used from terminals attached to the 3174. You should use the default response of 00000000 if you are not using the X.21 Switched feature. The digits, numbered from left to right, represent a different X.21 function:

Digit	Description
1	Direct Key
2	Dial Key
3	Local and Communicate Keys
4	Disconnect Key
5	Reserved
6	Delayed Disconnect function
7	DCE Supported for Direct Calls
8	DCE Supported for Addressed Calls

Digit 1 - Direct Key: Used to initiate a direct call through the X.21 switched network.

0 = The Direct Key can be used only from a terminal on port 0 of HG 26 or HG 27, and only if digit 7 = 1.
1 = The Direct Key can be used from any port, but only if digit 7 = 1.

Digit 2 - Dial Key: Used to initiate an addressed call through the X.21 switched network.

0 = The Dial Key can be used only from a terminal on port 0 of HG 26 or HG 27, and only if digit 8 = 1.
1 = The Dial Key can be used from any port, but only if digit 8 = 1.

Digit 3 - Local and Communicate Keys: Used to manage the 3174's interface to the DCE of the X.21 network. The Local Key takes the 3174 off-line from the network, and prevents any incoming or outgoing call. The Communicate Key puts the controller back on-line.

0 = The Local and Communicate Keys can be used only from a terminal on port 0 of HG 26 or HG 27.
1 = The Local and Communicate Keys can be used from any port.

Digit 4 - Disconnect Key: Used to terminate a call.

0 = The Disconnect Key can be used only from a terminal on port 0 of HG 26 or HG 27.
1 = The Disconnect Key can be used from any port.

Digit 5 - Reserved: The fifth digit is reserved.

Digit 6 - Delayed Disconnect function

0 = When the Disconnect Key is pressed, the 3174 breaks the connection immediately.
1 = If there are any active (bound) SNA sessions, the Disconnect Key must be pressed twice before the 3174 breaks the connection.

Digit 7 - DCE Supported for Direct Calls

0 = The X.21 Switched connection cannot be made using direct calling. This means that the Direct Key cannot be used from any port.
1 = The X.21 Switched connection can be made using direct calling. The Direct Key may be used from port 0 of HG 26 or HG 27, and from any other port if digit 1 = 1.

Digit 8 - DCE Supported for Addressed Calls

0 = The X.21 Switched connection cannot be made using addressed calling. This means that the Dial Key cannot be used from any port.
1 = The X.21 Switched connection can be made using addressed calling. The Dial Key may be used from port 0 of HG 26 or HG 27, and from any other port if digit 2 = 1.

To use the X.21 Switched feature, you must specify either or both of the seventh and eighth digits as 1. Your choice depends on the functions that your X.21 network provides.

Example 1: Selecting 00000111 allows an operator at port 0 of HG 26 or HG 27 to use all the X.21 keys, and requires that operator to press the Disconnect Key twice to break the connection when SNA sessions are active. No X.21 keys can be used on ports other than 0.

Example 2: Selecting 01110001 prevents direct calling from any port, but allows all ports to use all other X.21 keys. Delayed disconnect (digit 6) is not selected; when an operator presses the Disconnect Key, the 3174 breaks the connection immediately, regardless of the state of SNA sessions.

365: X.21 Data Transfer Delay

Planner When filling in "Worksheet 4—SDLC" or "Worksheet 5—X.25," respond to this question only if your response to question 100 is 2R, 12R, or 62R.

When filling in "Worksheet 4S—Secondary SDLC" or "Worksheet 5S—Secondary X.25," respond to this question only if the adapter type specified for this host (on worksheet 2) is the Type 2 Concurrent Communication Adapter.

Response:

    0 = Not applicable
    1 = No delay
    2 = Data Transfer Delay (X.21 nonswitched only).

The default response is 0.

Select 1 for:

- X.21 switched operation, **or**
- X.21 leased operation if the DTE connection at the host end of the network is through an X.21 interface (for example, not through X.21 bis).

Select 2 when:

- The DTE connection at the host end of the network is through X.21 bis, **or**
- The 3174 connection to the network is through an "X.21 multipoint" DCE.

Response 2 provides a delay of 24-bit times in the transition from the X.21 Data state to the X.21 Data Transfer state. This delay prevents loss of data in the attachments described above.

Planner: If you are filling in

- *Worksheet 4, 4S, 8, 8S, 9, or 9S, continue responding to the following configuration questions that appear on your worksheet.*

- *"Worksheet 5—X.25," fill out "Worksheet 13—X.25 Options" and "Worksheet 14—Common SNA." The information you need to fill out these worksheets is in Chapter 10 and Chapter 11.*

- *"Worksheet 5S—Secondary X.25," fill out "Worksheet 13S—Secondary X.25 Options." The information you need to fill out this worksheet is in Chapter 10.*

You may also refer to the divider page labeled "Worksheet Summary" to determine where to proceed next.

Keep records of your configuration using one of the methods described under "Customization Records" on page 5-6.

367: X.21 Switched Short-Hold Mode

Response:

0 = No
1 = Yes.

Short-Hold Mode is an automatic facility that disconnects the X.21 switched link between a primary station and a secondary station whenever there is a break in the data traffic. It reconnects the link as soon as there is more data to send.

368: X.21 Switched Short-Hold Mode Dial Number

Response: Up to 14 numeric characters.

Enter the dial number of the 3174. This field must be completed if the response to question 367 is equal to 1. If the response to this question does not fill the entire field, leave underscores or blanks wherever you have not written a character.

370: Maximum Inbound I-Frame Size

Response:

0 = 265-byte Maximum I-Frame
1 = 521-byte Maximum I-Frame.

The default response is 0.

When large amounts of data are being transmitted, network performance and speed can be improved by responding to this question with a 1.

When APPN is selected and the connection is to NCP, the response to this question should be a 1.

The I-Frame size includes the length of the transmission header (TH) and request or response header (RH). For example, if the maximum length of a request unit (RU) segment is 512, then the I-frame size is 521 (512 + 9 for the TH and RH).

Note: Maximum Inbound I-Frame Size refers to the maximum size of the I-Frame that the 3174 controller sends to the host.

371: X.21 Switched Dial Digits

Response: A maximum of thirty-one numeric digits (0-9).

These digits are the number by which the host is called if the Autocall function is enabled for *dial* autocall. If Autocall is enabled as *direct* (372 is 2 x), no response to this question is required. If, however, question 372 is *dial* (372 is 1 x), you must respond to this question.

The default response is underscores.

372: Autocall/Autodisconnect

Response: Two digits

The default response is 0 0.

Digit 1 - Enable Autocall function:

0 = No autocall
1 = Enable DIAL autocall
2 = Enable DIRECT autocall (X.21 switched only).

If this digit is 1 or 2 and the 3174 is not already connected to the host, the 3174 will attempt to make the switched connection to the host whenever a new logical terminal becomes active. This may be when a device powers on or when a logical terminal is first reached in the change screen sequence.

Digit 2 - Enable Autodisconnect function:

0 = No autodisconnect
1 = Enable autodisconnect.

> If this digit is 1, the 3174 will break the switched connection to the host when the last logical terminal becomes inactive or powers off.

> The Autocall and Autodisconnect functions are independent of one another: you can enable or disable one without the other.

Planner: If you are filling in:

- *"Worksheet 9—Token-Ring Network" or "Worksheet 9S—Secondary Token-Ring Network," continue responding to the following configuration questions.*

- *"Worksheet 4—SDLC" or "Worksheet 8—X.21 Switched," fill out "Worksheet 14—Common SNA." The information you need to fill out this worksheet is in Chapter 11.*

- *"Worksheet 4S—Secondary SDLC" or "Worksheet 8S—Secondary X.21 Switched," return to the divider page labeled "Microcode Customization Planning." See step 5 to determine if you need to fill out worksheets for additional host attachments before continuing with the next step.*

You may also refer to the divider page labeled "Worksheet Summary" to determine where to proceed next.

Keep records of your configuration using one of the methods described under "Customization Records" on page 5-6.

382: Transmit I-Frame Size

Response: Four numeric characters.

The default response is 0521.

- For controllers with a 4Mbps Token-Ring Adapter installed, a valid response ranges from 265 to 2042 bytes.

- For controllers with a 16/4Mbps Token-Ring Adapter installed, a valid response ranges from 265 to 2057 bytes.

Where necessary, use a leading zero (0521 for 521 bytes).

Notes:

1. The response to this question depends on your gateway and ring configuration.

2. In responding to this question, you need to consider the route by which data will flow. If at link activation time there does not exist a route to the gateway that supports the specified I-frame size, then the I-frame size is downgraded to the maximum supported on the available route. When a downgrade takes place, a unique status code appears on the operator panel and an error is written in the 3174 event log.

3. The I-frame size should include the length of the transmission header (TH) and response header (RH). For example, if the maximum length of an RU segment is 1024, the I-frame size specified should be 1033 (1024 + 9 for the TH and RH).

4. Transmit I-Frame Size refers to the maximum size of the I-Frame that the 3174 controller sends over the ring.

383: Token-Ring Network Maximum Out

Response: One numeric character.

A valid response ranges from 1 to a maximum of 7.

The default response is 2. This field specifies the maximum number of link level I-frames that the 3174 transmits before waiting for an acknowledgment and may also be referred to as the "transmit window size."

Note: The response to this question is dependent upon your gateway and ring configuration.

384: Ring Speed of the Token-Ring Network

Response:

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

The default response is 0.

- For controllers with a 4Mbps Token-Ring Adapter installed, 0 is the only valid response.

- For controllers with a 16/4Mbps Token-Ring Adapter installed, 0, 1, or 2 is a valid response. A response of 2 is recommended for large networks.

385: Link Subsystem Name

Response: Up to eight alphanumeric characters.

The default response is "IBMLAN", which appears on the panel.

The link subsystem name identifies which controller an alert is from when an alert is sent to the host. This is a required field when your response to question 101 = 7.

When responding to this question, do not precede the name with blanks and do not enter blanks between characters.

386: Receive I-Frame Size

Response:

    0 = Up to 4K frames
    1 = Up to 8K frames.

The default response is 1.

This question appears only on the primary host Token-Ring Network panel. If you have a 4Mbps Token-Ring Adapter, this question is not applicable. 4K—8K frame size is only available on 16/4Mbps Token-Ring Adapters. When 8K frames are selected, the 3174 APPN network node can only support up to 100 links.

Planner: This is the end of the regular configuration questions. If you filled out:

- *"Worksheet 9—Token-Ring Network," fill out "Worksheet 14—Common SNA." The information you need to fill out this worksheet is in Chapter 11.*

- *"Worksheet 9S—Secondary Token-Ring Network," return to the divider page labeled "Microcode Customization Planning." See step 5 to determine if you need to fill out worksheets for additional host attachments before continuing with the next step.*

You may also refer to the divider page labeled "Worksheet Summary" to determine where to proceed next.

Keep records of your configuration using one of the methods described under "Customization Records" on page 5-6.

Chapter 7. Planning for Port Assignment

An Overview of Port Assignment

Before you start planning, you need:

- "Worksheet 11A—117: Port Assignment" on page A-21
- "Worksheet 11B—117: Port Assignment for AEA" on page A-22
- Information about the terminals to be attached to the controller
- Information from the site planner about terminal port assignments
- Information on the number of additional host attachments (if any) that have been configured. Each host attachment requires a separate port assignment.

Depending on your response to question 116, you can either assign ports on an individual basis or let the customizing program assign them for you. If you assign ports on an individual basis, you save host addresses because only those ports that you will use are defined. When planning Port Assignment, you define 3270 host sessions for all types of devices: 3270 display stations and printers, as well as ASCII display stations and printers.

If you let the customizing program assign addresses for you, it assigns addresses for each 3270 port of the controller, even if display stations or printers are not connected to all the ports. The same is true for AEA ports. **When the system is operating in non-SNA, unused addresses take up channel address space.**

If you are not planning to use Multi-Host Support, Port Assignment identifies the number of sessions that each device can have with a host. Up to five sessions with a host can be defined on ports that are used to attach control unit terminals (CUTs) using the Multiple Logical Terminals (MLT) function or distributed function terminals (DFTs) with multiple interactive screen (MIS) capability.

Planner: If you are planning to allow communication with ASCII devices through the Asynchronous Emulation Adapter (AEA), you should plan the AEA configuration before you plan for Port Assignment. For additional information, see Chapter 14, "Planning for the Asynchronous Emulation Adapter."

Which Response to Question 116 Should You Specify?

There are many possible responses to question 116. If you need help choosing a response, see "Port Assignment Considerations."

Question 116 enables you to direct the system to make all port assignments, whether for 3270 ports, AEA ports, or both. Or, it lets you make all or part of the assignments yourself.

The response to question 116 can be 1, 2, or 4 digits long. Depending on the response you select, you can assign 3270 ports only or 3270 ports and AEA ports.

"116: Individual Port Assignment" on page 6-18 explains the possible responses in detail. It also gives information about the impact on question 116 of responses to several other customization questions (see the list of notes in question 116).

Port Assignment Considerations

For DFT

The **multiple interactive sessions capability (MIS)** allows DFT display stations to act as multiple logical terminals. Each logical terminal has its own host address and can interact independently with its own host program. When assigning addresses or allowing the customizing program to assign addresses to ports supporting DFTs, you should check the DFT supporting documentation regarding the number and type of sessions supported for that DFT; for example, a DFT may support only three host sessions and one printer session.

For CUT (or CUT Emulation by ASCII Displays) and Printers

The **Multiple Logical Terminals (MLT) function** allows CUT displays and ASCII displays emulating CUT displays to act as multiple logical terminals. Each logical terminal has its own host address and can interact independently with its own host program. For CUTs using the MLT function, consult "Worksheets 10A and 10B—Multiple Logical Terminals" to ensure that you do not exceed the amount of storage reserved to support these displays. The "Number of Sessions" column on this worksheet contains the number of planned host sessions for each CUT display. For ASCII devices using MLT, consult "Worksheet 10C—Multiple Logical Terminals for AEA" for this information.

3270 Display Stations and Printers

In order for a 3270 display or printer to communicate with the 3270 host, a 3270 host address must be assigned to the Terminal Adapter (TA) port to which the display or printer is attached.

If a CUT display is using the MLT function, it is able to connect to the 3270 host only on the logical terminals for which a 3270 host address has been assigned.

For a printer attached to a 3270 display station to communicate with a 3270 host, two 3270 host addresses must be assigned to the 3270 port for host 1A. If a second address is not defined, only the 3270 display station can communicate with the 3270 host.

ASCII Display Stations and Printers

For an ASCII display or printer to communicate with the 3270 host, the display or printer must have a 3270 host address assigned to the AEA port to which it is attached. If you do not assign a 3270 host address, the display user will not be permitted to connect to the 3270 host.

For a printer attached to an ASCII display station to communicate with a 3270 host, two 3270 host addresses must be assigned to the AEA port. If a second address is not defined, only the ASCII display station can communicate with the 3270 host.

Examples of 3270 Host Addressing Restrictions for the AEA

- If you specify the 3270 host as the first session and the Connection Menu for the next two sessions on "Worksheet 31—AEA Default Destination," a display user is not able to connect to the 3270 host for the two Connection Menu sessions unless you assign 3270 host addresses for those sessions. When $116 = 1$, enter 3 in the IS column; when $116 = 2$, assign host addresses 1, 2, and 3 (see Figure 7-1 on page 7-7).

- If you specify the 3270 host as the first session, the Connection Menu as the second session, and the 3270 host as the third session, you **must** assign a 3270 host address to all three sessions. When $116 = 1$, enter 3 in the IS column; when $116 = 2$, assign host addresses 1, 2, and 3 (see Figure 7-1 on page 7-7). Skipping addresses on a port is not permitted.

For Multi-Host Support

If you are using Multi-Host Support, a separate port assignment is required for each attachment to a host. All of the addresses that you assign for each port (over all hosts) become a pool of potential host sessions for a device on the port. The host sessions that are presented to a device are defined using Logical Terminal Assignment (described in Chapter 15). Logical Terminal Assignment allows you to choose up to five host sessions (from the pool of potential sessions) for the display attached to the port.

When planning LTA, remember:

- ASCII devices can communicate only with the primary host on the primary link.
- Even with Multi-Host Support, a printer can be assigned only one host session.

Who Assigns the Terminals to the Ports?

In some establishments, the person who plans for customizing assigns the terminals to the ports and then communicates the assignments to the site planner. In others, the site planner assigns the terminals to the ports and communicates that information to the person who plans customizing (because that person will be customizing for port assignment or defining the Printer Authorization Matrix).

If you are responsible for assigning terminals to ports, you can record the port assignment data for the site planner on the Cabling Worksheets. These worksheets are included in *3174 Site Planning*. These worksheets are designed to keep records of the port connections and to communicate that information between the site planner and the person who plans customizing.

The Port Assignment Worksheet

If you respond to question 116 with a 1 or 2, you must fill out "Worksheet 11—117: Port Assignment". This worksheet has two pages; make sure you get both (11A and 11B). See Figure 7-1 for an example of Worksheet 11A. On the worksheets, you assign the number of host addresses per port connection. The person who customizes uses the completed worksheet to identify these assignments in the microcode.

If you have configured for Multi-Host Support, you can assign addresses to ports 21-00 through 23-07 (ASCII ports), on Worksheet 11B, when filling in the worksheet for host 1A. Assign addresses to ports 27-00 through 27-31 on Worksheet 11A, when filling in the worksheet for hosts 1A through 1H. Addresses can be assigned to ports 26-00 through 26-31 on Worksheet 11A for all hosts.

```
_____ 117: Port Assignment _____

          Host Addresses                          Host Addresses

Port  IS  1    2    3    4    5       Port  IS  1    2    3    4    5
26-00 ___ ___ ___ ___ ___ ___         26-01 ___ ___ ___ ___ ___ ___
26-02 ___ ___ ___ ___ ___ ___         26-03 ___ ___ ___ ___ ___ ___
26-04 ___ ___ ___ ___ ___ ___         26-05 ___ ___ ___ ___ ___ ___
26-06 ___ ___ ___ ___ ___ ___         26-07 ___ ___ ___ ___ ___ ___
26-08 ___ ___ ___ ___ ___ ___         26-09 ___ ___ ___ ___ ___ ___
26-10 ___ ___ ___ ___ ___ ___         26-11 ___ ___ ___ ___ ___ ___
26-12 ___ ___ ___ ___ ___ ___         26-13 ___ ___ ___ ___ ___ ___
26-14 ___ ___ ___ ___ ___ ___         26-15 ___ ___ ___ ___ ___ ___
26-16 ___ ___ ___ ___ ___ ___         26-17 ___ ___ ___ ___ ___ ___
26-18 ___ ___ ___ ___ ___ ___         26-19 ___ ___ ___ ___ ___ ___
26-20 ___ ___ ___ ___ ___ ___         26-21 ___ ___ ___ ___ ___ ___
26-22 ___ ___ ___ ___ ___ ___         26-23 ___ ___ ___ ___ ___ ___
26-24 ___ ___ ___ ___ ___ ___         26-25 ___ ___ ___ ___ ___ ___
26-26 ___ ___ ___ ___ ___ ___         26-27 ___ ___ ___ ___ ___ ___
26-28 ___ ___ ___ ___ ___ ___         26-29 ___ ___ ___ ___ ___ ___
26-30 ___ ___ ___ ___ ___ ___         26-31 ___ ___ ___ ___ ___ ___

27-00 ___ ___ ___ ___ ___ ___         27-01 ___ ___ ___ ___ ___ ___
27-02 ___ ___ ___ ___ ___ ___         27-03 ___ ___ ___ ___ ___ ___
27-04 ___ ___ ___ ___ ___ ___         27-05 ___ ___ ___ ___ ___ ___
27-06 ___ ___ ___ ___ ___ ___         27-07 ___ ___ ___ ___ ___ ___
27-08 ___ ___ ___ ___ ___ ___         27-09 ___ ___ ___ ___ ___ ___
27-10 ___ ___ ___ ___ ___ ___         27-11 ___ ___ ___ ___ ___ ___
27-12 ___ ___ ___ ___ ___ ___         27-13 ___ ___ ___ ___ ___ ___
27-14 ___ ___ ___ ___ ___ ___         27-15 ___ ___ ___ ___ ___ ___
27-16 ___ ___ ___ ___ ___ ___         27-17 ___ ___ ___ ___ ___ ___
27-18 ___ ___ ___ ___ ___ ___         27-19 ___ ___ ___ ___ ___ ___
27-20 ___ ___ ___ ___ ___ ___         27-21 ___ ___ ___ ___ ___ ___
27-22 ___ ___ ___ ___ ___ ___         27-23 ___ ___ ___ ___ ___ ___
27-24 ___ ___ ___ ___ ___ ___         27-25 ___ ___ ___ ___ ___ ___
27-26 ___ ___ ___ ___ ___ ___         27-27 ___ ___ ___ ___ ___ ___
27-28 ___ ___ ___ ___ ___ ___         27-29 ___ ___ ___ ___ ___ ___
27-30 ___ ___ ___ ___ ___ ___         27-31 ___ ___ ___ ___ ___ ___
```

Figure 7-1. An Example of Worksheet 11A — 117: Port Assignment

There are two procedures for filling in this worksheet. If you:

- Specified that 116 = 1, use the procedure on page 7-10.
- Specified that 116 = 2, use the procedure on page 7-11.

The columns on this worksheet are described below.

Port
This column lists the port numbers, beginning with port 26-00. The prefix "26" indicates direct or indirect connection to the Terminal Adapter (TA), identified by Hardware Group 26. The prefix "27" indicates direct or indirect connection to the Terminal Adapter, identified by Hardware Group 27.

- For Models 51R, 61R, 62R, and 63R, you can assign addresses only to ports 26-00 through 26-15 on Worksheet 11A, and to ports 21-00 through 21-07 on Worksheet 11B.

- For Model 53R, you can assign addresses only to ports 26-00 through 26-15 on Worksheet 11A.

- For Models 11L, 11R, 12L, 13R, 21L, 21R, 22L, and 23R, you can assign addresses to ports 26-00 through 27-31 (if you have a second Terminal Adapter) on Worksheet 11A and to ports 21-00 through 23-07 on Worksheet 11B.

IS
This column defines the number of 3270 host addresses to be assigned to each port. For a display using the MLT function, this number must correspond to the number of logical terminals requiring connections to the 3270 host. The default for all ports is a 0. The default can be changed to a number between 1 and 5.

Host Addresses
These columns define the primary and secondary addresses of a host. The addresses are used to route information to and from the display stations and printers assigned to the ports. The first column (1) represents the host's primary address. The remaining columns (2–5) represent the host's secondary addresses for displays using the MLT function or the address of a host addressable printer (printer attached to a display). (Use column 2 for host addressable printers on worksheets for host 1A.) The combined total of primary and secondary host addresses should equal the number of 3270 host sessions.

The following indicates how the host addresses will be assigned.

The scheme for response 0 is as follows:

- Assign one address to each of the first (HG 26) 32 Terminal Adapter ports, by increasing port number.

- Assign one address to each of the second (HG 27) 32 Terminal Adapter ports, by increasing port number.

The scheme for response SX is as follows:

- Assign one address to each of the first (HG 26) 32 Terminal Adapter ports, by increasing port number.

- Assign remaining addresses to each of the first 32 Terminal Adapter ports, by increasing port number.

- Assign one address to each of the second (HG 27) 32 Terminal Adapter ports, by increasing port number.

- Assign remaining addresses to each of the second 32 Terminal Adapter ports, by increasing port number.

The 1/SX AY scheme is expanded as follows:

- Assign one address to each of the first (HG 26) 32 Terminal Adapter ports by increasing port number.

- Assign one address to each of the 24 AEA ports, by increasing port number.

- Assign remaining addresses to each of the first 32 Terminal Adapter ports by increasing port number.

- Assign remaining addresses to each of the 24 AEA ports, by increasing port number.

- Assign one address to each of the second (HG 27) 32 Terminal Adapter ports, by increasing port number.

- Assign remaining addresses to each of the second 32 Terminal Adapter ports, by increasing port number.

  The primary and secondary addresses (1—5) correspond to the "LT1—LT5" response columns on "Worksheet 31—AEA Default Destination."

Completing the Port Assignment Worksheet When 116 = 1

If your response to question 116 is 1, you select the ports you will use and define the number of host addresses per port. The 3174 customizing program automatically assigns the primary and secondary addresses of the host.

Note: If you have not read the previous information in this chapter, you need to do so before you begin to fill out the worksheet.

Step 1 Locate and make a copy of "Worksheet 11—117: Port Assignment". This worksheet has two pages; make sure you get both (11A and 11B). If you have configured for Multi-Host Support, you need to identify which host these port assignments are for by writing the host identifier in the Host ID field on the top of the worksheet. If you are filling in these worksheets for a secondary host attachment, you can assign addresses to ports 27-00 through 27-31 on worksheet 11A for hosts 1A through 1H, but you can only assign addresses to ports 21-00 through 23-07 for host 1A on worksheet 11B.

Addresses can be assigned to ports 26-00 through 26-31 for all hosts.

Step 2 In the IS column, write the number of host addresses you want assigned (0 to 5) next to each port. Write a number next to each port. If you do not want to use a port for a 3270 host session, be sure to write a 0.

Note: This number must represent the total number of 3270 host sessions desired to support the CUT, DFT, or ASCII device.

In the following example, DFTs or CUTs (with MLT support) are assigned to all Terminal Adapter ports (HG 26), and ports 27-00 through 27-04 on the Terminal Adapter (HG 27). Ports with an entry of zero in the IS column will not be used for 3270 host sessions.

```
                          117: Port Assignment

              Host Addresses                      Host Addresses
      Port  IS  1   2   3   4   5        Port  IS  1   2   3   4   5
      26-00  2  __  __  __  __  __       26-01  3  __  __  __  __  __
      26-02  4  __  __  __  __  __       26-03  3  __  __  __  __  __
      26-04  3  __  __  __  __  __       26-05  2  __  __  __  __  __
      26-06  3  __  __  __  __  __       26-07  2  __  __  __  __  __
      26-08  3  __  __  __  __  __       26-09  3  __  __  __  __  __



      27-00  2  __  __  __  __  __       27-01  2  __  __  __  __  __
      27-02  4  __  __  __  __  __       27-03  5  __  __  __  __  __
      27-04  3  __  __  __  __  __       27-05  0  __  __  __  __  __
      27-06  0  __  __  __  __  __       27-07  0  __  __  __  __  __
```

Step **3** Do not exceed the port assignment limitations for your protocol:

- For SNA protocol (SNA Local, SDLC, X.25, X.21 Switched, Token-Ring Network), up to 253 addresses in the range from 2 to 254 are permitted.

- For non-SNA protocol (non-SNA Local or BSC), the addresses range from 0 to 31.

   Note: If you define a Printer Authorization Matrix, check that the printers (with the exception of local copy printers) are assigned addresses on Worksheets 11A and 11B.

Planner: You have completed "Worksheet 11A—117: Port Assignment" and "Worksheet 11B—117: Port Assignment for AEA."

Return to the divider page labeled "Microcode Customization Planning." Refer to the step that instructed you to fill out Worksheets 11A and 11B to determine if there are additional worksheets you need to fill out before continuing with the next step. You may also refer to the divider page labeled "Worksheet Summary" to determine where to proceed next.

Keep records of your configuration by using one of the methods described under "Customization Records" on page 5-6.

If you need to communicate these port assignments to the site planner, use the Cabling Worksheets in 3174 Site Planning, *which explain how to enter the port assignments on the worksheet.*

Completing the Port Assignment Worksheet When 116 = 2

If your response to question 116 is 2, you assign (in decimal values) the host addresses (primary and secondary) that you want to use for each port. Then, the customizing program automatically generates the IS field.

Note: If you have not read the previous information in this chapter, you need to do so before you begin to fill out the worksheet.

Step **1** Locate and make a copy of "Worksheet 11—117: Port Assignment". This worksheet has two pages; make sure you get both (11A and 11B). If you have configured for Multi-Host Support, you need to identify which host these port assignments are for by writing the host identifier in the Host ID field on the top of the worksheet. If you are filling in these worksheets for a secondary host attachment, you can assign addresses to ports 27-00 through 27-31 on worksheet 11A for hosts 1A through 1H, but you can only assign addresses to ports 21-00 through 23-07 for host 1A on worksheet 11B.

Addresses can be assigned to ports 26-00 through 26-31 for all hosts.

Step **2** Under the host address column headings, write the addresses in decimal values. When you assign host addresses to a port, assign them to consecutive columns: 1, 2, 3, 4, and 5. You can skip addresses between ports, or skip ports, but you **cannot** skip over host address columns. For example, you cannot assign addresses to columns 1, 3, and 4, but not to column 2. The addresses themselves do not need to be sequential, but be careful not to repeat any addresses. For example, 7, 9, 5, 15 is an acceptable sequence, but 7,

9, 5, 9 is not. If there is no address to specify, leave the field empty on the worksheet.

In the following example, DFTs or CUTs (with MLT support) are assigned to Terminal Adapter ports 26-00 through 26-09 on HG 26, and to Terminal Adapter ports 27-00 through 27-04 on HG 27. No terminal is assigned to ports 27-05, 27-06, or 27-07.

```
                        ─────────── 117: Port Assignment ───────────

              Host Addresses                        Host Addresses
     Port  IS  1   2   3   4   5        Port  IS  1   2   3   4   5
     26-00 ___  2   3  ___ ___ ___      26-01 ___ 20  21  ___ ___ ___
     26-02 ___  5   7   8   9  ___      26-03 ___ 22  23  ___ ___ ___
     26-04 ___ 10  11  ___ ___ ___      26-05 ___ 24  25  ___ ___ ___
     26-06 ___ 12  13  14  15  16       26-07 ___ 26  27  28  ___ ___
     26-08 ___ 18  33  ___ ___ ___      26-09 ___ 29  30  31  32  ___


     27-00 ___ 36  37  ___ ___ ___      27-01 ___ 38  ___ ___ ___ ___
     27-02 ___ 41  ___ ___ ___ ___      27-03 ___ 50  52  ___ ___ ___
     27-04 ___ 53  ___ ___ ___ ___      27-05 ___ ___ ___ ___ ___ ___
     27-06 ___ ___ ___ ___ ___ ___      27-07 ___ ___ ___ ___ ___ ___
```

Step   **3**   Do not exceed the port assignment limitations for your protocol:

- For SNA protocol (SNA Local, SDLC, X.25, X.21 Switched, and Token-Ring Network), up to 253 addresses in the range from 2 to 254 are permitted.

- For non-SNA protocol (non-SNA Local or BSC), the addresses range from 0 to 31.

Note: If you define a Printer Authorization Matrix, check that the printers (with the exception of local copy printers) are assigned addresses on Worksheets 11A and 11B.

Planner: You have completed "Worksheet 11A—117: Port Assignment" and "Worksheet 11B—117: Port Assignment for AEA."

Return to the divider page labeled "Microcode Customization Planning." Refer to the step that instructed you to fill out Worksheets 11A and 11B to determine if there are additional worksheets you need to fill out before continuing with the next step. You may also refer to the divider page labeled "Worksheet Summary" to determine where to proceed next.

Keep records of your configuration by using one of the methods described under "Customization Records" on page 5-6.

If you need to communicate these port assignments to the site planner, use the Cabling Worksheets in 3174 Site Planning, *which explain how to enter the port assignments on the worksheet.*

Changing Port Assignments

If you change your response to question 116, refer to the following table, which explains how to fill out Worksheet 11 (both pages 11A and 11B).

Change in 116		Change to Worksheet
Was	**Now**	
0	1	Fill in the IS column.
0	2	Fill in the host address columns (1—5) with decimal values.
1	0	None. The customizing program automatically assigns new addresses.
1	2	In the host address columns (1—5), you can add new addresses or you can delete or replace the previous assigned addresses (use decimal values).
2	0	None. The customizing program automatically assigns new addresses.
2	1	Fill in the IS columns with new values.
S1—S5	S1—S5	None. The customizing program automatically assigns new addresses. (Remember, a maximum of 253 addresses can be assigned. See "116: Individual Port Assignment" on page 6-18.)
S1 A1—S5 A5	S1 A1—S5 A5	None. The customizing program automatically assigns new addresses. (Remember, a maximum of 253 addresses can be assigned. See "116: Individual Port Assignment" on page 6-18.)

Chapter 8. Planning for Country Extended Code Page

An Overview of Country Extended Code Page

Country Extended Code Page (CECP) allows the terminal user to display and print an expanded set of characters. This expanded set of characters is an extension of the Base support provided for each CECP language (see Table 6-6 on page 6-22 for the supported languages).

For example, the French Base support, which contains 105 graphic characters, under CECP expands to 190 graphic characters plus a space. The Base support, a subset of CECP support, remains the same.

Without CECP, communication is restricted to the character set of a given language. For example, a keyboard customized for German is restricted to only the characters and punctuation necessary for German. CECP provides the flexibility to communicate in another language—French, for example.

With CECP, a German keyboard can be modified to contain the same characters as a French keyboard. The system provides two means of keyboard modification: the Keyboard Definition Utility (KDU) and the Extended Graphics function. KDU is a utility for creating unique keyboard layouts to meet the needs of specific applications. The Extended Graphics function provides support of additional characters on the keyboard that can be made active by pressing one key (ExGr). The additional characters must have been previously assigned.

CECP enables all languages to support one universal set of characters, Character Set 697. Characters from other languages can then be entered, displayed, printed and sent to the host.

You select CECP for your controller through the customization process. When you fill out the worksheets for customizing the microcode, you respond to question "123: Country Extended Code Page Support" (see page 6-21) to indicate support or nonsupport of CECP.

Warning: Installation of CECP may cause a loss of data integrity in data bases and applications. Therefore, it is important to read "System Considerations" on page 8-8 before customizing for CECP.

To understand CECP, it is helpful to learn of:

* Code pages
* Character sets
* Base support.

Code Pages

A *code page* is an assignment of graphic characters and control function meanings to all code points in the page. To understand this, consider a 1-byte (8-bit) binary code. Such a code consists of 0's and 1's that can be arranged in up to 256 different patterns. Each pattern is a *code point*. Each code point is assigned a meaning, either as a character or as a control function. An arrangement of code points and their meanings together make up a *code page*. (Refer to the *3174 Character Set Reference*, GA27-3831, to view the supported code pages.)

In addition, the code page serves as the I/O interface between a host and a controller. It is divided into two parts: commands and graphic characters.

Commands are control instructions to devices that define how devices should format data for presentation. Commands are the same for each language. Commands take up 64 code point positions (from 00 to 3F) in a code page.

Graphic characters are the characters that are displayed or printed on a device. These graphic characters are assigned to positions 40 through FE in each country's code page. But, within these positions, the location of the characters can be different from one language to another. Also, within existing code pages, the supported characters can differ between languages. (For example, the French code page supports E-accent grave; the German does not. They both contain the character !, but that character is assigned a different position on each page.)

Character Sets

A *character set* is the collection of graphic characters required to support a specific language. In addition to supporting a language's character set, the 3174 controller supports the "space." Base character sets may differ in size. For example, the French character set contains 105 characters and the German character set contains 94 characters.

For CECP, one universal character set has been defined. It contains the 190 graphic characters plus a space required to support all CECP languages. It is known as *Character Set 697*. In this book, references to Character Set 697 include the character set and the space.

Base Support

Prior to CECP, each language defined a character set that consists of 94 to 161 graphic characters. The code points that have been defined to represent these graphic characters make up a *subset* of the code points available on the whole page. For each country, this subset is known as its *Base* support. The remaining code points, those not assigned a graphic character, are undefined and unsupported.

CECP Terminology

CECP has its own terminology. Some of the more commonly used terms are explained below. These terms are also defined in the glossary at the back of this book.

Base data set	A data set that does not contain CECP-unique graphics.
CECP-capable device	A device that has the necessary features to support CECP, which are enabled.
CECP Character Set	A collection of symbols in Character Set 697 required for CECP languages.
CECP data set	A data set that contains at least one CECP-unique graphic.
CECP-unique graphic	A graphic that is in the CECP character set and not in the Base support.
Synonym	A code point that is supported only by a device that contains an extended attribute buffer (EAB). For devices without an EAB, synonyms are translated to hyphens.

CECP and Devices

The following devices will support CECP when attached to a 3174 Establishment Controller customized for a CECP language:

- 3191 Control Unit Terminals, Models D, E, and L
- 3192 Control Unit Terminals, Models C, D, F, L, and W
- 3812-2 printer
- 4224 printers
- 4234 printers
- 6262 printers
- ASCII devices (displays and printers).
- 3471 Control Unit Terminals (Model B)
- 3472 Control Unit Terminals (all Models except Model G).

Warning: The use of CECP will result in a loss of the Mono Case function on 3192 Models C, D, and F.

Printers and Displays

There are two versions of character set 697. CECP-capable printers support character set 697 Version 0, while CECP-capable displays support Version 1. The support provided by each version is the same, with the exception of 4 characters. The differences in the characters are shown in the table below.

Version 0		Version 1	
Dotless "i"	I	Superscript 1	¹
Florin symbol	*f*	Copyright symbol	©
Numeric space		Divide symbol	÷
Double underscore	=	Multiply symbol	×

Unique Printer Considerations

CECP mode of operation does not support Intelligent Printer Data Stream (IPDS), since IPDS manages the character set within the data stream. CECP mode of operation also does not support a printer attached to a port on the Asynchronous Emulation Adapter (AEA).

Keyboards

CECP extended characters are supported on the IBM Enhanced Keyboards and the IBM Converged Keyboards.

On these keyboards, any of the characters on a CECP code page may be defined by using the Keyboard Definition Utility (KDU). The characters can be assigned to the upper shift, lower shift, or alternate shift position of keys on the keyboards.

Notes:

1. When using KDU, you may need to refer to the code pages in the *3174 Character Set Reference*, GA27-3831.

2. A CECP-capable display with an IBM Converged Keyboard that is used in 3278 Emulation mode is not supported as a CECP-capable display.

3. CECP-unique graphics will be presented correctly only on a CECP-capable display.

4. For CECP countries, when the Acute, Grave, Circumflex, Diaeresis, Cedilla, and Degree/Overcircle accents are added to a Typewriter or APL keyboard, they become "nonescaping keys." A nonescaping key is a key that allows a character to be typed without the imprint position being changed. These keys are intended to be combined with other characters in a two-keystroke sequence to create accented characters. If the accent is to be used by itself, the two-keystroke sequence **must** be the accent and space.

ASCII Devices

The Asynchronous Emulation Adapter supports CECP languages in both ASCII and 3270 Emulation. They are in addition to U.S.A. English. For a list of the languages, see Table 6-5 on page 6-21. For support of a language *not* provided by the AEA, the AEA allows construction of User-Defined Translate tables and User-Defined Terminal tables. Chapter 14, "Planning for the Asynchronous Emulation Adapter" explains these tables.

Different ASCII displays support different CECP languages (all are subsets of the set of CECP-supported languages).

Note: When in ASCII Emulation, the system always has CECP support, regardless of the response to question 123 (CECP support).

Table 8-1. AEA Stations with CECP Support

Language	ASCII Stations						
	IBM 3101	IBM 3151/61	FTTERM	DEC VT100**	DEC VT220**	DEC VT240**	Tektronix 4205**
Austrian/ German (03)	√	√	√	√	√	√	√
Belgian (43)		√	√	√	√	√	
Canadian bilingual (29)		√	√	√	√	√	
Danish (07)		√	√	√	√	√	√
English (UK) (22)	√	√	√	√	√	√	√
English (US) (01)	√	√	√	√	√	√	√
Finnish (09)		√	√	√	√	√	
French (30)	√	√	√	√	√	√	√
Icelandic (37)		√	√	√	√	√	
Italian (15)	√	√	√	√	√	√	
Netherlands (47)				√	√	√	
Norwegian (23)		√	√	√	√	√	√
Portuguese (28)		√	√				
Spanish (19)	√	√	√	√	√	√	
Spanish- speaking (21)	√	√	√	√	√	√	
Swedish (24)		√	√	√	√	√	√
Swiss French (41)		√	√	√	√	√	
Swiss German (42)		√	√	√	√	√	

Notes:

1. CS1 and CS2 are supported for French, German, Canadian, Italian, Spanish, Spanish-speaking, English (UK and US) on the IBM 3151/61.

2. ISO 8859/1.2 is supported for all languages except Dutch on the IBM 3151/61.

3. FTTERM is supported through ISO 8859/1.2.

4. DEC VT220 keyboards D, E, and F are supported for Danish, Norwegian, and UK English.

5. ISO 8859/1.2 and CS1 and CS2 are supported on the 3101 as provided by 316X displays.

Entering/Exiting CECP Mode

If a device is CECP-capable, the controller places the device in CECP mode whenever connected to an IBM host session. Printers remain in CECP mode unless data is being copied from a device that is not CECP-capable. These printers return to CECP mode after the copy operation is complete.

Setup Mode

Display setup mode may allow the enabling of the CECP feature. For example, on a 3191 or 3192, valid model IDs for CECP support are 2+, 3+, 4+, or 5+. Models 3471 (Model B), and 3472 (all models except G) support CECP if the keyboard type is not 78EMU (3278 emulation).

System Considerations

You may need to consider whether host programs accept CECP data before customizing for CECP. When CECP is supported, conventions may need to be adopted. IBM host applications, vendor applications, and in-house applications may be affected.

CECP generally doubles the number of valid I/O code points generated from a keyboard and sent inbound. It is the your responsibility to ensure that host programs and data bases can accept CECP data. Be careful of the following:

- Host filters
- Host use of previously defined I/O code points
- Data integrity.

You may be required to keep track of which data sets will or will not be CECP.

Host Filters

Filters in host programs could generate undesired results. The filters might reject or translate some CECP-unique graphic code points from their original values to incorrect values. This might cause data loss, a program check, or undetected, erroneous alteration of data.

Host Use of Previously Undefined I/O code points

Since a user could not directly enter previously undefined character code points, a host program could be using those code points for other purposes without causing conflicts before CECP support. However, with CECP support, host usage of these previously undefined code points may now result in conflict with the CECP usage.

One example would be if a host application (such as a data base manager) used the previously undefined character code points as control codes (such as end of file markers).

Another example would be a host application that used the previously undefined character code points as values for a special font (such as APL).

Data Integrity

When the host properly manages CECP data, the data can generally be sent to either CECP-capable devices or devices that are not CECP-capable. Devices that are not CECP-capable present the data in the best manner they can. Care must be exercised when critical data is sent to a display that does not contain an extended attribute buffer (EAB), for example, a 3191 Model A or B. These displays physically cannot store nine I/O code points which vary per language. These nine I/O code points are called *synonyms*.

Warning: If synonyms are sent to a device that does not contain an EAB, they are translated to hyphens. If this data is read back by the host, the original CECP data that corresponded with these I/O code points is lost.

When unexpected hyphens appear, there is one primary action you should take. At the device on which the unexpected hyphens appear, make sure that the work being done is *not* filed or saved. Thus the altered code points will not be transmitted back to the host to overwrite the correct data. The *3174 Character Set Reference*, GA27-3831, shows the synonyms for each CECP code page.

Note: You can avoid problems by ensuring that CECP data sets are accessed only by CECP devices.

Local Copy Considerations

In a Local Copy operation, a display is the source of the operation and a printer is the target. If the source is CECP-capable and the target is not, CECP-unique characters do not print properly. For all other combinations of source and target, characters prints correctly.

Most local copy operations are limited to displays and printers that are both operating in either 3270 or 3270 emulation mode. But a 3270 display that is operating in ASCII emulation mode can perform a local copy to its target printer if the printer is operating in 3270 mode.

Multi-Host Support Considerations

CECP support can be specified only for the primary host on the primary link. If you are using Single Link Multi-Host Support and CECP is selected for the primary host, then all hosts on that link must use CECP code pages. CECP code pages must also be used for Concurrent Communication Adapter (CCA)-attached hosts if the primary host on the primary link is using CECP *and* question 139 = 00 or 01 for the CCA host attachment. (For information on question "139: Concurrent Communication Keyboard Language," see page 6-29.) CECP is not supported for hosts on secondary links unless such support is provided on the primary link.

Chapter 9. Planning for Response Time Monitor (RTM)

An Overview of Response Time Monitor

Before you start planning, you need:

- "Worksheet 12—128: RTM" on page A-23
- Information from your system programmer to select your responses.

The Response Time Monitor (RTM) function is a tool for network management, used to measure and evaluate response times. The RTM function measures and records the response time from the recognition of the inbound Attention Identifier (AID) request in the 3174 until the end of the transaction. Depending on how the 3174 controller is customized, RTM information can be obtained either by a network management application in the host or by a controller display station operator, or both.

Response times can be measured for all display terminals that attach to the 3174, but DFT terminals require a special interface. For a detailed description of the RTM function and the distributed function terminal (DFT) interface, see the *3174 Functional Description*.

The display of response times at the 3174 cluster level does not require any host programming support. However, RTM has a host interface for SNA communication. Host programming support (Network Logical Display Manager, Release 2 or higher) is available for setting RTM parameters from a host and for collecting and displaying RTM information at a NetView or Network Communication Control Facility (NCCF) operator station.

For BSC and non-SNA channel communication, response times are displayed only at the 3174 cluster level.

Note: DFTs do not support RTM while in session with a secondary host that is attached through a Concurrent Communication Adapter.

RTM Definition

RTM is defined in your two-digit response to question 127. The first digit asks whether you have host support for RTM and its nature. Even without host support, you can use RTM as a valuable network management tool.

Your second-digit response asks for the point at which you wish to measure response times. It's up to you to decide which point of measurement is most meaningful. If you specify a zero ("no RTM support") for one digit of your response, the other digit must also be zero.

First-Digit Response

The first digit of your response to question 127 determines whether RTM is configured with host support and where the RTM data is displayed.

0 = No RTM support (default).

1 = RTM without host support. On port 26-00 or port 27-00 only, the operator can:

- Display RTM log information in Test mode[1]
- Display the Last Transaction Time indicator
- Reset the RTM data via the /4,1 Test.

2 = RTM without host support. On all ports, the operator can:

- Display RTM log information in Test mode[1]
- Display the Last Transaction Time indicator
- Reset the RTM data via the /4,1 test.

3 = RTM with host support (Local [SNA], SDLC, X.25, Token-Ring Network). You cannot display RTM log information or the Last Transaction Time indicator on any port at the 3174 cluster level. The host may alter the authorization to display RTM log information at any time.

4 = RTM with host support (Local [SNA], SDLC, X.25, Token-Ring Network). On port 26-00 or port 27-00 only, the operator can:

- Display RTM log information in Test mode[1]
- Display the Last Transaction Time indicator.

The host may alter the authorization to display RTM log information at any time.

5 = RTM with host support (Local [SNA], SDLC, X.25, Token-Ring Network). On all ports, the operator can:

- Display RTM log information in Test mode[1]
- Display the Last Transaction Time indicator.

The host may alter the authorization to display RTM log information at any time.

---

[1] DFT terminals cannot display the RTM log.

Second-Digit Response

The second digit of your response to question 127 determines what is measured.

0 = No RTM support (default).

1 = **First Character:** The measurement is terminated when the first command of the next outbound message is written to the terminal. This command can be:
- Write, Erase/Write, or Erase/Write Alternate
- Erase All Unprotected
- Load Programmed Symbols
- Erase Reset
- Set Window Origin
- Activate Partition
- Create Partition
- Destroy Partition
- Reset Partition
- BSC Copy.

Note: A Write with or without data terminates the RTM measurement. The foregoing are examples of outbound communication that could possibly be expected to modify the contents of the presentation space.

2 = **Keyboard Unlocked:** For SNA devices, measurement is terminated when the next outbound operation (other than a Read) to the terminal contains a Change Direction/End Bracket (CD/EB) or explicit or implicit keyboard restore (WCC = keyboard restore or EAU command).

In non-SNA:

- For terminals such as the 3278 or 3279 display stations, measurement is terminated:

    - On end of transmission (EOT) for BSC. Exception: Upon receipt of a BSC Copy command, the measurement is terminated on the *from* device, once the screen image has been stored in the controller. At this point, the *from* device is available for the operator to use. The *to* device in the BSC Copy still has the measurement terminated at EOT.

    - On end of command chain.

- For distributed function terminals, such as the 3290 Information Panel, the 3179 Color Graphics Display Station, and the IBM 3270 Personal Computer, measurement is terminated upon receipt of a Terminate Chained Command Sequence (TCCS).

3 = **CD/EB:** This definition is valid only in an SNA environment. The measurement is terminated upon receipt of a Change Direction (CD) or End Bracket (EB), which puts the terminal into a Send or Contention state, respectively. This is usually equivalent to a "time-to-last-character."

Notes:

1. EB or CD received in an exception response request or in a definite response causes the last in chain (LIC) segment to terminate the measurement.

2. CD in conjunction with a Read does not stop the timer.

4 = **Last Character:** This definition measures from the pressing of an AID key to receipt of the last character of the last message prior to the pressing of the next AID key.

In non-SNA:

For terminals such as the 3278 or 3279 display stations, measurement is terminated:

- On end of transmission (EOT) for BSC. Exception: Upon receipt of a BSC Copy command, the measurement is terminated on the *from* device, once the screen image has been stored in the controller. At this point, the *from* device is available for the operator to use. The *to* device in the BSC Copy still has the measurement terminated at EOT.

- On end of command chain.

In SNA:

Measurement is terminated on receipt of CD/EB (Change Direction or End Bracket).

Note: This new transaction-end definition applies only to attached CUT-mode terminals. RTM support is disabled for DFT devices if this new RTM type is selected by the host or during 3174 customization. DFT devices do not support this new transaction-end definition.

The RTM Worksheet

If you specified a nonzero response to question 127, you must fill out
"Worksheet 12—128: RTM" (Figure 9-1). There are two versions of the 128: RTM
Definition panel on this worksheet.

The version (A or B) that you fill out depends on your first-digit response to
question 127.

- Fill out Version A if your first-digit response is 1 or 2. It allows you to specify
  the time boundaries for the RTM counters.

- Fill out Version B if your first-digit response is 3, 4, or 5. It allows you to
  specify a flag for setting the host interface status and to specify the boundaries
  for the RTM counters.

The procedure on page 9-10 helps you fill out "Worksheet 12—128: RTM."

```
Default Values

Version A
_____

                    128: RTM Definition


              B1  []     []     []
                  00     01     0
              B2  []     []     []
                  00     02     0
              B3  []     []     []
                  00     05     0
              B4  []     []     []
                  00     10     0


_____

Version B
_____

                    128: RTM Definition
        F1 - [ | | | | | | | ]
              0  0  0  0  0  0  0  0
              B1  []     []     []
                  00     01     0
              B2  []     []     []
                  00     02     0
              B3  []     []     []
                  00     05     0
              B4  []     []     []
                  00     10     0

_____
```

Figure   9-1. An Example of Worksheet 12 – 128: RTM

The fields on this worksheet are described below.

F1   The host interface status, an eight-digit field, is used only
                when host support is specified. (See the procedure on page
                9-10 for a description of the digits.) This field cannot contain
                blanks; specify a 0 instead.

B1 – B4   These fields specify the boundary — the maximum time
                associated with each RTM counter. Time is specified in
                minutes, seconds, and tenths of a second; for example,
                11:35.3 is 11 minutes, 35 and 3/10 seconds. See "Sample
                Boundary Specifications" on page 9-9 for examples that
                illustrate both valid and invalid boundary specifications. This
                field cannot contain blanks; specify a 0 instead.

Default responses   The defaults are printed under the boxes on the worksheet,
                and are automatically supplied by the microcode.

How Is Response Time Measured?

When you customize for RTM support, a series of five counters (see Figure 9-2) is
allocated for each display or logical terminal.
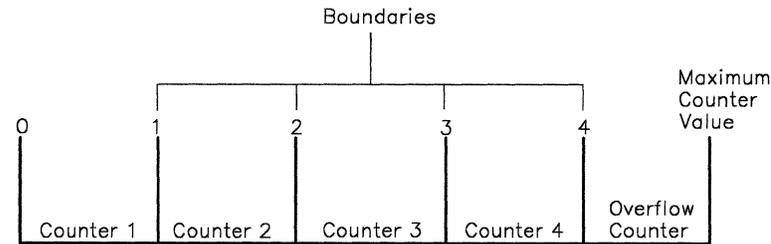
Figure 9-2. Counters and Boundaries

The counters represent the intervals of time into which response times can be
categorized. You can set up as many as four counters and specify the maximum
amount of time in the interval, or boundary, associated with each. If a response
time is less than or equal to a particular boundary (for example, boundary 3), the
counter associated with that boundary (counter 3) is incremented at the end of the
transaction. If the response time does not fit within any of the boundaries, it is
categorized in the fifth, or overflow, counter. If you specify any one of the first four
boundaries as the maximum, the counter following that boundary becomes the
overflow counter and the subsequent counters are ignored. The maximum *counter*
value is 65535. The counter does not wrap around when this value is reached.

Sample Boundary Specifications

The following examples illustrate both valid and invalid specification of boundaries (B1, B2, B3, and B4).

Valid Boundaries

```
B1 - 00 : 02 . 1
B2 - 00 : 03 . 2
B3 - 00 : 05 . 5
B4 - 00 : 07 . 7
```

Each response time of 2.1 seconds or less increases the first counter.

Each response time exceeding 2.1 seconds but less than or equal to 3.2 seconds increases the second counter.

Each response time exceeding 3.2 seconds but less than or equal to 5.5 seconds increases the third counter.

Each response time exceeding 5.5 seconds but less than or equal to 7.7 seconds increases the fourth counter.

Each response time exceeding 7.7 seconds increases the fifth counter.

Invalid Boundaries

Example 1: Boundary Values Not in Ascending Order

```
B1 - 00 : 02 . 0
B2 - 00 : 05 . 7
B3 - 00 : 04 . 5
B4 - 00 : 06 . 8
```

Example 2: A Zero Entry for Field B1

```
B1 - 00 : 00 . 0
B2 - 00 : 00 . 1
B3 - 00 : 00 . 2
B4 - 00 : 00 . 3
```

Example 3: Nonzero Entry after the Maximum Boundary Value

```
B1 - 00 : 01 . 0
B2 - 27 : 18 . 3
B3 - 10 : 15 . 4
B4 - 20 : 10 . 5
```

Example 4: The Seconds Field Exceeds 59

```
B1 - 00 : 01 . 0
B2 - 00 : 10 . 0
B3 - 00 : 30 . 0
B4 - 00 : 61 . 0
```

Filling In Worksheet 12—128: RTM

Step **1** Locate "Worksheet 12—128: RTM" on page A-23. If you have configured for Multi-Host Support, you need to identify which host these RTM boundaries are for by writing the host identifier in the Host ID field on the top of the worksheet.

Step **2** Enter your responses on the worksheet.

- If you want to use the defaults, circle "Default Values." You have completed the worksheet. Go to the "Planner" note on page 9-11.

- If your first-digit response to question 127 was:

    1 or 2, circle "Version A."
    3, 4, or 5, circle "Version B."

Step **3** For Version B, fill out the eight-digit status flag field. Respond with 0 or 1:

    0 = No; turns off the function associated with the bit position.
    1 = Yes; turns on the function associated with the bit position.

Digit	Description
1	RTM Enabled. If the default (0) is used, RTM will remain off unless turned on by host support.
2	3174 transmits unsolicited RTM data when an UNBIND is processed (LU-LU)
3	3174 transmits unsolicited RTM data if counter overflows
4	3174 sends alert if counter overflows
5	Reserved. Set to 0.
6	Reserved. Set to 0.
7	Reserved. Set to 0.
8	Reserved. Set to 0.

Note: If you specify host support in question 127 but let the defaults for the status flag field stand, RTM statistics are not kept for any device unless a host application enables the RTM function.

Step **4** Specify the boundaries (B1—B4) in Version A or B. The rules for specifying boundaries are:

- Specify the time in minutes, seconds, and tenths of a second; for example, 11:35.3 is 11 minutes, 35 and 3/10 seconds.

- Do not specify a zero entry (00 : 00.0) for field B1.

- Specify from one to four boundaries, in sequence of ascending value. Do not embed a zero entry between two nonzero entries.

- The maximum boundary you can specify is 27:18.3. Any entries after the maximum value **must** be zero.

- The maximum entry you can specify in the seconds field is 59 seconds.

Planner: You have completed "Worksheet 12—128: RTM."

Return to the divider page labeled "Microcode Customization Planning." Refer to the step that instructed you to fill out Worksheet 12 to determine if there are additional worksheets you need to fill out before continuing with next step. You may also refer to the divider page labeled "Worksheet Summary" to determine where to proceed next.

Keep records of your configuration by using one of the methods described under "Customization Records" on page 5-6.

Changing the RTM Specifications

If you change your first-digit response to question 127, refer to the following table, which explains how to fill out "Worksheet 12—128: RTM."

Change in 127		
Was	**Now**	**Change on Worksheet**
1	2	Record the changed responses on Version A of the 128 panel.
2	1	Record the changed responses on Version A of the 128 panel.
3, 4, 5	1, 2	Fill out Version A of the 128 panel.
1, 2	3, 4, 5	Fill out Version B of the 128 panel.
3, 4, 5	3, 4, 5	Record the changed responses on Version B of the 128 panel.

Chapter 10. Planning for X.25

Before You Begin

Before you start planning, you need:

- "Worksheet 13—X.25 Options" on page A-24
- The X.25 network subscription.

This chapter is presented differently from other customizing chapters. For X.25, the questions are grouped logically instead of numerically. There are two groups: questions relating to virtual circuit definition (host) and questions relating to subscription definition (links). The table below lists the questions in numeric order. Page references help you find each question easily.

X.25 Questions-Numerical Listing	
Question:	**Page:**
400: Network Type	Page 10-6
401: Circuit Type	Page 10-10
402: Logical Channel	Page 10-10
409: X.25 Keyboard Support Options	Page 10-10
420: Incoming Call Options	Page 10-13
421: Outgoing Call Options	Page 10-14
423: Host DTE Address	Page 10-15
424: 3174 DTE Address	Page 10-6
430: Negotiated Packet Size	Page 10-15
431: Packet Sequence Numbering	Page 10-7
432: Negotiated Window Size	Page 10-15
433: K-Maximum Out	Page 10-7
434: Nonstandard Default Packet Size	Page 10-7
435: Nonstandard Default Window Size	Page 10-8
440: Throughput Class	Page 10-16
441: Closed User Group	Page 10-16
442: Recognized Private Operating Agency	Page 10-16
450: Link Level Transmit Timeout	Page 10-8
451: Number of Retries	Page 10-8
452: Connection Identifier	Page 10-17
453: Connection Options	Page 10-17
461: Lowest Incoming Channel	Page 10-9
462: Highest Incoming Channel	Page 10-9
463: Lowest Two-Way Channel	Page 10-9
464: Highest Two-Way Channel	Page 10-9
465: Lowest Outgoing Channel	Page 10-10
466: Highest Outgoing Channel	Page 10-10

Overview

The CCITT Recommendation X.25 defines the packet formats and control procedures for the exchange of packets between data terminal equipment (DTE) and data-circuit-terminating equipment (DCE) for switched virtual circuits (SVCs) and permanent virtual circuits (PVCs). The control procedures include establishing and clearing of calls, data transfer, flow control, and error recovery.

Customizing for X.25 involves defining the unique aspects of your X.25 network subscription to the 3174 controller. You need a copy of your firm's X.25 network subscription to complete the X.25 worksheet.

An X.25 network subscription can include optional user facilities. The 3174 controller supports the following facilities for SVCs and provides customizing questions for them:

- Closed User Group
- Negotiated Window Size
- Negotiated Packet Size
- Nonstandard Default Window Size

- Nonstandard Default Packet Size
- Recognized Private Operating Agency
- Reverse Charge
- Throughput Class.

An operator, however, can modify customized values for certain X.25 facilities during the Dial procedure. To allow the operator to change values during the Dial procedure, for question 409 ("X.25 Keyboard Support Options") you *must* set the sixth digit equal to 0 ("Dial Screen Display").

X.25 and Microcode Upgrade

If you used X.25 with earlier levels of 3174 microcode, be aware that the meanings of some X.25 questions have changed. Also, due to expanded X.25 support, several questions have been added.

If you plan to use the Microcode Upgrade utility to update your microcode, the utility will handle the necessary changes for you. If you do *not* plan to use the upgrade utility, please read this chapter carefully; it explains changes to the X.25 panels.

The X.25 Options Worksheet

If you are configuring for primary hosts, you must fill out "Worksheet 13—X.25 Options" (Figure 10-1); if you are configuring for secondary hosts, you must fill out "Worksheet 13S—Secondary X.25 Options."

Figure 10-1. An Example of Worksheet 13 – X.25 Options

The areas on this worksheet are described below.

Default responses   The microcode automatically supplies the default response unless you specify a different response during customization. If there is a default value for a facility to which you do not subscribe, leave the default value unchanged.

X   You must respond to this question. No default is supplied.

Underscore   This question is a sequel to a previous question. Your response to the previous question dictates whether you need to respond to the sequel. For example, if your response to question 401 (circuit type) is 1 (permanent virtual circuit), no response is necessary for question 423 (host and DTE address). When you do not want to specify a response on the worksheet, circle the underscores. The person who customizes can leave the underscore unchanged in the response field.

Filling In Worksheet 13—X.25 Options

Planner: The following questions appear on "Worksheet 13—X.25 Options" and some of them appear on Worksheet 13S. If you are filling in a worksheet for a primary host link, Locate "Worksheet 13—X.25 Options" on page A-24. (If you have configured for Multi-Host Support, identify which host these X.25 options are for in the Host ID field on the top of the worksheet.) If you are filling in a worksheet for a secondary host link, locate "Worksheet 13S—Secondary X.25 Options" on

page A-25. Identify which host these X.25 options are for. Write your responses to the following questions on the worksheet.

Link Attachment Questions

The following questions pertain to link attachment. They appear on primary host panels only.

400: Network Type

Response: Four numeric characters.

The four digits of this response are divided into three parts. The first two digits represent the network type. The third digit represents the network level. The fourth digit represents the type of diagnostic codes the 3174 should send for the link.

The possible responses are shown below. The digits shown in bold type are the digits to which the possible responses apply.

00 0 0: (First two digits)

    00 = CCITT-recommended network with announced IBM support, not DATANET-1.

    01 = Connection is to the Netherlands DATANET-1.

If IBM has announced X.25 support for your country's network and it is not DATANET-1, use the default (00).

00 **0** 0: (Third digit)

    0 = The network supports CCITT Recommendation X.25, 1980 level

    1 = The network supports CCITT Recommendation X.25, 1984 level and beyond.

00 0 **0**: (Fourth digit)

    0 = The 3174 should use SNA diagnostic codes for errors that are reported to the network.

    1 = The 3174 should use ISO diagnostic codes.

The default response to this question is 00 0 0.

424: 3174 DTE Address

Response: A maximum of 15 numeric characters (0 through 9).

The default response is underscores.

This field contains the local DTE address for the 3174. Enter a maximum of 15 digits for the number, leaving blanks or underscores wherever you have not written a numeric character.

For any hosts on this link, if the first digit of your response to question 421 (Outgoing Call Options) is 1 and the response to question 401 (Circuit Type) is 3 or 4, then you must respond to this question. Otherwise, circle the default (underscore) on the worksheet.

431: Packet Sequence Numbering
Response:

        0 = Modulo 8
        1 = Modulo 128.

The default response is 0.

Your response determines whether the extended packet sequence numbering facility is to be used. Refer to your network subscription information to determine your response. The response to this question can affect responses to questions 432 (Negotiated Window Size) and 435 (Nonstandard Default Window Size).

433: K-Maximum Out
Response: Maximum number of link level I-frames. The response can be a value of 1 – 7.

The default response is 2.

This field specifies the maximum number of outstanding link level I-frames that the 3174 transmits before waiting for an acknowledgment. Your network subscription information indicates the correct response.

434: Nonstandard Default Packet Size
Response:

        0 = 64-byte packet
        1 = 128-byte packet
        2 = 256-byte packet
        3 = 512-byte packet.

The default response is 1.

This field contains the default packet size to which you subscribed in your X.25 network agreement. This value is used to select the packet size for an SVC when packet size negotiation is not used.

The table below shows the relationship of packet sizes to Path Information Unit (PIU) sizes.

PIU Size Inbound (Q370)	Packet Size	Number of Data Packets for Maximum PIU
If Q370 = 0, max PIU = 265	64	5
	128	3
	256	2
	512	1
If Q370 = 1, max PIU = 521	64	9
	128	5
	256	3
	512	2

Note: In Configuration Support B, Release 3 microcode and higher, questions 434 and 435 do not apply to PVCs. The microcode upgrade process makes the necessary changes during an upgrade from Release B2.

435: Nonstandard Default Window Size

Response:

01 − 07 = Range for modulo 8 (if question 431 equals 0)
01 − 11 = Range for modulo 128 (if question 431 equals 1).

The default response is 02.

This field contains the default packet window size value subscribed to in your X.25 network agreement. This value is used to select the window size for an SVC when window size negotiation is not used.

Note: In Configuration Support B, Release 3 microcode and higher, questions 434 and 435 do not apply to PVCs. The microcode upgrade process makes the necessary changes during an upgrade from Release B2.

450: Link Level Transmit Timeout

Response: A value in the range 0001 − 2540.

You must respond to this question. No default is supplied.

This is the value referred to as T_1 or Tp. It is specified in 0.1-second intervals and set to the value required by each individual network. Refer to your network subscription for the value you should use. The 3174 timer will be ±20% of the value specified. For values greater than 25.0 seconds (0250 input), the lower (tenths) digit is ignored. For example, 0277 is treated as 27 seconds.

451: Number of Retries

Response: A value in the range 01 − 99.

You must respond to this question. No default is supplied.

Set this value (referred to as Np or N_2) to the number of retries required by the individual network. Refer to your network subscription for this information.

Logical Channel Numbering

Planner: Questions 461 through 466 describe the logical channel numbering of your network subscription. Responses to the questions determine valid ranges for incoming and outgoing calls. Figure 10-2 shows how these questions relate to one another in establishing channel ranges.

Figure 10-2 shows channel range pairs. Pairs must be in ascending order, and the total number of channels and PVCs cannot exceed 255.

The outside delimiters of the channel ranges can be used (i.e. some networks use 0, and some assign Highest Outgoing Channel (HOC) to be 4095). If there are no PVCs, the pairs must still be relative, but the Lowest Incoming Channel (LIC) could be 1 while Highest Incoming Channel (HIC) is 255.
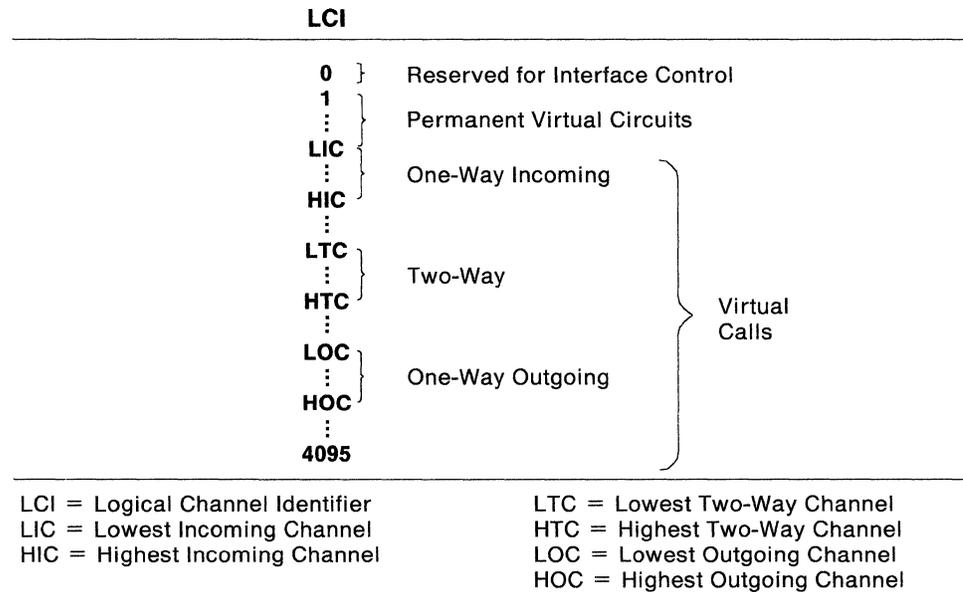
LCI

```
          0  }     Reserved for Interface Control
          1  ⎤
          :  ⎬     Permanent Virtual Circuits
        LIC ⎱
          :  ⎫     One-Way Incoming        ⎤
        HIC ⎦                              ⎥
          :                                ⎥
        LTC ⎤                              ⎥
          :  ⎬     Two-Way                 ⎥  Virtual
        HTC ⎦                              ⎬  Calls
          :                                ⎥
        LOC ⎤                              ⎥
          :  ⎬     One-Way Outgoing        ⎥
        HOC ⎦                              ⎥
          :                                ⎥
       4095                                ⎦
```

LCI = Logical Channel Identifier	LTC = Lowest Two-Way Channel
LIC = Lowest Incoming Channel	HTC = Highest Two-Way Channel
HIC = Highest Incoming Channel	LOC = Lowest Outgoing Channel
	HOC = Highest Outgoing Channel

Figure 10-2. Logical Channel Assignments

461: Lowest Incoming Channel

Response: A value in the range 0000-4095.

The response to this question is optional. If specified, this response should match the lowest number Logical Channel Number (LCN) in the network subscription that is reserved for calls incoming from the network. If you do not use Incoming Call Channels, do not enter a response for this question.

462: Highest Incoming Channel

Response: A value in the range 0000-4095.

The response to this question is optional. If specified, this response should match the highest number LCN in the network subscription that is reserved for calls incoming from the network. If you do not use Incoming Call Channels, do not enter a response for this question.

463: Lowest Two-Way Channel

Response: A value in the range 0000-4095.

The response to this question is optional. If specified, this response should match the lowest number LCN in the network subscription that is reserved for incoming or outgoing network calls. If you do not use Two-Way Channels, do not enter a response for this question.

464: Highest Two-Way Channel

Response: A value in the range 0000-4095.

The response to this question is optional. If specified, this response should match the highest number LCN in the network subscription that is reserved for incoming or outgoing network calls. If you do not use Two-Way Channels, do not enter a response for this question.

465: Lowest Outgoing Channel

Response: A value in the range 0000-4095.

The response to this question is optional. If specified, this response should match the lowest number LCN in the network subscription that is reserved for outgoing network calls. If you do not use Outgoing Call Channels, do not enter a response for this question.

466: Highest Outgoing Channel

Response: A value in the range 0000-4095.

The response to this question is optional. If specified, this response should match the highest number LCN in the network subscription that is reserved for outgoing network calls. If you do not use Outgoing Call Channels, do not enter a response for this question.

Host Attachment Questions

The following questions define X.25 characteristics for individual hosts (virtual circuits).

401: Circuit Type

Response:

1 = Permanent virtual circuit (PVC)
2 = Incoming call (from host) only (SVC)
3 = Outgoing call (to host) only (SVC)
4 = Two-way call (SVC).

This input field indicates the type of circuit for this host. Refer to your subscription information for your response. A permanent virtual circuit (PVC) is a permanent logical connection between two DTEs, analogous to a point-to-point SDLC nonswitched connection. It requires no call setup or clearing by the DTE. A switched virtual circuit (SVC) is a temporary logical connection between two DTEs, analogous to a point-to-point switched line.

402: Logical Channel Identifier

Response:

0000 − 4095.

This decimal value is the channel identifier for the PVC circuit specified in question 401 and must be specified only when the response to question 401 is 1. Refer to your subscription information for your channel identifier.

409: X.25 Keyboard Support Options

Response: Eight digits (0 or 1).

0 = No
1 = Yes.

The default response is 10100100. Digits are numbered from left to right.

This field allows you to choose how to use X.25 Extension Mode keys for this particular host. Keyboards on distributed function terminals cannot be used for

initiating or terminating an X.25 connection. The X.25 keys are Extension, DIAL, LOCAL, COMM (Communicate), and DISC (Disconnect). For more information about the function of these keys, see the *3174 Functional Description*, GA23-0218.

Typically, the device attached to port 0 of HG 26 or HG 27 has access to all the X.25 Extension Mode keys. During customization, however, you can assign the keys to all ports, or certain keys can be deleted. You may also customize for automatic dial and disconnect support (question 372), which can eliminate the need for use of the X.25 Extension Mode keys.

To allow the operator to change customized values for certain X.25 facilities on a per-call basis during the Dial procedure, set the sixth digit (Dial Screen Display) equal to 0.

Note: If the response to question 401 is 1, the first, second, and sixth digits have no meaning and are ignored.

Digit	Description
1	X.25 DISC Key
2	X.25 DISC Key
3	X.25 LOCAL and COMM
4.	X.25 LOCAL and COMM
5	X.25 Keys
6	Dial Screen Display
7	Disconnect/Local Mode Operation
8	Reserved

Digits 1 and 2 - X.25 DISC Key:

00 = X.25 DISC key is not supported.

01 = X.25 DISC key is supported only on port 0 of HG 26 or HG 27, regardless of how the fifth digit (X.25 Keys) is specified.

10 = Default – X.25 DISC is supported according to how the fifth digit (X.25 Keys) is specified.

11 = Invalid.

Digits 3 and 4 - X.25 LOCAL and COMM Keys:

00 = X.25 LOCAL and COMM keys are not supported.

01 = X.25 LOCAL and COMM keys are supported only on port 0 of HG 26 or HG 27, regardless of how the fifth digit (X.25 Keys) is specified.

10 = Default – X.25 LOCAL and COMM keys are supported according to how the fifth digit (X.25 Keys) is specified.

11 = Invalid.

Digit 5 - X.25 Keys:

0 = Default − X.25 keys are supported only on port 0 of HG 26 or HG 27.
1 = X.25 keys are supported on all ports (except those with a DFT attached).

Digit 6 - Dial Screen Display:

0 = Display all fields on the Dial screen. This allows the operator to change customized or default values on a per-call basis.
1 = Default − Display only the HNAD field on the Dial screen. This allows the operator to enter only the number to be called.

Digit 7 - Disconnect/Local Mode Operation:

0 = Default − If no SNA sessions are active, pressing the DISC (SVC) or LOCAL (PVC) key performs the disconnect or local mode operation. If any sessions are active, pressing the key once inhibits the rest of the keyboard. Pressing the key twice initiates the operation.
1 = The DISC (SVC) or LOCAL (PVC) key immediately performs the disconnect or local mode operation, regardless of active sessions.

Digit 8 - Reserved: This digit is reserved and defaulted to 0.

The Connection Identifier (CID)

In prior levels of 3174 configuration support, a one-to-one correspondence existed between a host DTE and a controller DTE. Each DTE was identified by a unique address. When an SVC was used, DTE addresses were sufficient to identify the DTEs initiating and receiving each call.

With X.25 Single Link Multi-Host Support this is no longer the case. One controller may communicate with several hosts simultaneously; or one controller may establish several sessions simultaneously with one host. If the controller has several sessions with one host, DTE addresses are not sufficient to identify sending and receiving DTEs. For instance, suppose one controller is to have several sessions with one host. To the host, each session appears as a separate controller. If the host issues a call to the 3174, the Incoming Call packet will contain the host's DTE address, but the 3174 cannot determine for which session the call is intended. A further means of identifying separate sessions (host or controller) within one DTE address is required.

To do this, the Connection Identifier (CID) portion of the call request packet is used. It is an 8-character field that you can use to identify the correct PU; it is used in conjunction with the DTE address to uniquely identify the session. The 3174 requires you to use the CID if two or more PUs on a link are associated with the same host system, and the host system is going to be calling the controller. If the controller will be calling the host, check with your host system administrator to determine whether use of CIDs is necessary.

If you are customizing for only one host, the CID can be specified for Call Packet verification *instead* of the host address.

Questions 420, 421, 423, 424, and 452 enable you to specify the remote DTE's address and CID and contain more explanation of these fields.

420: Incoming Call Options

Response: Eight digits (0 or 1).

0 = No
1 = Yes.

The default response is 00000000. Digits are numbered from left to right.

Your response specifies how to process fields in an incoming call. Many of the choices refer to optional facilities; refer to your network subscription information before selecting your response.

If you are planning for X.25 Single Link Multi-Host Support, you may be required to answer digits 1 and 6 with a 1 if more than one of your host definitions allows incoming calls (401 = 2 or 4). You must answer digit 1 with 1 for all such hosts and supply correct DTE addresses for question 423. If any of these host connections are to the same host DTE (responses to 423 are not unique), then you must answer digit 6 with a 1 and supply a unique CID for question 452.

If the X.25 keyboard support option (question 409) specifies that the Dial screen will display all the fields (sixth digit is 0), the operator can change any values selected for incoming call options by using the Dial panel.

Digit	Description
1	Host DTE Address
2	Reverse-Charge Facility
3	Reverse-Charge Facility
4	Negotiated Packet Size Facility
5	Negotiated Window Size Facility
6	Connection Identifier
7	Throughput Class
8	Reserved

Digit 1 - Host DTE Address: This digit specifies whether to validate the host (calling) DTE address on incoming calls.

Digits 2 and 3 - Reverse-Charge Facility: These digits specify how to handle calls with the reverse-charge facility.

00 = Do not accept calls that include the reverse-charge facility.
01 = Accept calls with the reverse-charge facility equal to reverse charge requested.
10 = Accept calls with the reverse-charge facility equal to reverse charge *not* requested.
11 = Accept calls with the reverse-charge facility whether reverse charges are requested or not.

Digit 4 - Negotiated Packet Size Facility: This digit specifies whether to accept Incoming Call packets that include the negotiated packet size facility.

Digit 5 - Negotiated Window Size Facility: This digit specifies whether to accept Incoming Call packets that include the negotiated window size facility.

Digit 6 - Connection Identifier: This digit specifies whether to validate the Connection Identifier (CID) on incoming calls.

Digit 7 - Throughput Class Negotiation: This digit specifies whether to accept Incoming Call packets that include the Throughput Class facility.

Digit 8 - Reserved: This digit is reserved and defaulted to 0.

421: Outgoing Call Options

Response: Eight digits (0 or 1).

0 = No
1 = Yes.

The default response is 00000000. Digits are numbered from left to right. Your response specifies the fields to include in an outgoing Call Request packet. Many of the choices refer to optional facilities. Refer to your network subscription information before selecting your responses.

If the X.25 keyboard support option (question 409) specifies that the Dial screen display all fields (sixth digit is 0), an operator can change any values selected for outgoing call options during a Dial session on a per-call basis.

Digit	Description
1	3174 DTE Address
2	Reverse-Charge Facility
3	Reverse-Charge Facility
4	Negotiated Packet Size Facility
5	Negotiated Window Size Facility
6	Connection Identifier
7	Throughput Class
8	Reserved

Digit 1 - 3174 DTE Address: This digit specifies whether to supply the 3174 (calling) DTE address in the Call Request packet.

Digits 2 and 3 - Reverse-Charge Facility: These digits specify how to handle calls with the reverse-charge facility.

00 = Do not include the reverse-charge facility in the Call Request packet.
01 = Request reverse charge via the reverse-charge facility.
10 = Request *no* reverse charge via the reverse-charge facility.
11 = Invalid response.

Digit 4 - Negotiated Packet Size Facility: The response for this digit specifies whether the negotiated packet size facility field will be included in the Call Request packet.

Digit 5 - Negotiated Window Size Facility: This digit specifies whether to include the negotiated window size facility field in the Call Request packet.

Digit 6 - Connection Identifier: This digit specifies whether to include the CID in the Call Request packet.

Digit 7 - Throughput Class: This digit specifies whether to include the Throughput Class facility in the Call Request packet.

Digit 8 - Reserved: This digit is reserved and is defaulted to 0.

423: Host DTE Address (HNAD)

Response: A maximum of 15 digits (0 through 9).

This field contains the host network data terminating equipment (DTE) address, which is a unique address identifying this DTE to the network. Enter a maximum of 15 digits for the telephone number, leaving blanks or underscores wherever you have not written a numeric character.

You must respond to this question if question 401 (Circuit Type) is 2 *and* digit one of 420 (Incoming Call Options) is 1. Or, if question 401 is 3 or 4, you must respond to this question. Otherwise, circle the default (underscore) on the worksheet.

430: Negotiated Packet Size (NPKT) or PVC Packet Size

Response:

> 0 = 64-byte packet
> 1 = 128-byte packet
> 2 = 256-byte packet
> 3 = 512-byte packet.

The default response is 1.

For SVCs Your response to this question defines the negotiated packet size facility. This is an optional facility; refer to your subscription information to see if a response is required.: This question is related to questions 420 (Incoming Call Options) and 421 (Outgoing Call Options). The fourth digit of both of those questions enables the negotiated packet size facility. In question 420, if the fourth digit is 1, the response you select here sets the size limit to which the controller may negotiate when accepting an incoming call. In question 421, if the fourth digit is 1, the response you select here will be requested in the Call Request Packet.

For PVCs This question has a little different meaning for PVCs than for SVCs. If you are configuring for PVCs, *the packet size is not negotiated but remains constant at the value you select here.* If you are configuring for SVCs, the value you select for this question is a *limit* on variable packet sizes.

432: Negotiated Window Size (NWND) or PVC Window Size

Response:

> 01 − 07 = Range for modulo 8 (if question 431 equals 0)
> 01 − 11 = Range for modulo 128 (if question 431 equals 1).

For SVCs This field is used for the negotiated window size facility. It is an optional field. Refer to your network subscription for information to determine your response. In question 420 (Incoming Call Options), if the fifth digit is 1, the response selected here sets the size limit to which the controller may negotiate when processing an incoming call. In question 421 (Outgoing Call Options), if the fifth digit is 1, the response selected here will be requested in the Call Request Packet.

For PVCs This question has a little different meaning for PVCs than for SVCs. If you are configuring for PVCs, *the window size is not negotiated but remains constant at the value you select here.* If you are configuring for SVCs, the value you select for this question is a *limit* on variable window sizes.

440: Throughput Class Negotiation (TCLS)
Response:

3 = 75 bps	9 = 4800 bps
4 = 150 bps	A = 9600 bps
5 = 300 bps	B = 19 200 bps
6 = 600 bps	C = 48 000 bps
7 = 1200 bps	D = 64 000 bps.
8 = 2400 bps	

The default response is 9.

Throughput Class is a network facility that sets priority for packets. Refer to your network subscription information for the response to this question.

In question 421 (Outgoing Call Options), if the seventh digit is 1 (include the Throughput Class facility in the Call Request packet), this field supplies the value. In question 420 (Incoming Call Options), if the seventh digit is 1 (accept Throughput Class on an incoming Call Request packet), the 3174 accepts the requested value if it is less than or equal to the customized value. If not, the customized value is returned.

441: Closed User Group (CUG)
Response:

00 − 99 = Include closed user group facility in outgoing Call Request packet.

A response to this question is optional.

Consult your network subscription information for your response. Enter a value to be included in the closed user group facility in an outgoing Call Request packet. If the field is left with underscores, blanks, or nulls, the closed user group facility is not included in the outgoing Call Request packet.

An operator can enter this value on a per-call basis, overriding default or customized values.

Note: If the response is a number with fewer than two digits, use a leading zero. For example, if your response is 6, enter 06 on the worksheet. If there is no response for this question, circle the underscore (default) on the worksheet.

442: Recognized Private Operating Agency (RPOA)
Response:

0000 − 9999 = Recognized private operating agency.

A response to this question is optional. Enter a value for the recognized private operating agency facility if this applies to your system. If the field is left with underscores, this facility is not included in the outgoing Call Request packet.

An operator can enter this value on a per-call basis, overriding default or customized values.

Note: If the response is a number with fewer than four digits, use leading zeros. For example, if your response is 57, enter 0057 on the worksheet. If there is

no response for this question, circle the underscore (default) on the worksheet.

452: Connection Identifier (CID)

Response: This identifier can have up to 8 numeric characters (0−9), alphabetic characters (A−Z), or blanks. Refer to "The Connection Identifier (CID)" on page 10-12 for information about the connection identifier and its use with the DTE.

Note: For 3174 customizing you must enter alphanumeric characters for this response. In the host SYSGEN procedure, however, you may be required to enter hexadecimal characters for this same CID password. Check the appropriate host documentation to determine SYSGEN requirements.

For example, when using the NCP Packet Switching Interface (NPSI), hexadecimal characters are required when coding the USRFIL2 keyboard of the X25.OUFT statement, for calls originating from NPSI to the 3174.

453: Connection Options

Response: Eight digits (0 or 1).

The default response is 00000000. Digits are numbered from left to right.

Digit	Description
1	Level of CCITT X.25 architecture supported
2	Diagnostic code type
3-8	Reserved

Digit 1 - CCITT X.25 Architecture Level:

    0 = 1980
    1 = 1984 and beyond

Digit 2 - Diagnostic Code Type:

    0 = SNA
    1 = ISO

This digit identifies what type of diagnostic codes the 3174 should use for Clear Request or Reset Request packets when breaking the connection with the remote DTE.

Digit 3-8 — Reserved. Digits 3 through 8 are reserved.

Planner: You have completed the X.25 Options Worksheet.

* *If you filled out "Worksheet 5—X.25" previously, fill out "Worksheet 14—Common SNA." (Chapter 11 contains the information needed to fill out this worksheet.) If you have already filled out Worksheet 14, return to the divider page labeled "Microcode Customization Planning." See step 4 to determine the next worksheet you need to fill out.*

* *If you filled out "Worksheet 5S—Secondary X.25" previously, return to the divider page labeled "Microcode Customization Planning." See step 5 to determine if you need to fill out worksheets for additional host attachments before continuing with the next step.*

You may also refer to the divider page labeled "Worksheet Summary" to determine where to proceed next.

Keep records of your configuration by using one of the methods described under "Customization Records" on page 5-6.

Changing the X.25 Options

If you have changes to make to the X.25 Options, refer to the following table, which explains how to fill out "Worksheet 13—X.25 Options" on page A-24.

Change in 101	Change on Worksheet
Your previous response was 101 = 3, and you did not change it.	The 332 panel that appears on the screen displays the previous responses. Enter your changed responses to the 332 panel on the worksheet.
You changed your previous response to 101 = 3.	The panel that appears on the screen displays response fields filled with Xs, underscores, and default responses. See "Filling In Worksheet 13—X.25 Options" (on page 10-5) for instructions on filling in that panel on the configuration worksheet. If you have changes to make to a previously customized 332 panel, enter your changed responses on the 332: X.25 Options panel on the configuration worksheet. Reread the description of the question. Check whether the changed response requires you to change a response to another question.

Chapter 11. Planning for Common SNA

An Overview of Common SNA

Before you start planning, you need:

- "Worksheet 14—Common SNA" on page A-26
- Information from your host system programmer about responses to questions 501, 502, 511, and 512.

The Common SNA Worksheet allows you plan your customization for CSCM and for APPN.

Before planning for CSCM, you should become familiar with the *Central Site Customizing User's Guide*, GA27-3868. Before planning for APPN, you should become familiar with Chapter 12, "Planning for APPN" on page 12-1.

If you plan to configure for CSCM and APPN, you need to ensure that your controller contains sufficient storage.

Note: CSCM and APPN are supported only on the primary host on the primary link (1A). However, the customization data and/or microcode for other host attachments can be distributed by CSCM through the primary host's attachment.

Central Site Change Management (CSCM): Central Site Change Management offers many advantages. By centrally customizing the controllers, you can reduce the errors that often occur during customization because one person and one location are doing the customizing for all the controllers in the network. If you are using the NetView Distribution Manager (NetView DM) software package, the customization data and/or microcode can be electronically distributed to the SNA Network Site Controllers and then remotely IMLed from the host. This decreases the need for trained personnel at each controller.

Advanced Peer-to-Peer Networking (APPN): The 3174 APPN feature enhances the connectivity options of the 3174 Establishment Controller and its attached workstations. It provides network node-to-network node communication over the Token-Ring and NN-to-LEN host communication using SDLC, Token-Ring, or S/370 SNA channel, and NN services for LEN ENs and APPN ENs on the Token-Ring.

The Common SNA Worksheet

Your response to question 101: Host Attachment determines whether or not you must fill out "Worksheet 14—Common SNA" (Figure 11-1). If your response to question 101 was one of the following or if you responded to question 101 with M and you are using one of the following protocols, fill out the Common SNA worksheet.

- 2−SDLC
- 3−X.25
- 5−Local SNA

- 6−X.21 Switched
- 7−Token-Ring Network.

On the worksheet, you respond to the questions that are discussed in this chapter.

Figure 11-1. An Example of Worksheet 14−Common SNA

Filling In Worksheet 14—Common SNA

Planner: *The following questions appear on "Worksheet 14—Common SNA."*
Locate "Worksheet 14—Common SNA" on page A-26. Write your responses to the
questions on the worksheet.

500: CSCM Unique

Response:

    0 = CSCM is not in use.
    1 = CSCM is in use as a Network Site Controller.
    2 = CSCM is in use as a Central Site Controller.

The default is 0.

Note: A response of 2 is not valid for 3174 models using the 3270 Gateway feature.

If you:

- Do not want to use CSCM, leave this question set to its default.

- Wish to use CSCM and the controller you are planning the customization for is a Network Site Controller, respond with 1.

- Wish to use CSCM and the controller you are planning the customization for is the Central Site Controller, respond with 2.

- Respond to this question with a 1 or 2, you must respond to questions 501: Network ID and 502: LUNAME.

501: Network ID (NETID)

This name is used in an SNA network and an APPN network to uniquely identify a SNA or APPN Network. It identifies the network of the controller you are planning to customize, and distinguishes that network from the other networks.

The Network ID name should be unique to all CPNAMES, LUNAMES, and Serving NN names on the Network Resources worksheet and the Associated LUs worksheet. Provide the same response to this question for each controller within a given network. If your response to question 510 = 1, this name must be unique to both questions 511 and 512.

Response: Up to 8 alphanumeric characters (first character must be alphabetic and no blanks/spaces between characters are allowed). See the following example.

```
┌── Example ─────────────────────────────────────────────────┐
│    NETCONTA (valid)                                         │
│    NW CONTA (invalid)                                       │
└────────────────────────────────────────────────────────────┘
```

This response is required if question 500 = 1 or 2, or if question 510 = 1.

The name specified should be obtained from or coordinated with the host system programmer.

502: Logical Unit Name (LUNAME)

The LUNAME identifies a controller that is using change management. Specify a unique name for each controller within a given network. If the LUNAME is the same as the CPNAME in question 511 and question 510=1, then the LU for CSCM is considered to be an independent LU. The LU for CSCM is considered to be a dependent LU if question 510=0, or if the names in questions 502 and 511 do not match.

Response: Up to 8 alphanumeric characters (first character must be alphabetic and no blanks/spaces between characters are allowed). See the following example.

```
┌─── Example ──────────────────────────────────────────────────┐
│     NETWKLU6 (valid)                                          │
│     LU6 NETW (invalid)                                        │
└──────────────────────────────────────────────────────────────┘
```

The default is blanks.

The name specified should be obtained from or coordinated with the host system programmer.

510: APPN Network Controller

Response:

0 = APPN is not active (this controller does not participate in APPN)
1 = APPN is active on this controller.

The default is 0. This indicates that APPN operational code is not activated. If question 510=1 and no further APPN customization is performed, a minimum APPN configuration is available along with the IBM supplied default Class of Service (COS) definitions.

When question 242 = 1, question 510 must also be a 1 (for channel-attached models) and your responses to questions 501, 511, and 512 must be unique.

Planner: If you wish to have a higher level of APPN support than the minimum, you must plan for APPN. Refer to "APPN Customization Planning" on page 12-40 for the information you need.

511: APPN Control Point Name (CPNAME)

This name is used as the Control Point name for the 3174 APPN node and identifies the node to the network. This is a required field if customizing for APPN.

The CPNAME must be unique to NETID and VNODE (Virtual Node Name), as well as to other resources in the network.

Response: Up to 8 alphanumeric characters (first character must be alphabetic and no blanks/spaces between characters are allowed). See the following example.

```
┌─── Example ──────────────────────────────────────────────────┐
│     G8644A (valid)                                            │
│     G864 4A (invalid)                                         │
│                                                              │
└──────────────────────────────────────────────────────────────┘
```

A response is required if question 510 = 1.

The name specified should be obtained from or coordinated with the host system programmer.

512: APPN Virtual Node Name (VNODE)

This name is the Virtual Node name for the Token-Ring Network to which this NN is attached.

This is a required field if customizing for APPN.

The VNODE name must be unique to NETID and CPNAME, as well as to other resources in the network. It must also be unique to all CPNAMES, LUNAMES and Serving NN names on the Network Resources worksheet and the Associated LUs worksheet. All APPN nodes using the Token-Ring network as an APPN connection network should have the same VNODE name.

Response: Up to 8 alphanumeric characters (first character must be alphabetic and no blanks/spaces between characters are allowed).

The name specified should be obtained from or coordinated with the host system programmer.

Planner: *You have completed "Worksheet 14—Common SNA."*

Return to the divider page labeled "Microcode Customization Planning." Refer to the step that instructed you to fill out Worksheet 14 to determine if there are additional worksheets that you need to fill out before continuing with the next step. You may also refer to the divider page labeled "Worksheet Summary" to determine where to proceed next.

Keep records of your configuration by using one of the methods described under "Customization Records" on page 5-6.

Chapter 12. Planning for APPN

The 3174 APPN Network Node Feature

The purpose of the 3174 APPN Network Node is to provide a system that is easy to use, has decentralized network control but centralized network management, allows for dynamic topologies, has connection flexibility and continuous operation, and requires no specialized communication hardware.

In addition to Token-Ring attached end nodes (ENs) or low-entry networking end nodes (LENs), intelligent workstations can attach to the 3174 terminal adapter (HG 26 and HG 27) ports as LEN ENs. The 3174 NN function allows the LEN EN to obtain network node services from the 3174. The LEN EN can then have concurrent parallel sessions. This support is known as 3174 Peer Communication. Refer to Chapter 13, "Planning for 3174 Peer Communication" on page 13-1 for additional information.

Independent logical units are able to communicate to multiple destinations with a single definition by the best route. APPN with independent LUs eliminates the need to define multiple PUs and LUs and/or use the host for cross-domain routing. A single control point can have multiple links to NNs or ENs.

With APPN, network system definition is reduced since routes are not predefined. Sessions can be re-established if another path is available by using dynamic routing. Nodes can be added or deleted without recustomizing since an EN registers it's resources with the 3174 NN (known as dynamic resource registration). 3174 NNs allow all LU 6.2 traffic to flow on a single link. Therefore, multiple subchannel addresses or multi-drop links are not needed for T2.1 traffic.

Dynamic route selection is done by using information about the network's topology and the desired class of service (COS) which is discussed in "An Overview of Class of Service" on page 12-32.

The following are additional benefits of APPN:

- Ease of Use—APPN minimizes the requirement for coordinated system definition; network resources such as LUs and links are defined only at the node where they are located. APPN distributes information about these resources through the network dynamically, as needed. For example, if the node containing a specified session partner is connected to an APPN network, a distributed directory search will find it.

- Reliability—in an APPN network there is no single point of failure. The network's topology is replicated throughout the network, as is the route computation function. APPN nodes have the capacity to compute both parallel and disjoint routes through the network, as well as distributing traffic load and minimizing the effects of link outages by computing routes around them.

- Self-tuning—APPN is able to adjust data flows and message sizes without system programmer intervention.

APPN enhancements extend the T2.1 support to provide automatic network topology and directory support within APPN networks that simplifies network definition and permits dynamic selection of network routes. The advanced functions of APPN are:

- Distributed directory searches: Determines by a network search (among network nodes) the current node location of any remote logical unit (LU) requested by local session services, which knows the LU only by name. This alleviates the requirement to manually define routing or location information for every remote LU with which a local LU in a node may establish a session.

- Topology and route selection services: Selects the best route (nodes and links) to use to access the remote LU, based on a set of user-specified criteria. Using the properties of the nodes and links in the network that are maintained in a local topology database, the best route from the local control point to the remote control point is calculated at a network node server according to the class of service selected by the LU initiating the session.

- Adaptive pacing and transmission priority: Allows the transport network to adjust the flow of session traffic and allow more important traffic to bypass less important traffic at queuing points in the transport network. While establishing the session, the transport network assigns the transmission priority to be used for the message units that will flow on the session and allocates buffers according to a user-specified class of service and the existing system capabilities.

- Intermediate session routing: Allows session traffic to be routed through a network node for sessions that neither originate nor end at that node.

APPN and APPC

The APPN architecture has been designed to work very closely with IBM's logical unit 6.2 (also known as Advanced Program-to-Program Communications, or APPC). APPC provides a standard set of functions required for all kinds of connectivity requirements, including program-to-program, program-to-device, and device-to-device communication. APPN uses and enables APPC.

APPN's system of network control and configuration uses LU 6.2 sessions to exchange messages and network information between nodes; APPN enables APPC because APPN protocols accommodate more fully the notion of communication between peer devices from which APPC is derived—particularly in their application to distributed processing environments, such as Token-Rings.

APPN Terminology

The following terms are used throughout this chapter:

Adjacent Node

An adjacent node is a node that is either directly attached or logically attached using a Connection Network.

APPN End Node (EN)

A type 2.1 (T2.1) node supports sessions between its own control point (CP) and the CP in an adjacent network node, to dynamically register its resources with the adjacent CP, to send and receive directory search requests, and to obtain network services and management services.

APPN Network Node (NN)

A T2.1 node that in addition to offering full SNA end-user services, also provides intermediate routing services within a T2.1 network, and network services to its local LUs and attached T2.1 end nodes in its domain; it can also attach to a subarea network as a peripheral node.

Class-of Service (COS)

A designation of the transport network characteristics, such as route, security, transmission priority, and bandwidth. The class of service is derived from a mode name specified by the initiator of a session.

Connection Network

A representation within an APPN network of a shared-access transport facility, such as a Token-Ring that reduces the system-customization burden of each APPN node attached to the facility. Each such node may represent its connectivity to the other, real nodes on the facility generically, by a single, virtual routing node, which each reports to its network node server in the APPN network.

Control Point

A component of a node that manages resources of that node and optionally provides services to other nodes in the network.

CP-CP Sessions

The parallel sessions between two control points, using LU 6.2 protocols and a mode name of CPSVCMSG, on which network services requests and replies are exchanged. Each CP of a given pair has one contention-winner session and one contention-loser session with the other.

Intermediate Network Node

An intermediate network node is one that is 'in between' at least two other nodes in a network. Some intermediate nodes in an APPN network are capable of

performing intermediate session routing; these nodes are called Network Nodes.

Logical Unit (LU)

In SNA, a port through which an end user accesses the SNA network in order to communicate with another end user and through which the end user accesses the functions provided by system services control points (SSCPs). An LU can support at least two sessions, one with an SSCP and one with another LU, and may be capable of supporting many sessions with other logical units.

Low-Entry Networking (LEN) End Node

A type 2.1 (T2.1) end node that provides SNA end-user services, attaches directly to other T2.1 nodes using peer protocols, and derives network services implicitly from an adjacent network node when attached to an APPN network without a session between its local control point (CP) and another CP; it can also attach to a subarea network as a peripheral node.

Mode Name

The name used by the initiator of a session to designate the characteristics desired for the session, such as traffic pacing values, message-length limits, sync point and cryptography options, and the class of service within the transport network.

Node

Any device, attached to a network, that transmits and/or receives data. An endpoint of a link, or a junction common to two or more links in a network. In a network, a point where one or more functional units interconnect transmission lines.

Peripheral Node

A peripheral node is either a type 2.0 (T2.0) or type 2.1 (T2.1). Peripheral nodes are typically devices such as distributed processors, establishment controllers (such as the 3174), or workstations. A type 2.1 node differs from a type 2.0 node primarily by its ability to communicate directly with another type 2.1 node without the assistance of another node. A T2.0 node requires the assistance of a system service control point (SSCP) node in order to communicate with any other node.

System Services Control Point (SSCP)

In SNA, the focal point within an SNA network for managing the configuration, coordinating network operator and problem determination requests, and providing directory support and other session services for end users of the network. Multiple SSCPs, cooperating as peers, can divide the network into domains of control, with each SSCP having a hierarchical control relationship to the physical units (PUs) and logical units (LUs) within its domain.

T2.1 Node

A T2.1 node provides support to allow it to participate in a peer-to-peer network. Type 2.1 support (T2.1 without APPN) is also called low entry networking. (T2.1 was referred to in SNA as PU2.1.) Types of T2.1 nodes are:

- Network Node (NN)
- End Node (EN)
- Low-Entry Networking (LEN) End Nodes.

Topology Database

The representation of the current topology of the intermediate routing portion of the APPN network. The network topology database contains entries for network nodes and the transmission groups (TGs) interconnecting them. Each entry describes the current characteristics of the node or TG that it represents.

Transmission Group

A group of links between adjacent subarea nodes appearing as a single logical link for routing of messages. A transmission group may consist of one or more SDLC links (parallel links) or of a single System/370 channel. In APPN, transmission group is synonymous with link.

Virtual Routing Node

A representation of an end node's connectivity to a connection network defined on a shared-access transport facility, such as a Token-Ring.

Names in SNA Networks

In all SNA networks, names identify both network resources and the networks themselves. Names fall into three categories:

- Network identifiers
- Network names
- Network-qualified names.

Network Identifiers

A network identifier (network ID) is an 8-character alphanumeric name that uniquely identifies a network. Within an APPN network, all network nodes share a common network ID. A unique network ID is assigned during APPN customization in your response to "501: Network ID (NETID)" on page 11-5.

Network Names

A network name is an 8-character alphanumeric symbolic resource identifier. Each network resource, such as control point and logical unit, in an SNA network can have a network name. Network names eliminate the need for application programs, network operators, and workstation operators to know the locations of different resources within the network.

Network-Qualified Names

A network-qualified name identifies both a resource and the network in which the resource is located. It is a concatenation of the network ID and the network name of the resource.

A control point name is a network-qualified name of a control point, consisting of a network ID qualifier identifying the network (or name space) to which the CP's node belongs, and a unique name within the scope of that network ID identifying the CP. Each T2.1 node has one CP name assigned to it during system definition. Assigning network control point names is done during 3174 customizing in your response to "511: APPN Control Point Name (CPNAME)" on page 11-7. For example, a network ID name of USA and a control point (CP) name of RALEIGH would be concatenated to become USA.RALEIGH. The period (.) along with the two names is what is referred to as concatenation. Your responses to questions 501 and 511 are used in determining this name. BIND requests for LU 6.2 sessions specify network-qualified names.

Node and LU Types

A LEN or APPN end node can be configured in the following ways:

* Attached to an APPN network node to gain access to the APPN network to which the network node provides entry.

* Attach to a subarea network through a boundary node. Attachment to a boundary node permits an APPN node to establish LU-LU sessions through the subarea network with LUs in subarea nodes or in other APPN nodes attached to boundary nodes.

In a T2.1 network, any node can control the establishment and ending of sessions and application program transactions without depending on a controlling host system.

Two types of T2.1 nodes are:

* LEN End Nodes and End Nodes
* Network Nodes.

LEN End Nodes

A LEN end node is a node that implements the basic T2.1 end node protocols without the APPN enhancements obtained through CP-CP sessions. In a LEN end node, all potential connections with remote LUs are predefined by customization. The system customization specifies an LU name, the CP name of the adjacent node through which the LU can be accessed, and identification of the link directly attaching the LEN end node to that adjacent node. A LEN end node uses the advanced functions of APPN by predefining potential connections with remote LUs as if they existed at an adjacent network node. This network node, in turn, can automatically act as the LEN end node's network node server and locate the actual destination of the LU and select the best route to it.

End Nodes

An APPN end node operates in a peer environment for LU-LU sessions (using LU 6.2 protocols) while providing additional APPN functions. An APPN end node provides APPN functions such as limited directory services and topology and route selection services to end users at its own node. It may participate in the APPN network by using the services of an attached network node server for session requests that involve nodes not directly connected; it does this by exchanging requests and replies for directory services with an adjacent network node (its server) using CP-CP sessions.

APPN end nodes also can register their local LUs with their network node server. This alleviates the network operator at the network node server from having to pre-define the LU names for the LUs in all the attached end nodes for which the network node provides services. For services provided by network nodes, refer to "3174 Network Node Services" on page 12-12.

An APPN end node can be attached to multiple network nodes, but may have CP-CP sessions active with only one network node at a time; the others may be back-up servers. Attachment of multiple network nodes allows the network node server to be changed, for example, for back-up purposes. CP-CP sessions are never established by an APPN end node to other directly attached end nodes.

Network Nodes

An APPN network node supports its own end users. It also provides directory, route selection, and management services to end nodes, and performs intermediate routing of data on sessions that travel across it. An APPN network node performs distributed searches of the network to locate remote LUs and calculates the best route from origin node to destination node based on user-specified criteria.

A network node server refers to the role of a network node in acting as the network entry point for specific end nodes attached to it; these end nodes are defined as being in its domain. For example, all directory requests regarding resources (such as LUs) in these end nodes (as well as its own resources) pass through directory services in the network node server. In that way, the network nodes are able to collect and control directory information that passes into the APPN network.

An APPN network node provides the following services:

- LU-LU session services for its locally resident LUs

- Intermediate session routing

- Network server functions (to perform network directory searches and route selection) for attached APPN or LEN end nodes (as well as for its own locally resident LUs)

- Management services focal point or relay services for network problem management.

LU Types

All node types can contain logical units (LUs). The LU supports sessions with control points and with LUs in other nodes.

End users access SNA networks through logical units. A logical unit manages the exchange of data between end users, acting as an intermediary between the end

user and the network. A one-to-one relationship does not exist between end users and LUs. The number of end users that can access a network through the same LU is an implementation design option.

Before end users can communicate with one another, their respective LUs must be connected in a session. Multiple, concurrent sessions between the same two logical units are possible. When such sessions are activated, they are called parallel sessions, which are provided in LU 6.2 only.

SNA defines different kinds of logical units called LU types. LU types identify sets of SNA functions that support end-user communication. LU types supported in the 3174 are:

- LU type 1 is a session between an application program and a single terminal using an SNA character string.

- LU type 2 is for sessions between an application program and a single terminal using the 3270 data stream.

- LU type 3 is for a session between an application program and a single printer using the 3270 data stream.

- LU type 6.2 is for transaction programs communicating in a distributed environment using the SNA general data stream (GDS) or user-defined data stream.

LU types 1, 2, and 3 are dependent on an SSCP. LU 6.2 can be dependent on an SSCP in a subarea environment using PU2.0 or independent of the SSCP using T2.1. For APPN, LU 6.2 is the only independent LU type supported.

LU-LU sessions can exist only between logical units of the same LU type. For example, an LU type 2 can communicate only with another LU type 2; it cannot communicate with an LU type 3.

Network Node Functions

The network node provides the following functions:

- Control Point
- Topology and Routing Services
- Directory Services
- Intermediate Session Routing.

Each of these is summarized below. For additional information, refer to the *3174 Functional Description*.

Control Point

Control point is responsible for managing the T2.1 node and its resources. In an NN, the control point communicates with its served end node to provide services.

To perform directory services and topology and route selection services, adjacent APPN nodes throughout the APPN network use a pair of parallel CP-CP sessions to exchange network information. CP-CP sessions are two LU 6.2 sessions that are parallel. Network nodes use CP-CP sessions to keep track of the way that nodes in a network are linked and also for directory and session services.

Topology and Routing Services

In an NN, Topology and Routing Services (TRS) is responsible for creating and maintaining the class of service (COS) database and a copy of the network topology database. The COS database contains an entry for each COS defined at the node. The network topology database (TDB) contains the current topology of the intermediate routing portion of the network. The TDB contains entries for the containing network node and all transmission groups (TGs) attached to the node, and for all other NNs and their attached intermediate routing TGs.

Directory Services

A T2.1 network node provides directory services to the LUs located in it and to the LUs in the end nodes that it serves. It also assists in the directory services provided by the other network nodes in the network by responding to received directory search requests when the resource requested is found in the local directory.

Intermediate Session Routing

Intermediate session routing (ISR) in APPN is a network node-only function that participates in setting up the two session stages, and is involved in certain session protocols, such as session pacing, after the session is set up. Intermediate session routing is accepting traffic on one session stage and passing it to another. Since each session stage varies in RU sizes, flow control, and required outage notification, ISR is responsible for such functions as segmenting and supporting adaptive session pacing.

3174 Network Node Services

3174 network nodes provide, not only 3174 NN services to other NNs, but also a number of APPN functions for end nodes and low entry networking nodes in order to enable them to participate in an APPN network.

The following 3174 network node services are summarized below:

- Link activation
- Network node server
- Wildcard routing.

For additional information on network node services, see the *3174 Functional Description*.

Link Activation

The activation of APPN networks is arbitrary in nature. APPN nodes become active network components by the decisions of their local operators to join the network.

Control points (CPs) activate, control, and deactivate links through the link stations (data link control elements) in the node. To activate a link, configuration services in the CP causes data link control to issue link-level commands to the link station for that link. Once a link between adjacent nodes is activated, that link can carry session traffic.

Network Node Server

A network node that provides APPN functions for an EN or LEN end node is called a network node server for that node. The 3174 regards all ENs as authorized. An NN that is a server for a node performs routing and directory services for that node.

APPN End Node Support: The functions performed by a network node server for an EN with a CP-CP session capability are:

- T2.1 link connection—Once a T2.1 link connection is established, the EN can use this link to transport multiple, parallel, LU 6.2 session traffic for independent LUs.

- CP-CP Sessions—To perform services for APPN ENs, the control points activate CP-CP sessions between themselves. Depending on the capability of the EN to support parallel sessions, one or two sessions using LU 6.2 protocols are requested. Once established, capabilities of the control points are exchanged.

- Resource Registration—In order for a network node to provide service to end nodes within its domain and respond to search requests from other NNs, a server must know the resources of the end node. To avoid querying each EN for a destination LU, an EN registers its resources with its serving NN. The NN stores this information in the local portion of its directory.

- Directory services and preferred route selection.

  An NN server will perform directory searches in order to locate a remote LU name specified by an adjacent EN. An EN with a CP-CP session to an NN server need not manually configure any remote locations with which it may require a session.

- Network Problem Management is performed by an EN sending alerts to its NN server. The NN server then forwards EN alerts to a focal point. The NN server

exchanges management services capabilities with an EN and identifies a focal point.

LEN End Node Support: A LEN EN does not have CP-CP session capability with an NN server so there is no way of transferring certain APPN information. Therefore, a LEN EN has reduced capabilities in comparison to an EN with a CP-CP session.

The functions performed by a network node server for a LEN EN are:

- T2.1 link connection—Once a T2.1 link connection is established, a LEN node can use this link to transport multiple parallel, LU 6.2 session traffic for independent LUs.

- There are no CP-CP sessions to a LEN EN.

- The LEN EN cannot send its local LU names to the NN server. The server cannot automatically register LU names of the adjacent ENs.

  The NN server should have configured the local LUs of the LEN EN so that it can respond to the search request on behalf of the LEN EN. However, network node servers cache results of directory searches. Therefore, once a LEN EN identifies an LU (by a Bind to the NN server), then the NN server can respond to directory search requests for that LU. See "Directory Services" on page 12-11 for details.

- The LEN EN cannot send or receive a search request to locate a remote LU name. Therefore, the LEN EN must send a Bind to the NN server. When the NN receives the Bind, it will then perform directory services. Once the NN server has found the remote LU specified in the Bind, it selects the preferred route, attaches the RSCV and forwards the Bind through the network transparently to the LEN EN.

- There is no network management support for LEN end nodes.

Wildcard Routing

Wildcard routing is the ability for a 3174 Network Node to service resources that are not known explicitly in the APPN network.

Currently, VTAM/NCP subarea does not support CP-CP sessions on its T2.1 link connections and, therefore, cannot register LUNAMES or process LOCATE search requests. A wildcard option in the 3174 network node that is boundary attached to the subarea allows access to the host LUs.

When an NN server cannot locate a resource in the APPN network, it can calculate a route to the NN that indicated a wildcard response. The NN server cannot verify the LU will be found, but if the LU is located in the subarea or defined to the subarea as in another APPN network attached to the subarea, then the subarea can route the Bind/session. If the LU is not found, the Bind will fail.

There are some cautions for using wildcard routing:

- Only one node in a connected APPN network may have the wildcard option.

- Since the NN server cannot verify the LU location, caching is not done. Therefore, a broadcast search is always initiated for this resource.

- Since the route is calculated to the NN with the wildcard option, all traffic for these resources must be routed through this one node.

- The AS/400 refers to the wildcard option as *ANY Routing. If an AS/400 is in the connected APPN network with the *ANY option, then there cannot be a 3174 in the network with the wildcard option (response to question 612=1).
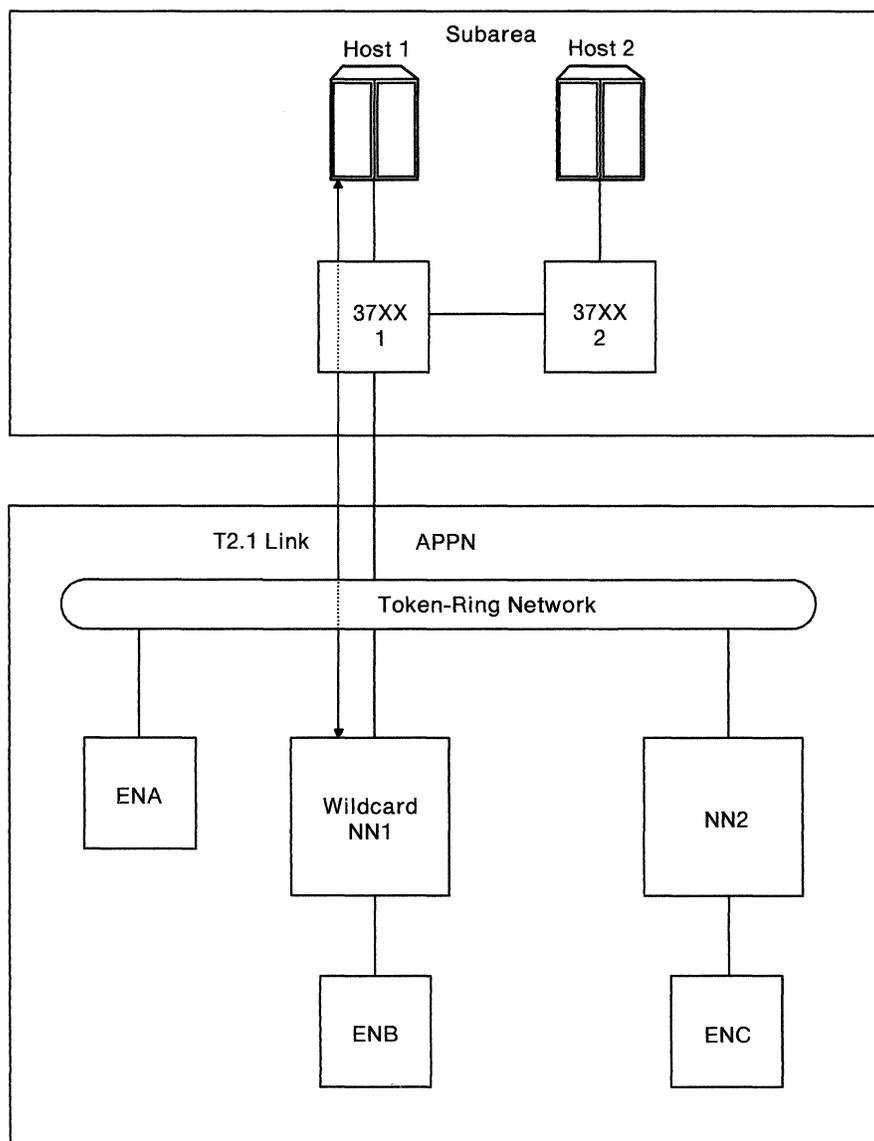

Figure 12-1. NN1 with Wildcard Entry

Figure 12-1 represents a single link from an APPN network to a subarea network—NN1 to 37XX1 to HOST 1. All LUs in the connected APPN network that desire connectivity to or through the subarea must be defined at the host on that T2.1 link between NN1 and HOST 1. To access host LUs, the following occurs:

ENC sends locate Host LU to serving NN2
NN2 does a broadcast search
NN2 receives wildcard reply from NN1
NN2 calculates a route from ENC to NN1 to Host
NN2 sends the calculated route to ENC.

Note that NN2, although also boundary attached, cannot respond because it does not contain the wildcard. In addition, all APPN—subarea traffic passes through NN1. For example, ENC traffic is routed through NN2 to NN1 to Host 1.
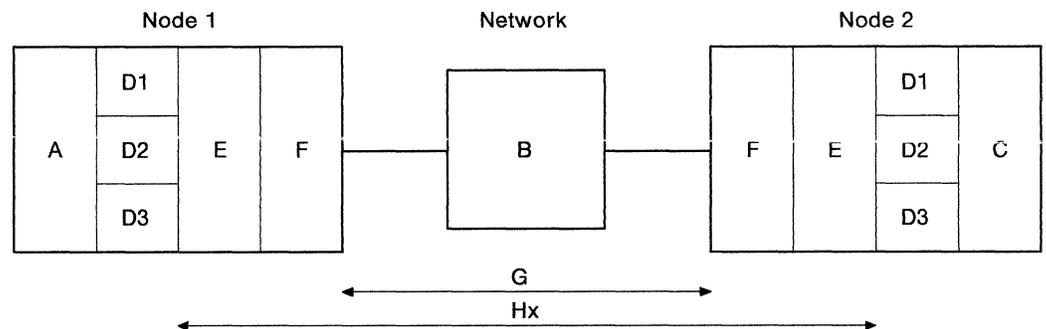
Planning Your Network

By planning your APPN Network, it will be easier to define and maintain. Although routes are not predefined, and end nodes dynamically connect into the network, a number of considerations need to be determined:

- Connectivity of Network Nodes
- NN Servers
- Host Considerations
- Gateways
- Connection Networks.

Network Operations Model

The following network operations models are an abstract representation of the user's view of the communications node and its underlying network. The models are general enough to represent all implementations by other APPN products. The purpose is to establish a common model to aid users in mapping different terminologies and clarify terms that may be encountered in other sources while planning for APPN. Figure 12-2 is for data link and represents the physical devices and data link protocols.

```
          Node 1                  Network                   Node 2
  ┌───┬──────┬───┬───┐        ┌──────────┐         ┌───┬───┬──────┬───┐
  │   │  D1  │   │   │        │          │         │   │   │  D1  │   │
  │   ├──────┤   │   │        │          │         │   │   ├──────┤   │
  │ A │  D2  │ E │ F ├────────┤    B     ├─────────┤ F │ E │  D2  │ C │
  │   ├──────┤   │   │        │          │         │   │   ├──────┤   │
  │   │  D3  │   │   │        │          │         │   │   │  D3  │   │
  └───┴──────┴───┴───┘        └──────────┘         └───┴───┴──────┴───┘
                           G
                    ◄───────────────►
                   Hx
            ◄───────────────────────────────►
```

```
Where:    A  = station            E  = port (optional)
          B  = network (optional) F  = adapter
          C  = station            G  = physical link
          Dx = link station       Hx = logical links (optional)
```

Figure 12-2. Abstract Data Link Model

Using this abstract model, we can map the different DLCs for the 3174 APPN network node.

- SDLC TP connection

    A = Primary station at host
    C = Secondary station
    D = Station address
    F = Teleprocessing communications adapter
    G = SDLC host link connection

- Channel

    A = Primary station at host
    C = Secondary station
    D = Subchannel address
    F = Channel adapter
    G = Channel host link

- Token-Ring

    B = Token-Ring Network with virtual node
    D = SAP (Service Access Point)
    E = MAC Token-Ring address
    F = Token-Ring Adapter
    G = Token-Ring media
    H = Logical link connections

Figure 12-3 is for an APPN network and represents the networking protocol and logical attributes.

Figure 12-3. APPN Network Model
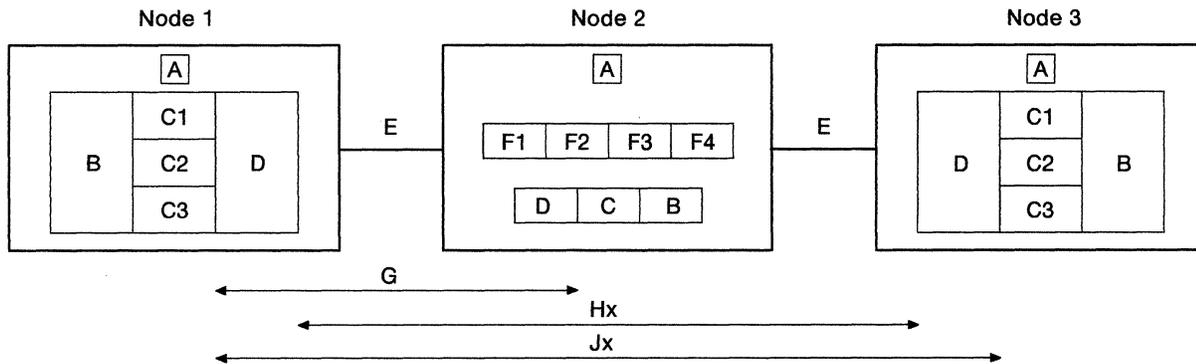
```
Where:    A  = control point
          B  = application
          Cx = transaction programs
          D  = LU 6.2
          E  = transmission groups
          Fx = session connectors for Intermediate Session Routing
          G  = CP-CP session
          Hx = LU-LU sessions
          Jx = conversations (modes)
```

Notes:

1. Node 1 can be called a local node, end node, or origin LU.

2. Node 2 can be called adjacent node, network node server, or intermediate routing node.

3. Node 3 can be called remote node, end node/LEN end node, or destination LU.

Determining Connectivity of Network Nodes

In APPN, NNs are configured along pathways interconnecting other nodes. Network nodes connect end nodes into the APPN network, since ENs are logically connected to the network through its serving NN. The topology database that is used for calculating routes is created and kept current by transmitting updates to all NNs. In addition, to locate a resource, NNs must be able to generate a broadcast through the APPN network. Therefore, in order to provide this routing and directory service, all NNs in an APPN network must be able to communicate with an adjacent NN. This does not mean that all NNs are connected with all other NNs, but a path through all NNs is required for network information to flow. The minimum number of link connections is the "number of NNs" minus one. For backup and recovery and for shorter paths and hops, additional links are desirable. Figure 12-4 illustrates an example of a minimum link network (A—B, B—D, C—D). Note that these links could be A—B, B—C, C—D as illustrated in Figure 12-5 on page 12-18. Figure 12-5 on page 12-18 also shows additional links between the NNs (A—C, D—A, B—D). For additional information about network node connectivity, refer to the *3174 Functional Description.*
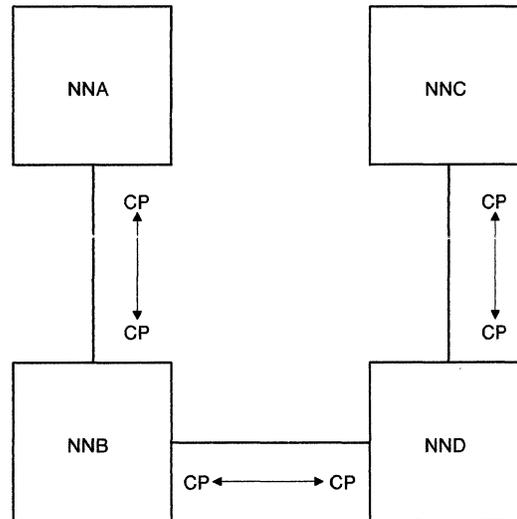
Figure 12-4. Minimal Links Example
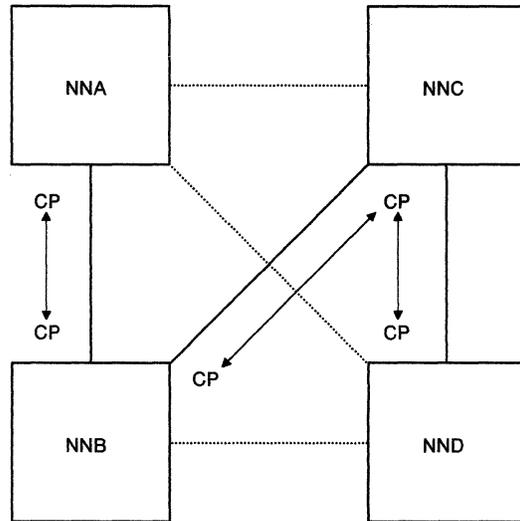
Figure 12-5. Additional Links Example

Note that CP-CP sessions between adjacent NNs are required on a minimum number of links, but not on all NN to NN connections.

For a 3174 NN, an adjacent NN(s) is defined on the Network Resources panel by specifying the CPNAME, node type of the NN, DLC type, and address.

Determining NN Services for EN and LEN End Nodes

In an APPN network, EN and LEN end nodes must have one and only one network node server. Generally, the end node will be defined with the address of its NN server. In the case of LEN end nodes, the address of the NN server will be the destination for all partner LUs as all Binds are sent to the NN server. Therefore, a network administrator needs to define to the end node or LEN end node (not to the NN server) the address of their serving NN. For backup and recovery, alternate serving NNs may be specified at the EN in the event the primary NN server is unavailable. The 3174 NN can initiate a connection to a LEN or APPN end node as its server, if specified in the Network Resources panel by CPNAME, node type, DLC type, and address. This initiation attempt is only made when the NN is activated (IMLed).
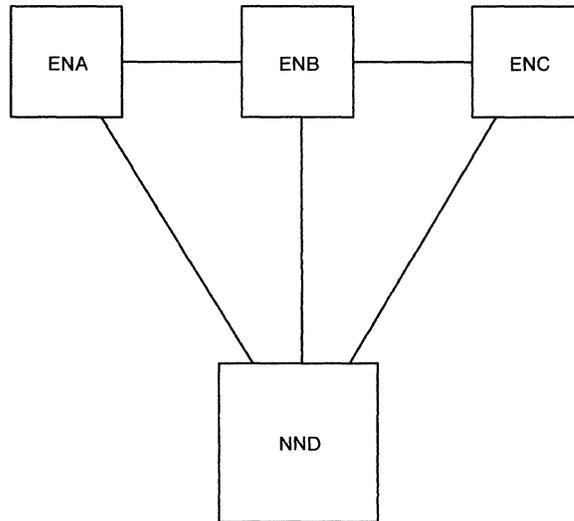
Figure 12-6. Sessions Between End nodes

To determine which nodes should be NNs, remember that ENs do not have an intermediate routing function. An EN can directly have a session to another EN without being routed through a NN, however, an EN cannot connect (hop) through another EN. Figure 12-6 illustrates that ENA can have a session with ENB directly. ENA cannot have a session through ENB to ENC as in A—B—C. ENA would be routed to NND to ENC as in A—D—C.

In assigning the NN server, the network administrator needs to consider the adjacency of the EN and NN server and the number of nodes the NN can serve. To serve an EN, CP-CP sessions are required between the EN and serving NN, and CP-CP sessions require adjacent nodes (that is no intermediate hops). Note that in connection networks, such as Token-Ring, all nodes are adjacent.

The number of nodes a NN can support is determined by the number of CP-CP sessions that can be activated at one time, the number of intermediate sessions through the NN that are active at one time, and the RU size. In addition, the activity of the network needs to be considered to determine the load on the NN to handle NN services such as search requests, topology updates, directory inquiries, and route calculations. For the 3174, the number of concurrent intermediate sessions and number of nodes/links is defined on the APPN Node Definition Panel. The maximum number of sessions is based on average RU size of 4K or less. Note that these parameters define storage usage, not performance considerations. The maximum RU size that the 3174 NN accepts is 8KB.

Host Connectivity

For a T2.1 host link connection, support for T2.1 peripheral nodes is needed in VTAM and NCP. The following release levels or later are required:

VTAM(TM) V3R2 or later for SDLC
VTAM(TM) V3R3 or later for 4361, ES/9370, or VM S/370 channel
VTAM(TM) V3R4 or later for MVS/ESA S/370 channel
NCP V4R3.1 or later for 3725
NCP V5R2.1 or V5R3 or later for 3720 or 3745
APAR #VM45562 for VTAM V3R3
APAR #VM45886 for VTAM V3R3
APAR #VM45911 for VTAM V3R3.

The 3174 must maintain a connection to a host providing an SSCP function (VTAM boundary, for example). This link to the host can be an SDLC-TP or S/370 channel, Integrated Communication Adapter (ICA), or for a Token-Ring (X3R), this attachment can be by a Gateway such as 37X5 NTRI or 3174 Token-Ring Gateway (PU2.0 pass through). This boundary attachment is required to provide locally attached dependent LUs to the 3174 and network management.

LU types 1, 2, and 3 that are used for 3270 Host applications are dependent upon an SSCP in a host (VTAM). These dependent LUs cannot be routed by APPN, therefore, they require PU2.0 functions. For the 3174 NN to maintain this support including response time monitor and network management, the T2.1 and PU2.0 traffic share the same link connection. Additionally, the 3174 requires a PU−SSCP session to NetView to provide sending of alerts, network asset management, and CSCF.

The 3174 NN requires that the host link support T2.1 and PU2.0 traffic sharing. See Figure 12-7 for an example of host shared link support. The request for this support is indicated on the XID3 (this node requires an ACTPU). Being able to share one station address allows the dependent LU traffic for locally attached devices on the 3174 NN and the independent LU 6.2 traffic from the APPN network to utilize the same link station address.
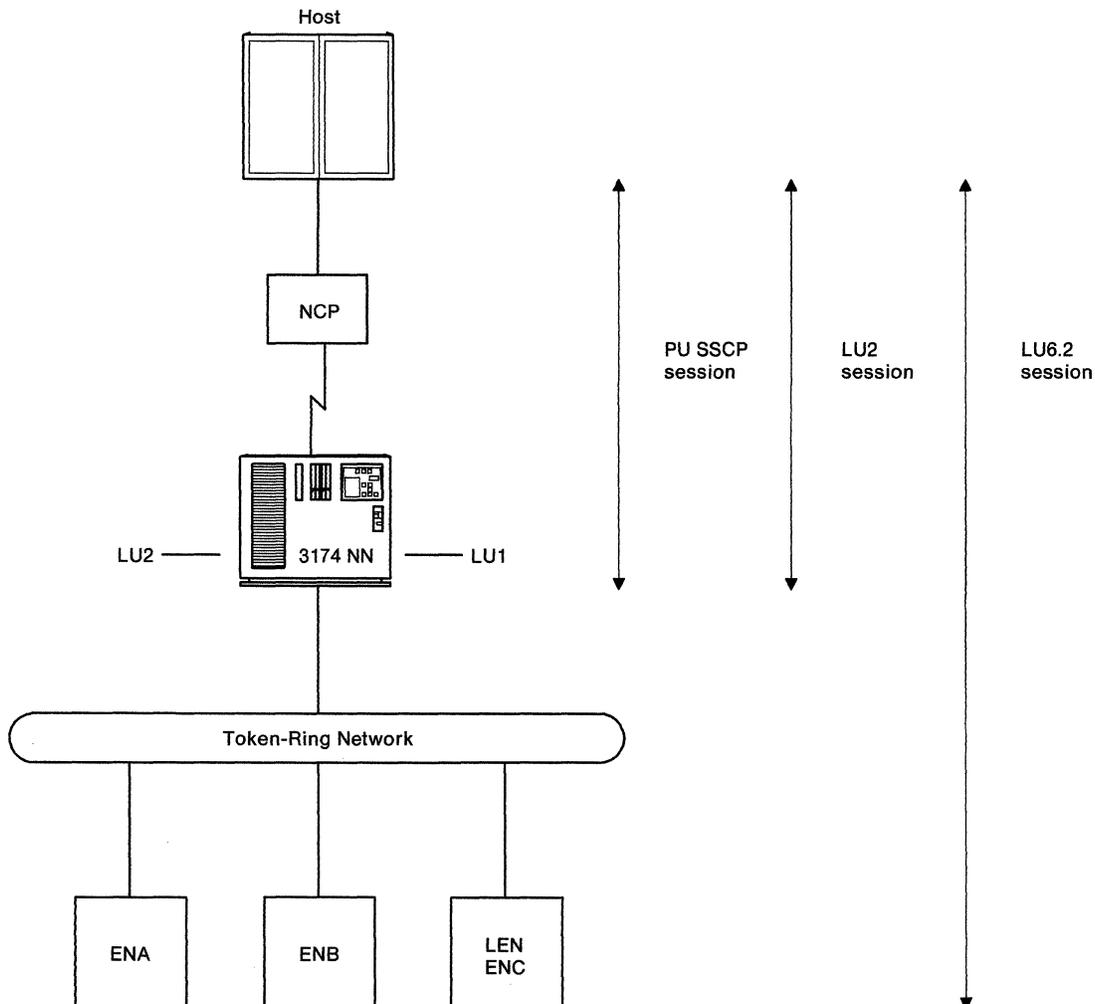

Figure 12-7. Host Shared Link Support

In the same link station address, the 3174 NN can transmit and receive LU 1, LU 2, and LU 3 data for the 3174 NN, maintain a PU – SSCP session, and transmit and receive LU 6.2 traffic for ENA or ENB to the host.

The 3174 NN only supports a single T2.1 link connection to the subarea host; that is, no parallel or multi-tail TGs. For a boundary attached 3174 NN, access to the host LUs is accomplished by the wildcard option. Refer to "Wildcard Routing" on page 12-13 for more information. Since there is only one wildcard option in a connected APPN network, only a single T2.1 link connection is permitted to the subarea. In addition, T2.1 is not supported on the CCA Adapter. If the host connection fails, the 3174 will continue to support the APPN network, but until the link is re-established, a route to the host is not available.

For link connections to 37XX, since LU 6.2 binds can exceed 256 bytes and NCP does not provide reassembly of Binds, the frame size needs to be set to 521 since LU 6.2 Binds can exceed 256 bytes. Therefore, your response to question 370 must be one (1) on the 3174 SDLC panel.

For channel attached 3174s, the host Read Channel Program size should be at least 1033 bytes. If this value is less than 1033, the 3174 will not reassemble all data I-frames. This may impact overall performance. Therefore, the host definition should reflect this recommended Read Channel Program size.

For the CSCM user with APPN, the independent LU 6.2 used for an APPN network node can also be used for the CSCM session with NDM since an independent LU 6.2 session allows for multiple, parallel sessions. For CSCM to use an independent LU 6.2, the same name is specified for LUNAME (question 502) and CPNAME (question 511). The independent LU definition in the host is specified by setting LOCADDR = 0 on the LU definition statement. Since host shared link support allows dependent LU traffic on the T2.1 link, the CSCM LU 6.2 can remain as a single session, dependent LU. For a dependent LU, the LUNAME and CPNAME must not be the same. See Chapter 11, "Planning for Common SNA" on page 11-1 for additional information.

Gateway

The 3174 APPN feature can coexist with the 3174 Token-Ring Gateway feature. In fact, the 3174 provides shared link support for Token-Ring DSPUs. This capability allows a LEN or APPN end node to use a single link connection to a 3174 NN with the Token-Ring Gateway feature for transporting PU2.0 session traffic (PU—SSCP, LU—SSCP, and dependent LU session traffic) and independent LU 6.2 session traffic on the same logical link connection. The 3174 passes the PU2.0 traffic to the Gateway feature, and the Gateway feature routes the PU2.0 traffic on a predefined link to the host. The independent LU session traffic is handled by the APPN control point. Consider the following example:

Host

Host Definition:
PUA = 200 Address
LU2 = LUA
LU6.2 = LUC
PUB = 201 Address
LU2 = LUB

T2.0 ——
link

—— T2.1
link

3174NN/GW

PUNAME = PUA
LU2 = LUA

—— Shared link

Token-Ring

EN/DSPU2.0

CPNAME = CPC
LU6.2 = LUC
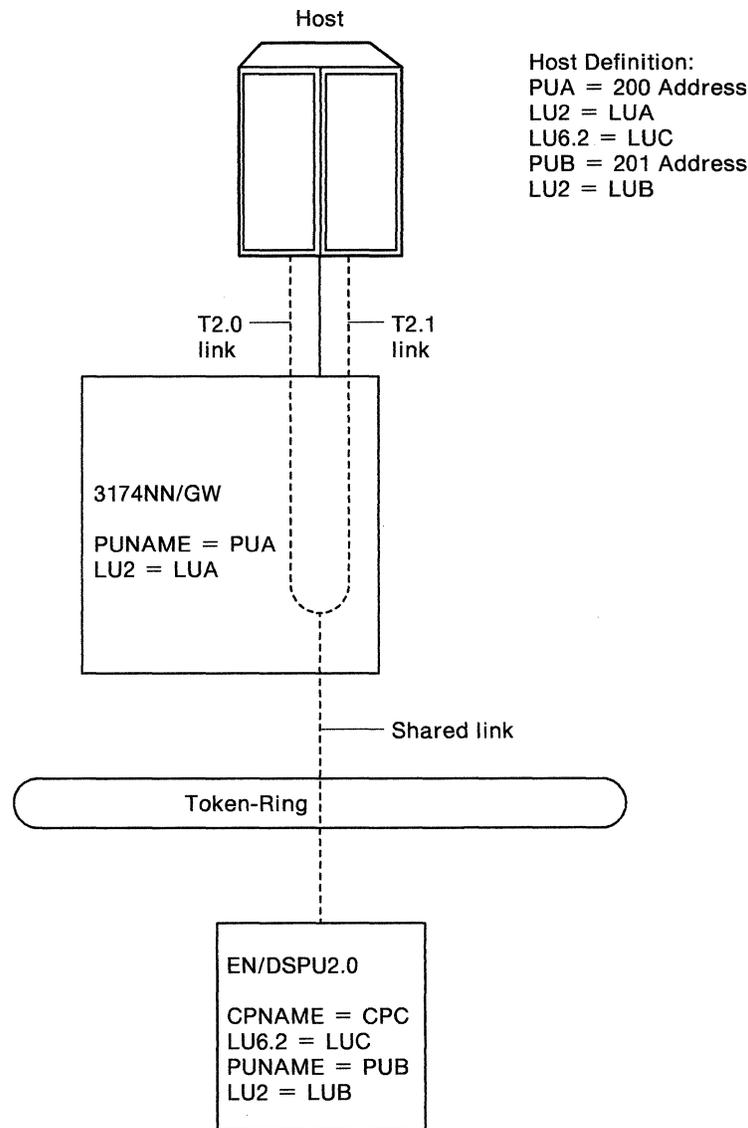PUNAME = PUB
LU2 = LUB

Figure 12-8. Network Node/Gateway Shared Link Support

Session traffic from EN/DSPU2.0 (LUC, LUB, PUB—SSCP) use a single, shared T2.1 link connection to the 3174 NN/GW. The LUB and PUB data use the predefined subchannel 201 to the host. LUA data (in 3174 NN/GW) and LUC data in EN (as well as all APPN data) use subchannel 200 to the host. The PUNAME and the CPNAME cannot be the same. Since the PUNAME is **not** specified in the 3174, no interchecking is performed.

To obtain the shared link support, the LEN or APPN end node indicates on the XID3 (link establishment command) that this node is requesting an ACTPU to be sent from the SSCP. The PU2.0 for this node must be defined to the SSCP that actually sends the ACTPU.

In addition, the 3174 NN also requires some definition. The Token-Ring Gateway feature remains unchanged. It already requires the Token-Ring address of the DSPU and the station address of the host link in your responses to questions 940 and 941. Your response to the frame size for the link (question 941) affects the T2.0 and the T2.1 session traffic. In order to obtain shared link support, the LEN or

APPN end node must be defined on the Network Resources panel indicating CPNAME, node type, DLC type, and address. If the address on the Network Resources panel matches the address on the Token-Ring Gateway panel, then link establishment attempts to set up a shared link connection. If the Token-Ring node does not indicate ACTPU requested on the XID3, or the DSPU definition is missing from the Gateway feature, then a T2.1 only link is established. If the Token-Ring node does not request a T2.1 link connection (does not send XID3), then a T2.0 only link is established.

Once the link is established as 2.0 only or 2.1 only, the link must be deactivated and reactivated to change link type. If the link connection is T2.0 only, the 3174 NN/GW cannot dynamically establish a T2.1 link for independent LU 6.2 session data because this would require the existing T2.0 link to be disconnected. Therefore, if T2.1 traffic is to be routed to (EN) or through (NN), a node with dependent LUs, then it is recommended that a shared link be defined for initial link establishment.

For dynamic links that are T2.1 only, if the session count reaches zero, the link is deactivated and reactivated when a route is required. On a shared link, the link is **not** deactivated when the independent LU session count reaches zero, so that the PU2.0 session traffic can continue. However, if a host operator issues a deactivate PU, the shared link is deactivated making it unavailable for T2.1, independent LU session traffic as well.

Note that the total number of T2.0 only, shared, and T2.1 only links cannot exceed the limitations of the Token-Ring Adapter. That is, the maximum for 16/4Mbps Token-Ring Adapter is 250, for 4Mbps Token-Ring Adapter is 140, and for 8KB RU size is 100.

Token-Ring Host Attachment

3174 models with Token-Ring host attachment can take advantage of the host shared link support also. As shown in Figure 12-9 on page 12-24, the 3174 NN (3) has a single, shared T2.1 link connection to NCP (2) or Token-Ring Gateway (2) which supports a PU—SSCP session, LU 2 sessions, and LU 6.2 sessions from LEN end nodes. The figure indicates a LU 6.2 session from a LEN end node attached by coax using 3174-Peer. The Token-Ring link characteristics (frame size and window size) specified on "Worksheet 47—Ring Transmission Definition" on page A-62 are used by the GW/NN (2) when negotiating the shared T2.1 link to 3174 NN (3). Therefore, dependent LU and independent LU 6.2 session characteristics need to be considered when defining the Token-Ring Gateway.
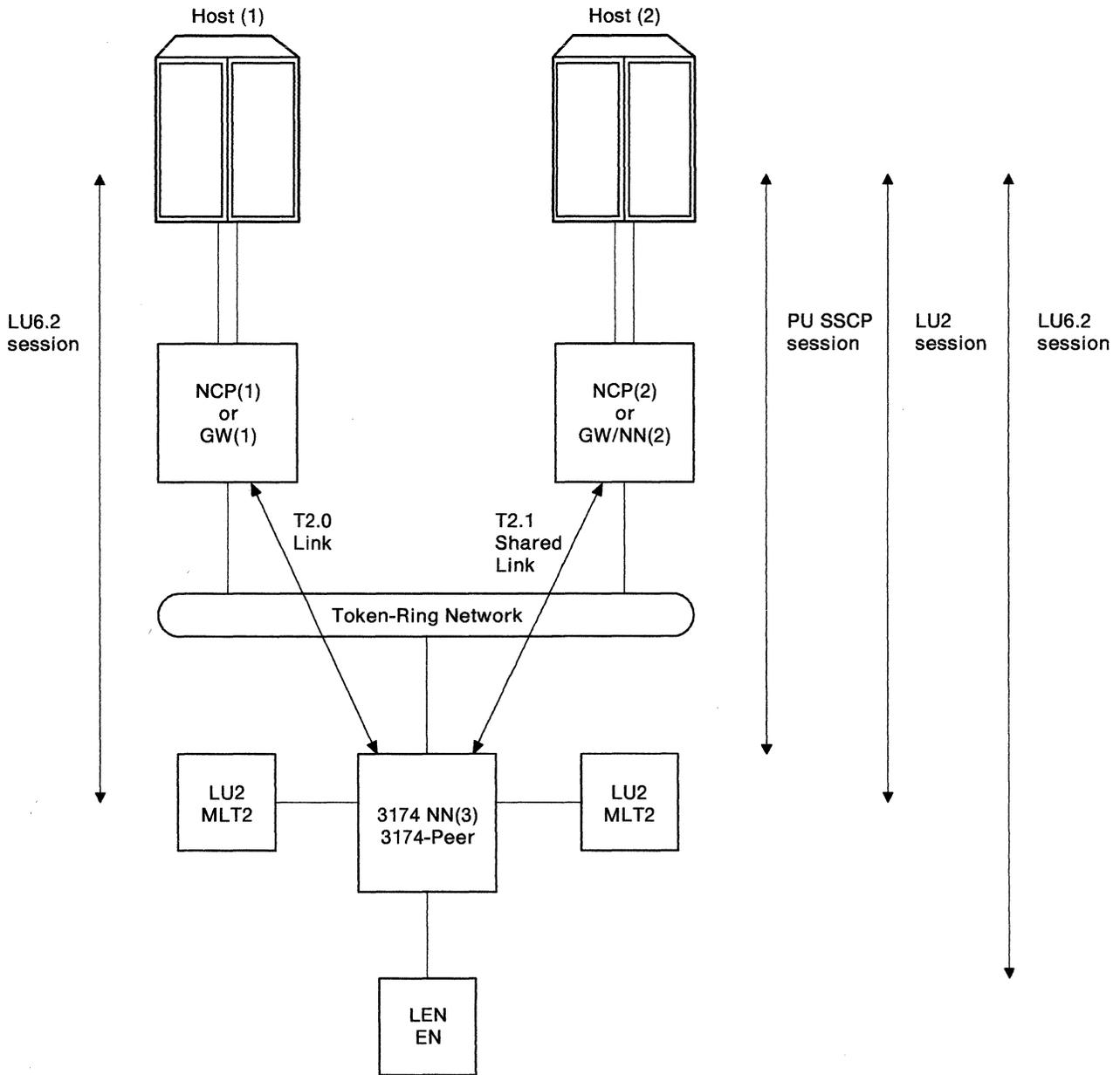
Figure 12-9. Example of Token-Ring Host Connectivity

As shown in Figure 12-9, in addition to the T2.1 link to NCP (2) or GW/NN (2), the 3174 NN (3) with Single-Link Multi-Host Support can concurrently support T2.0 link connections to multiple hosts by NCP (1) or 3174 Token-Ring Gateway(1). The T2.1 shared link must be the primary host link and use a SAP ID of 04. Note that by using different SAP IDs to indicate routing to a specific host, GW (1) and GW (2) could be a single controller. See Appendix E, "Examples of Using Service Access Points for Single Link Multi-Host Support" on page E-1 for details.

Connection Networks

A shared-access transport facility, such as Token-Ring, allows connectivity between any pair of link stations attaching to the facility. A Connection Network provides a means of defining attachments over a shared access transport facility without having to define (at each node) all the nodes it can reach over the facility, as well as all DLC signaling information needed to do so. Instead, full attachment can be defined by specifying the node as having a connection to a virtual routing node. Any node defined as having a connection to a virtual routing node is assumed to have connectivity with all other nodes having a connection to that virtual node. Using a virtual routing node to represent a Token-Ring network reduces system definition and topology update traffic. Virtual Node name is specified in your response to question 512, on the Common SNA panel.

Connection networks offer an advantage to APPN end nodes. Since an EN reports its connection to a virtual routing node (along with DLC signaling information), to its NN server, the NN server can calculate a direct route to the target node on the same connection network, bypassing the network node server of the target node.

3174 APPN Configurations

The 3174 APPN feature provides network node services for APPN end nodes and LEN end nodes and T2.1 link connection to a LEN S/370 host in the subarea. The following are APPN feature requirements:

1. Configuration Support C, Release 1 which requires:

   a. 3M minimal storage
   b. Two 2.4 diskette drives or one 2.4 diskette drive and hardfile.

2. Diskettes:

   a. Control
   b. Control Extension
   c. APPN feature
   d. Utility.

3. Sufficient storage for configurations

4. Token-Ring Adapter

5. PU2.0 and boundary attachment (or by Gateway) to an SSCP.

Table 12-1 on page 12-26 lists functions and the level of support in the 3174 APPN network node. This table can be read by finding a function in the left-hand column and looking at the corresponding right-hand column to determine if or how that function is supported in a 3174 NN.

Table 12-1. Functions and Level of Support in the 3174 APPN NN

Function	3174 APPN NN
T2.1 Attachments	
Token-Ring to Host	Models 3R, 13R, 23R, 53R, 61R, 62R, 63R
TP—SDLC to Host	Models 1R, 2R, 11R, 12R, 21R, 51R, 61R, 62R
S/370 Channel to Host	Models 1L, 11L, 21L
ESCON Channel	Not supported
Switched X.25 or X.21	Not supported, can coexist on CCA
SDLC to another 3174	Not supported
Token-Ring Nodes	Supported
APPN EN	AS/400, Networking Services/2, DPPX/370
LEN EN	AS/400, Networking Services/2, APPC/PC, DPPX/370
NN	3174, AS400, Networking Services/2, DPPX/370
ISDN	Not supported, T2.0 only, can coexist
3174 Peer LEN End Nodes	Requires Peer Communication feature including Bridge
APPN Functions	
NN Base Functions	Yes
CPNAME = LUNAME	Yes
Connection Network	Yes
BIND Segment and Reassembly	Yes
BIND Pacing (Independent LUs)	Yes
Transmission Priority	Yes
Parallel TG	No
Multi-link TG	No
Wildcard Routing	Yes
Shared Link to LEN Host	Yes
Shared Link to Downstream Node on T2.1 Link	Yes
Safe Store of DS cache	Yes, if fixed disk is available
Network Operator Facility	Offline, by customizing
Routing through subarea	Yes, using wildcard option
Routing to different APPN Netids	No
Network Management	
Generic alerts	Yes
NN Receives alerts from APPN EN	Yes, by CP-CP Session
NN Sends alerts to NetView	Yes, by PU — SSCP Session
NN Receives alerts from LEN EN	None in APPN; LEN can use Gateway Function for PU—SSCP Session
Pseudo Focal Point for APPN EN	Yes
CP—Focal Point session	No
3174 Functions	
Customizing	Yes
CSCM	Added Independent LU Support
CSCU	Yes
Microcode Upgrade	Yes, Prior Configuration to C
Online Tests	Added /17 APPN Tests
CSCF by PU— SSCP	Yes
DSL Merge	Required to Merge APPN
Deconfigure	Yes
PU2.0	Required
LU 1, 2, 3	Shared Link to Host
Peer Communication	Optional, required for 3174 Peer LEN End Nodes
Token-Ring Gateway	Optional, required for Shared Link to DSPUs
Other Configuration B Functions	No Change; Can Coexist.

3174 APPN Configuration Examples

The following 3174 APPN configurations are explained:

- 3174 APPN NN without Token-Ring Gateway Feature
- Upstream Token-Ring 3174 NN
- 3174 APPN NN with Token-Ring Gateway Feature
- 3174 APPN NN with Peer Communication Including Bridge
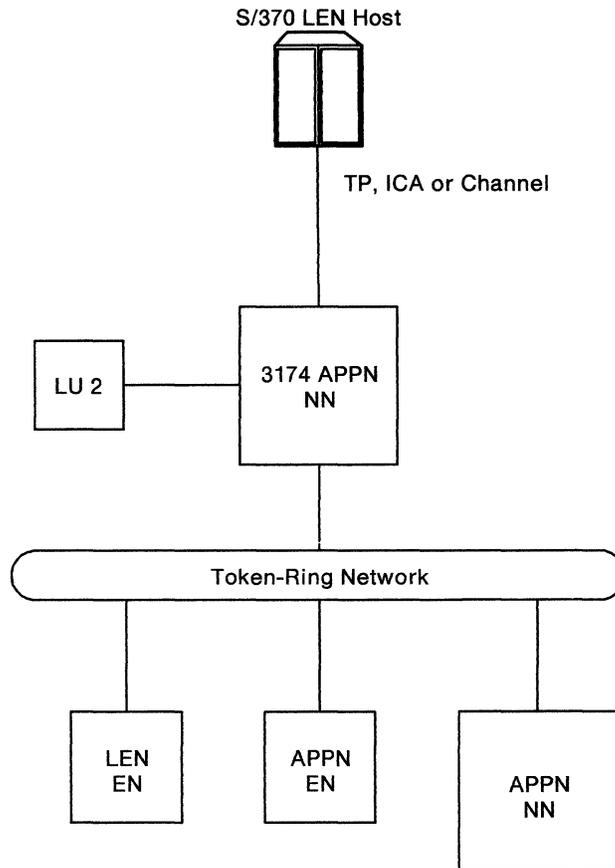- 3174 APPN NNs Routing Across Subarea.

Figure 12-10. 3174 APPN NN without Token-Ring Gateway Feature

In this example, the local LUs in the 3174 NN maintain host connectivity on the single T2.1 link connection to the host. The 3174 NN provides host connectivity for the independent LUs in the Token-Ring attached nodes, but not for the dependent LUs (PU2.0).
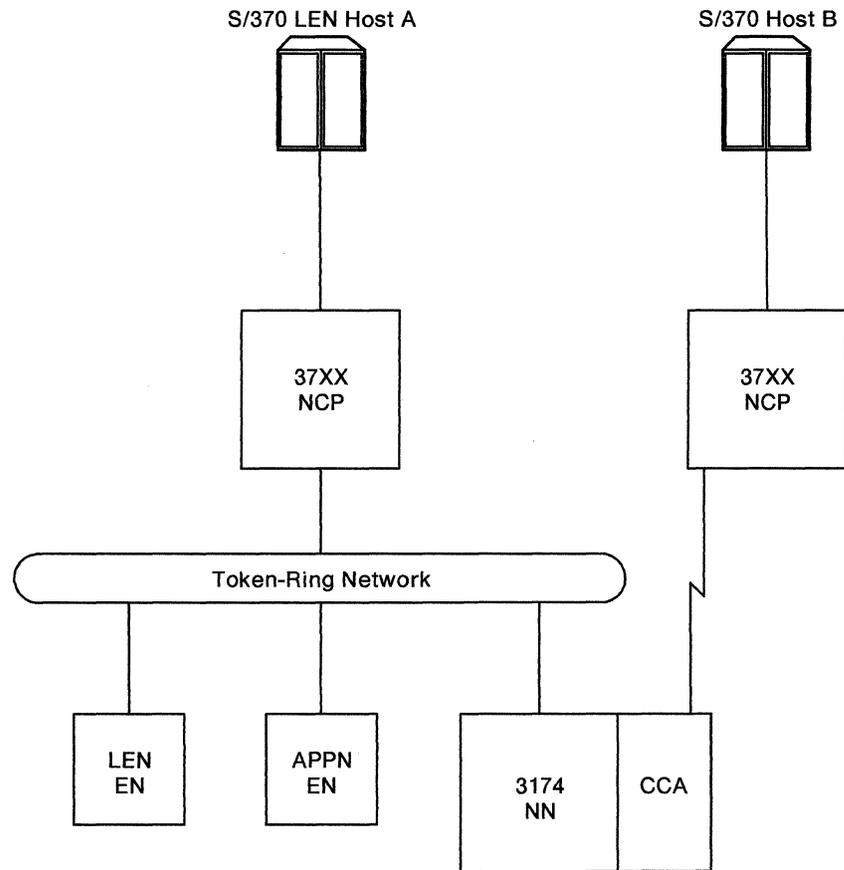
Figure 12-11. Upstream Token-Ring 3174 NN

In this example, the 3174 NN maintains a T2.1 Token-Ring link connection to the 370 Host A and a T2.0 TP link connection by the CCA to Host B. Local LU traffic in the 3174 NN can be transported to multiple hosts. The 3174 NN provides NN services to LEN or APPN ENs on the Token-Ring including routing of independent LU traffic to Host A.

S/370 LEN Host

Multiple⎯⎯⎯⎯
Station⎯⎯⎯⎯
Addresses⎯⎯⎯

3174 APPN
NN with
Gateway

Token-Ring Network

| LEN EN | 3174 NN | APPN EN | PU 2.0 |
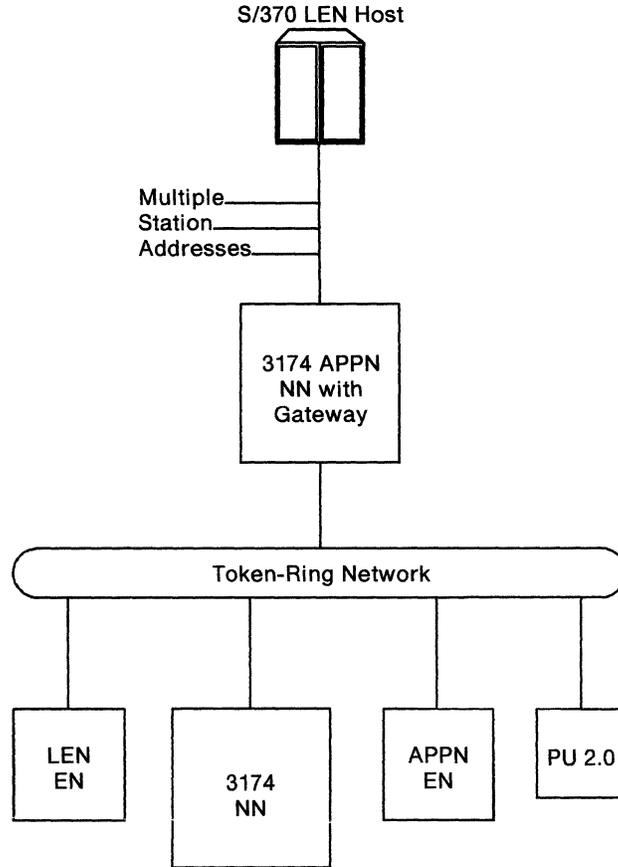
Figure 12-12. 3174 APPN NN with Token-Ring Gateway Feature

In this example, the 3174 Token-Ring Gateway Feature is added to the host attached 3174 NN allowing PU2.0 host connectivity for Token-Ring nodes. Nodes on the Token-Ring can use a single link attachment to the 3174 NN/Gateway for T2.1 independent LU traffic and dependent traffic.
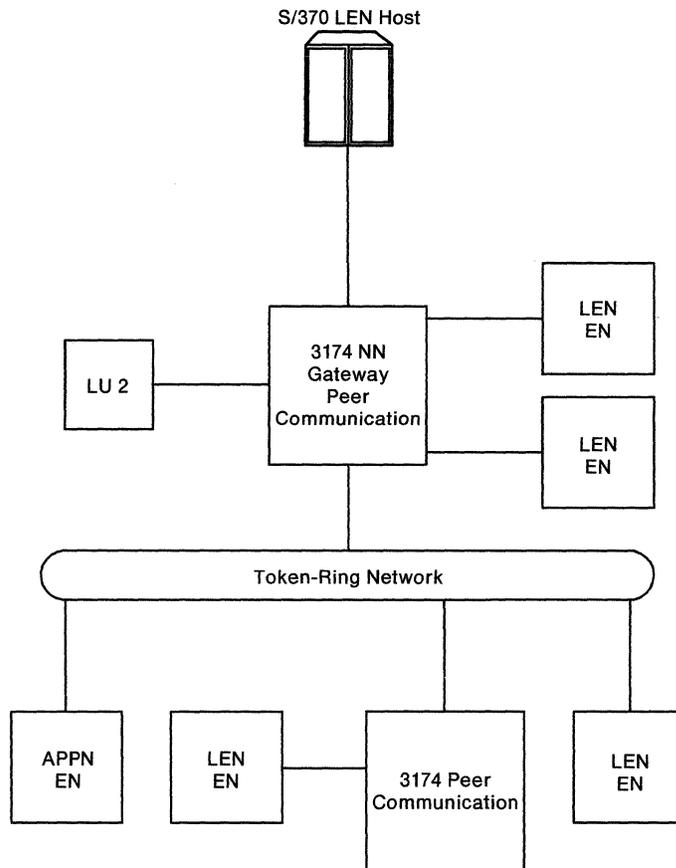
Figure 12-13. 3174 APPN NN/GW with Peer Communication including Bridge

In this example, the 3714 Peer Communication feature including the Bridge is added to the 3174s. This allows LEN ENs to be coax attached to the 3174 and communicate to any other node on the Token-Ring, or coax LEN EN on the same or different 3174, or to a S/370 host. The 3174 NN can provide NN services for these LEN ENs.
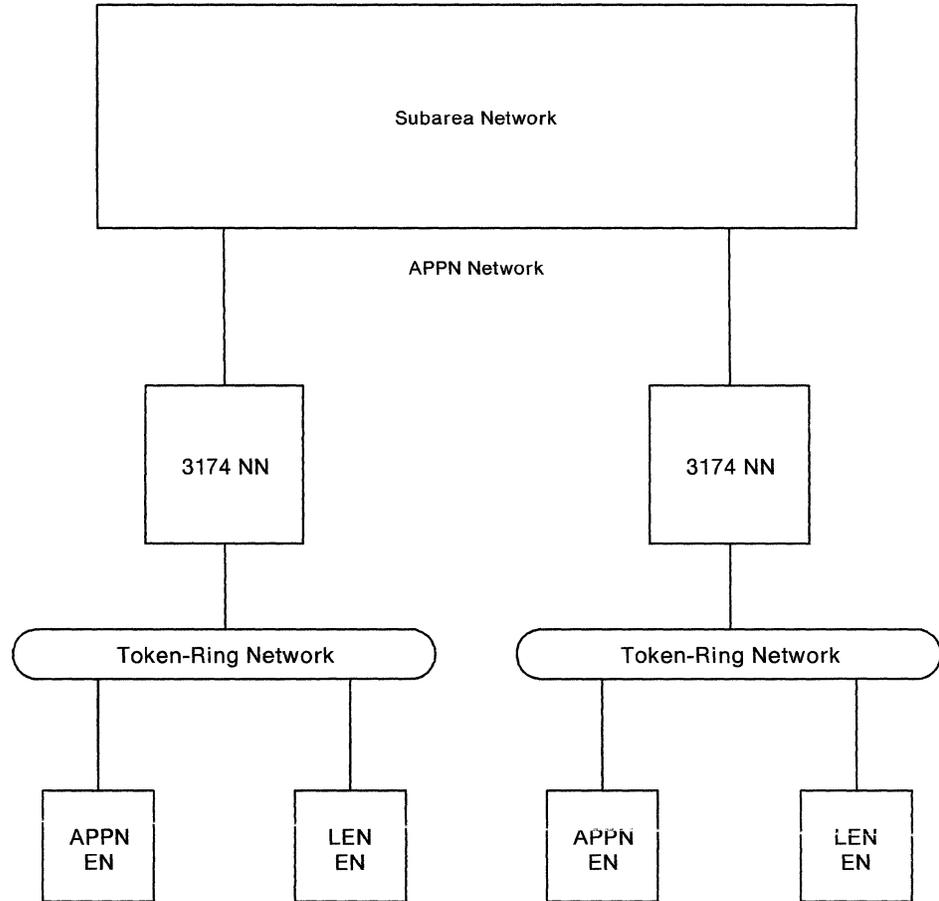
Figure 12-14. 3174 APPN NNs Routing Across Subarea

In this example, the 3174 NNs are in a disconnected APPN Network. However, independent LU traffic can be routed from one 3174 NN across the subarea network to another 3174 NN.

An Overview of Class of Service

Class of service (COS) is a means of expressing the characteristics of links (for example, priority level [high, medium, or low] assigned to the transmission groups [TGs]) and intermediate routing nodes required for routes in Advanced Peer-to-Peer Networking (APPN) when sessions are established.

Network nodes maintain information (in the topology data base) about all network nodes and links between network nodes. When a session is requested, a mode name is specified. Each mode name contains a parameter (class of service) that specifies the class of service description that will be used to calculate the route the session will take.

The ability to specify a mode name and COS table at session establishment time provides an increased amount of flexibility in terms of session characteristics and route selection. However, in many cases, such flexibility may not be required. Therefore, IBM provides seven predefined mode names and corresponding COS tables.

The COS also specifies the transmission priority that will govern the rate of data transfer after the session has been established.

A class of service consists of two parts: TG (link) characteristics and node characteristics.

- For links, the COS description is compared to the set of characteristics that are specified in "Specifying COS Characteristics" on page 12-33.

- For nodes, the COS description is compared to the route addition resistance (RAR) specified in "Node Characteristics" on page 12-37. The congestion characteristic is dynamically determined by a network node.

Network nodes get the characteristics of links to non-adjacent end nodes and low entry networking end nodes during directory services search processing. For a link to be acceptable for a given class of service, each characteristic for the link must be greater than or equal to the minimum value and less than or equal to the maximum value for the column. If a link is acceptable, it is assigned the weight associated with that column. Once every node and link between the origin and destination control points have been examined and assigned a weight, the set of links with the least weight (according to the COS selected) will be used for the session path.

Notes:

1. If a link or node has characteristics that are not within the range for any of the eight columns in a COS, that link or node cannot be used by the COS. A link or node may be unacceptable because of either its configured values or because of dynamic characteristics.

2. If there is more than one route that supplies the lowest weight between the origin and destination control points, then a route will be selected at random. There is no consideration made as to the number of nodes and transmission groups traveled.

COS Information for the Advanced User

Note: **If you are not an advanced user, you should not define your own classes of service or mode names. IBM defaults will automatically be available if APPN (question 510 = 1) is selected, and it is suggested that you do not define your own COS unless you are an advanced user.**

The ability to specify a mode name and COS table at session establishment time provides an increased amount of flexibility in terms of session characteristics and route selection. However, in many cases, such flexibility may not be required. Therefore, IBM provides seven predefined mode names and corresponding COS tables. Two of these modes (SNASVCMG and CPSVCMG) are IBM reserved names and are not available for modification. One of the remaining five IBM defined mode names is a mode name of *blank* and is represented internally as eight blank characters (X'40'). You will be able to alter this association, so that a COS name can be associated with more than one mode name.

If you are not going to define your own COS, you may skip the following sections and go to "APPN Customization Planning" on page 12-40.

Refer to Appendix F, "IBM Default COS Tables" on page F-1 for the IBM default classes of service.

COS Table Entries in APPN Networks

An entry in an APPN COS table defines a single transmission priority and multiple columns of COS characteristics that are acceptable for that class of service. Within the table, two classes of service, each specifying the same COS characteristics but having different transmission priorities, is acceptable and expected. These two classes of service allow two sessions to use the same route, but with one session having priority over the other.

In an APPN COS table, the order in which the columns of COS characteristics are listed is important. The various possible routes are assigned weights as specified in the columns, and the best routes must come first. The weights enable route selection services in the network node serving the origin logical unit (LU) to calculate the optimal route for the session.

Specifying COS Characteristics

The columns in an APPN COS table entry define both node and transmission group (TG) characteristics that are acceptable for the specified class of service. Each column defines either a set of node characteristics, or a set of TG characteristics. Refer to Table 12-3 on page 12-38 and Table 12-2 on page 12-36 for the 3174 values.

TG Characteristics

The TG characteristics are:

Cost/Connect

The units of cost/connect time are user-defined and are the relative cost of being connected over the line. Non-switched lines have the lowest cost; switched lines have the highest cost. The valid range is 0–255.

Cost/Byte

The units of cost/byte are user defined and are the relative cost per byte of sending and receiving data on the line. The valid range is 0–255.

User-Defined

You are allowed to define three additional characteristics to describe the transmission groups in your network.

Note: This characteristic is not defined on the 3174 but is used by other IBM products with APPN, such as the AS/400.

Link Speed

The data rate for the line. A numeric value from 0 through 13 is used; 0 indicating minimum speed and 13 indicating maximum speed.

The acceptable values for link speed are:

```
 0  = Minimum
 1  = 1.2K
 2  = 2.4K
 3  = 4.8K
 4  = 7.2K
 5  = 9.6K
 6  = 14.4K
 7  = 19.2K
 8  = 48.0K
 9  = 56.0K
10  = 64.0K
11  = 4M
12  = 16M
13  = Maximum.
```

Corresponding values are displayed on the screen.

Security

This characteristic indicates the level of security protection available on a transmission group. There are seven levels of security associated with the various transmission media to provide uniformity across all networks. A numeric value from 0 through 6 is used; 0 indicating minimum security and 6 indicating maximum security.

The acceptable values for security are:

```
0  = Nonsecure
1  = Public Switched Network
2  = Underground Cable
3  = Secure Conduit
4  = Guard Conduit
5  = Encrypted
6  = Maximum.
```

Corresponding values are displayed on the screen.

Propagation Delay

This indicates the time required for a signal to travel from one end of the transmission group to the other. A numeric value from 0 through 5 is used; 0 indicating minimum and 5 indicating maximum. Corresponding values are displayed on the screen.

The acceptable values for propagation delay are:

0 = Minimum
1 = LAN
2 = Telephone
3 = Packet Switched Network
4 = Satellite
5 = Maximum.

Effective Capacity

This characteristic expresses the highest bit transmission rate the TG supports.

These characteristics are used by APPN to select the best available route to satisfy your request for a session to a remote location.

For any given characteristic, the field representing it contains a range of acceptable values for the characteristic. For example, TG connect cost ranges from 0 to 255, with 0 representing the minimum connect cost. The range enables route selection services to compare the connect cost of an individual TG to the specified range to determine if the TG is acceptable for this class of service.

In addition to the set of node or TG characteristics, each column in a COS table entry contains a weight field. The weight field is used by route selection services when it is considering a particular node or TG for a route. The field can contain a constant numerical value only.

3174 NN Transmission Group Characteristics

The following table represents transmission group characteristics for the 3174 NNs.

Table 12-2. 3174 NN Transmission Group Characteristics	
Characteristic	**3174**
Cost/Connection	0
Cost/Byte	0
Link Speed	See **Note**
Security	See **Note**
Modem Class	N/A
Propagation Delay	See **Note**
Effective Capacity	100%
Operational	Dynamic

Note: The 3174 automatically assigns the following TG characteristics based on link type:

APPN TG Characteristics

Link Type	Link Speed	Propagation Delay	Security
SDLC	9 (56Kbps)	2 (Telephone)	1 (Pubswtnet)
Token-Ring (4Mbps)	11 (4Mbps)	1 (LAN)	1 (Pubswtnet)
Token-Ring (16 Mbps)	12 (16 Mbps)	1 (LAN)	1 (Pubswtnet)
Channel	13 (Max)	0 (Min)	3 (Securecnd)

COS Names

Each class of service name has an associated transmission priority at which data must flow on routes constructed for that COS. Two or more different COS names may have the same COS definition.

The general meaning of the classes of service names are as follows:

#BATCH   This COS name maps to a mode name of the same name. It is a general, batch-oriented class of service that uses low transmission priority. High bandwidth and low cost are considered more important than short delay.

#BATCHSC   Same as #BATCH, except that a minimum security is required.

#INTER   This COS name maps to a mode name of the same name. It is a general, interactive-oriented class of service that uses high transmission priority. Short delay is considered to be more important than high bandwidth and low cost.

#INTERSC   Same as #INTER, except that a minimum level of security is required.

#CONNECT   For LU-LU sessions. This class of service provides connectivity at medium transmission priority. #CONNECT equates to a mode name of all blanks.

Note: The IBM default names are the only names that are allowed to begin with a X'7B' (represented above by the # sign).

The IBM supplied default COS tables are in Appendix F, "IBM Default COS Tables" on page F-1.

COS Mode Names

It has already been mentioned that a COS table is specified at session establishment. The means by which a COS table is specified is by a Mode Name which is specified at session establishment time; the mode name then points to a COS table to be used in route selection.

A total of 14 different mode names can be defined, 9 of which are available for user definition. You have the option of creating other COS tables or mode names according to specific requirements which will be discussed, but this is not necessary in order to establish sessions in an APPN network. Unless you have applications with other mode names, you need not even consider modes and COS tables when using an APPN network.

Node Characteristics

There are three node characteristics: route addition resistance (RAR), intermediate route resources (IRR), and congestion that are used in route selection. The higher the value for RAR, (valid range is 0 through 255, with 128 as the 3174 value) the less desirable the node becomes for intermediate session routing purposes.

IRR is detected internally by APPN so that sessions can be directed away from a node when the configured maximum number of intermediate sessions allowed has been reached. A node is considered no longer depleted when the number of intermediate sessions drops below the maximum number. IRR depletion allows additional sessions to be routed through a network node. You do not customize for IRR since it is detected internally.

Node congestion is automatically calculated by APPN when a large portion of the available buffers have been assigned. When congestion is detected, the NN will be less desirable in route calculations as an intermediate node. Node congestion will lessen the probability that additional sessions be routed through this node. Information about IRR depletion and node congestion is broadcasted to other NNs in the APPN network. This information is broadcasted each time an NN enters or leaves congestion or IRR depletion. This broadcasting of information keeps each NN in an APPN network updated. This permits dynamic route calculation to be done using the latest network information.

3174 Node Characteristics

The following table represents node characteristics for the 3174 NNs.

Table 12-3. 3174 Node Characteristics	
Characteristic	**3174**
Gateway for APPN Networks	No
Central Directory	No
Intermediate Routing Supported	Yes
Quiescing	No
Node Type	T2.1
Route Addition Resistance	128
Congestion	Dynamic
Resources Depleted for Intermediate Routing	Dynamic

Route Selection Using COS

The following describes how route selection is performed.

Starting with each link originating at the session origin, all possible paths will be examined by comparing the characteristics of every link and node as compared to the characteristics contained in each column of the COS from column 1 to column 8 and proceeding until an acceptable column is found or until all 8 columns are compared and none are found to be acceptable. For a link to be considered acceptable, every characteristic for the link must be greater than or equal to the minimum value and less than or equal to the maximum value for every characteristic in a single column. (Refer to "Specifying COS Characteristics" on page 12-33.)

If one characteristic does not meet all values, the next column will be examined until a column is found that does meet all values or all columns have been exhausted. If all columns have been exhausted, then the link and/or node is considered unacceptable for this COS for this route calculation attempt. The characteristics of the node at the destination end of the link will also be examined to see if it meets the node COS value. The weight of the link added to the weight of the node at the destination end of the link will be used to obtain the weight of the hop.

After all of the links between the origin and destination control points have been examined and either were assigned a weight or found to be unacceptable, then the set of links and nodes that supplies the least weight path will be used for the route. Note that even though all links and nodes may be operational and communicating, a route request may fail if there is not a set path between the origin and destination control points that is acceptable for the COS.

Considerations for Route Selection

The following are considerations for route selection:

- The lower the weight for a node or link, the more desirable it is for the route calculation.

- Session control point origin and control point destination node weights are not added to the path weight.

- The IBM supplied COS defaults (described in "COS Names" on page 12-36) will be able to calculate a route for any line description except for #BATCHSC and #INTERSC, which require a minimum security, if the defaults are taken. This may not be true if they are changed during customization.

- When a link between NNs or node is being checked against the COS, the algorithm stops for that link or node as soon as all values have been satisfied. Subsequent columns will not be examined for performance reasons, therefore, you should customize your most desirable weights first.

- For the node COS, a value of LOW (0) means no it is not congested, and a value of HIGH (1) means yes it is congested. Therefore, a minimum of LOW and a maximum of LOW in all columns means that a congested node is never acceptable for routing. If one of the supplied class of service definitions is changed to this or one is created with these values, a congested node is not chosen as part of the route.

- When a link between NNs becomes inoperative due to a failure, updates are sent around the network to inform all NNs of the condition so that subsequent session requests may be routed around the failed link or node. When and if the link becomes operative again, another update will be sent around the network to inform all network nodes of the new condition. Note that at least a pair of active control point sessions is required for NNs to receive and send this information.

APPN Customization Planning

Before you start planning, you need:

- "Worksheet 15—APPN Node Definition" on page A-27
- "Worksheet 16—Network Resources" on page A-28
- "Worksheet 17—Associated LUs" on page A-29
- "Worksheet 18—COS Definition" on page A-30
- "Worksheet 19—COS Node Definition" on page A-31
- "Worksheet 20A—COS Transmission Group Definition" on page A-32
- "Worksheet 20B—COS Transmission Group Definition" on page A-33
- "Worksheet 21—Mode/COS Correlation" on page A-34.

The sample network shown in Figure 12-15 corresponds to the sample Network Resources and Associated LUs worksheets that follow. Refer to this diagram when you are looking at the examples for a better understanding of defining network resources.
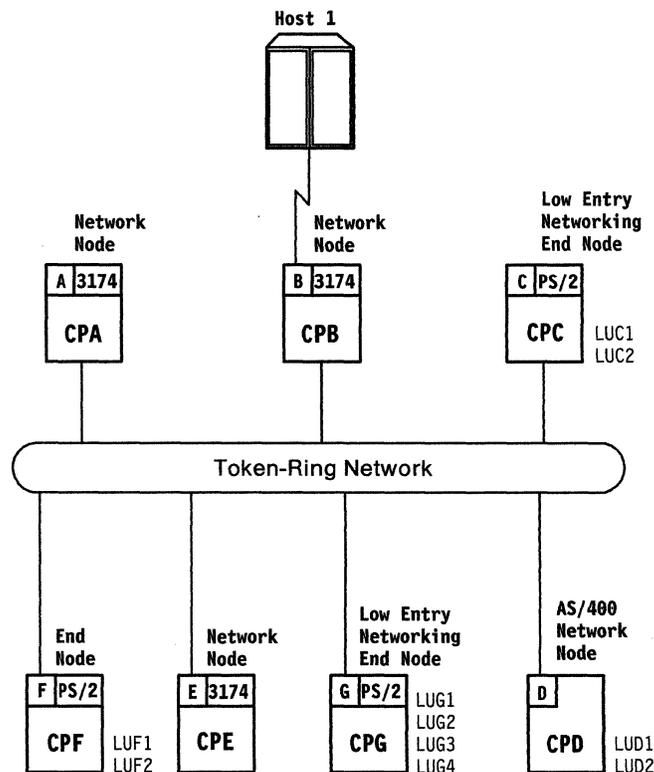
Figure 12-15. Example 3174 APPN Network

The APPN Node Definition Worksheet

The APPN Node Definition worksheet is the first worksheet you should fill out if your response to question 510 was a 1 (APPN is active). On the worksheet, you respond to configuration questions using the information that follows.

```
_____ APPN Node Definition _____


610 - ☐                   611 - ☐                   612 - ☐
      1                         1                         0
```

Figure 12-16. An Example of the APPN Node Definition Worksheet

Filling In Worksheet 15 – APPN Node Definition

Locate "Worksheet 15—APPN Node Definition" on page A-27. Using the following information, write your responses to the questions on the worksheet.

610: APPN Sessions

Response:

1 = up to 225 sessions
2 = up to 500 sessions
3 = up to 750 sessions
4 = up to 1000 sessions.

The default response is 1.

This response indicates the number of LU 6.2 intermediate sessions that may be activated through the 3174.

Your response to this question is used to allocate the 3174 storage when the 3174 NN is initially loaded. Since APPN sessions are dynamically set up based upon resources (buffers, control blocks, links) available at session initiation, this value may not always be achieved. In addition, the response is used to determine the total amount of storage required for the controller.

Refer to Chapter 3, "Planning for Controller Storage" on page 3-1 for storage requirements.

611: APPN Nodes/Links

Response:

1 = up to 20 nodes/links
2 = up to 75 nodes/links
3 = up to 150 nodes/links
4 = up to 225 nodes/links.

The default response is 1.

This response indicates the number of Type 2.1 links supported by the 3174.

Your response to this question is used to allocate 3174 storage when the 3174 NN is initially loaded. Since T2.1 links are dynamically activated as required based upon resources (control blocks and ports) available at link establishment, this value may not always be achieved. In addition, the response is used to determine the total amount of storage required for the controller.

Notes:

1. The total number of T2.0 only, shared, and T2.1 only links cannot exceed the limitations of the Token-Ring Adapter. That is, the maximum for 16/4 Mbps Token-Ring Adapter is 250, for 4Mbps Token-Ring Adapter is 140, and for 8KB frame size is 100.

2. The maximum number of nodes stored in the APPN topology data base is based upon your response to question 611 on the APPN node definition panel. If you respond with a 1 or 2, then 149 is the maximum number of nodes stored. If you respond with a 3 or 4, then 293 is the maximum number of nodes stored.

Refer to Chapter 3, "Planning for Controller Storage" on page 3-1 for storage requirements.

612: APPN Wildcard Option

The wildcard option exists in order to allow LUs to be dynamically located in a subarea node. The wildcard option permits sessions to be established from LUs in the APPN network to LUs in or through a subarea network. Refer to "Wildcard Routing" on page 12-13.

The wildcard option does not guarantee that the session endpoint is in the host, however, if it is or if the host knows the LU location (assume subarea routing will be done), the session will be established.

Response:

    0 = No wildcard option
    1 = Yes wildcard option.

The default response is 0.

This response indicates whether this 3174 APPN Network Node holds the wildcard connection to the host for the APPN network.

Notes:

1. *Only one network node in the entire connected APPN network may have the wildcard option.* APPN cannot guarantee selection of the appropriate link over a multi-link host connection, therefore, the network must have a single link into the subarea.

2. The AS/400 refers to the wildcard option as *ANY Routing.* If an AS/400 is in the network with the *ANY option, then there cannot be a 3174 in the network with the wildcard option (response to question 612 = 1).

For additional information, refer to "Wildcard Routing" on page 12-13.

Defining Network Resources

The Network Resources and Associated LUs worksheets are used to define nodes in the APPN network to this 3174 NN. Depending on your configuration and capabilities of the nodes in the network, these worksheets are optional. The Network Resources worksheet and the Associated LU's worksheet provide information for a variety of purposes:

- Define LUs located at LEN end nodes. LEN end nodes do not have the capability to register resources with an NN server. By specifying the CPNAME of the LEN end node and the LUNAMES that reside in that node, the NN can respond to search requests on behalf of the LEN EN. (For additional information, see "LEN End Node Support" on page 12-13.)

- Define adjacent NNs. By specifying a node type of NN along with the CPNAME, DLC type, and address of an adjacent NN, this 3174 NN will attempt to initiate a link connection and establish CP-CP sessions. If the link connection fails, periodic attempts are made to re-establish the connection. All Token-Ring adjacent NNs with CP-CP sessions to this NN must be specified. One exception to this rule exists for the shared T2.1 link to the primary host. For APPN networks that have more than one NN, the connectivity of network nodes must be planned.

  A maximum of eight (8) adjacent NNs is supported. (For additional information, see "Planning Your Network" on page 12-15.)

- Define resource cache. By specifying CPNAMES, node type, and LUNAMES of nodes in the APPN network along with their serving NN, the user can preload the directory cache. This may reduce the number of broadcasts in the network. (For additional information, see "Directory Services" on page 12-11.)

- Define nodes that share a link for both PU2.0 and type 2.1 traffic to this NN with the gateway feature. If DSPUs defined to a Token-Ring Gateway (questions 940 and 941) are also used to support APPN T2.1 traffic on the same link connection (same Token-Ring MAC address and SAP address), then these nodes must be defined on the Network Resources worksheet. The definition must include CPNAME, node type, DLC type, and Token-Ring address. Refer to "Gateway" on page 12-21 for additional information.

- Define addresses of nodes for link establishment. By specifying the CPNAME, node type, DLC type, and DLC address, this 3174 NN initiates a connection to the specified address when the 3174 is initially loaded (IMLed). By specifying the address, the 3174 reserves resources for this link connection. In addition, in the event of a link failure, CP-CP sessions for NNs are re-initiated by this NN. If the DLC type and address are not specified, then the attaching node initiates the connection to the 3174 NN.

- CP-CP Sessions. Between any two network nodes in a network, there can only be one pair of active control point-to-control point sessions (CP-CP). If a network node is adjacent to one or more network nodes, it must have a set of parallel active CP-CP session with at least one of the adjacent NNs. LEN end nodes do not support CP-CP sessions.

Character Set Supported

For all names (for example, LUNAMES, CPNAMES, virtual node name, serving NN names) that are customized by the user, character set 1134 type A is permitted. This character set consists of one or more EBCDIC uppercase letters A through Z and numbers 0 through 9. The first character of the symbol string must be uppercase A through Z. You cannot enter special characters such as #, @, and $, and there can be no imbedded blanks.

This rule also applies to COS and mode names, except for the five IBM supplied mode names. To provide uniqueness, the IBM supplied names contain a X'7B' (represented by a # sign) as the first character position.

Unique Names

All names (for example, LUNAMES, CPNAMES, virtual node name, serving NN name) in a connected APPN network must be unique, and cannot be more than 8 characters long. That is, there cannot be more than one node with the same CPNAME, nor can the same LUNAME be used in different nodes. The name for a CPNAME and LUNAME in the same node is valid. This is referred to as CP = LU and is normally used for CP-CP sessions between APPN nodes. The 3174 checks for unique names specified on the 3174 Common SNA worksheet, the Network Resources worksheet, and the Associated LUs worksheet. However, these checks do not protect you from duplicates specified elsewhere in the network.

The Network Resources Worksheet

The Network Resources worksheet is used to define nodes in the APPN network to this 3174 NN.

Figure 12-17. An Example of the Network Resources Worksheet

Use the procedure "Filling In Worksheet 16—Network Resources" on page 12-46 to complete this worksheet.

Filling In Worksheet 16—Network Resources

Step 1 Locate "Worksheet 16—Network Resources" on page A-28. The following steps guide you through the worksheet. An example configuration is provided. The example is designed to show you how to fill out the Network Resources worksheet.

Step 2 Fill in the CPNAME column.

Refer to "Character Set Supported" on page 12-45 and "Unique Names" on page 12-45 for information about how to assign CPNAMES.

The CPNAME is the name of the node you are defining. A maximum of 240 CPNAMES is definable; you may specify LUNAMES for 120 of them. The names must also be unique to NETID, CPNAME, and VNODE (questions 501, 511, and 512). This field is required when defining a resource.

Step 3 Fill in the NODE TYPE column.

This field specifies the APPN node type. This field is required when defining a resource.

Response:

1 = Low Entry Networking End Node (LEN)
2 = End Node (EN)
3 = Network Node (NN).

Note: The 3174 supports up to 8 adjacent NNs. An adjacent NN is a resource that has been customized with an ADDRESS, a DLC TYPE, and a NODE TYPE of **3**.

Step 4 Fill in the LUs column.

If LUs are desired for a given CPNAME, place an **X** in this field. This is optional. Refer to "Defining Network Resources" on page 12-44 for usage information. Up to 120 CPNAMES may specify LU names. The LU names will be specified on "Worksheet 17—Associated LUs" on page A-29.

Step 5 Fill in the DLC TYPE column.

DLC TYPE is the type of Data Link Control for this link and is used in conjunction with the ADDRESS field. It is used to identify the protocol.

Response: If the link uses Token-Ring protocol (either attached to IBM Token-Ring, or coax using Peer Communication feature of the 3174), respond with a 1.

DLC TYPE and ADDRESS are optional. For usage and additional information, refer to "Defining Network Resources" on page 12-44.

Step 6 Fill in the ADDRESS column.

The ADDRESS field specifies the DLC address for establishing a link connection. It is used in conjunction with DLC TYPE in order to validate the ADDRESS field. If ADDRESS is specified, DLC TYPE is required.

Response: For DLC TYPE of Token-Ring, a twelve-character hexadecimal address plus a two-character hexadecimal service access point (SAP) ID.

Refer to "940: Ring Address Assignment" on page 16-10 for information about assigning this Token-Ring address.

All Token-Ring addresses on this worksheet must be unique.

The Token-Ring Network Address of the controller assigned in "106: Token-Ring Network Address and Service Access Point of the 3174" on page 6-12 or "900: Token-Ring Network Address and SAP" on page 16-7 cannot be specified. If 3174-Peer Support (question 650 = yes) and Bridge Support (question 651 = yes) are customized, 4000 XXXX XXFF (where X is the user portion of the address specified in question 660) cannot be specified.

Note: Be sure that you have not customized for more resources than you specified in question 611. Refer to "611: APPN Nodes/Links" on page 12-42 for additional information.

A Sample Network Resources Worksheet

A sample of the Network Resources worksheet is defined in Figure 12-18.

```
                        _____ Network Resources _____


      CPNAME       NODE TYPE    LUs     DLC TYPE                  ADDRESS
                     (1-3)      (X)       (1)

      CPB            3           —        1        40000 0000 000B 04
      CPD            3           X        1        40000 0000 000D 04
      CPE            3           —        1        40000 0000 000E 04
      CPG            1           X        —
      CPC            1           X        —
```

Figure 12-18. An Example of the Network Resources Worksheet for NNA

The following describes the areas on this worksheet for NNA:

CPNAME   This is the name of the node in the APPN network. In the overall configuration involving this Network Resources worksheet, we have five CPNAMES defined.

NODE TYPE   The first three CPNAMES are assigned a NODE TYPE of 3 which represents network nodes.

The CPNAMEs of CPG and CPC have a NODE TYPE of 1 which are LEN end nodes.

LUs   In this example, LUs are desired for three of the CPNAMES: CPD, CPG, and CPC. LUs for CPF are not specified because, CPF, an EN, will register it's LUs with it's serving NN (CPE).

Note that a maximum of 120 nodes may specify LU names. The actual LU names will be specified on "A Sample Associated LUs Worksheet" on page 12-51.

DLC TYPE   The DLC TYPE for CPNAMEs CPB, CPD, and CPE are Token-Ring (1) and because addresses are specified, the DLC TYPE must also be given for each of these.

ADDRESS   The addresses must be twelve hexadecimal characters, plus a two-character hexadecimal SAP ID. The 04 SAP is used for APPN.

All addresses on this worksheet are unique and are different from network node (NNA) Token-Ring address.

The Associated LUs Worksheet

The Associated LUs worksheet is used to identify LUs that are located in nodes specified on the Network Resources worksheet.

```
_____ Associated LUs _____

CPNAME        LUNAME        LUNAME        LUNAME        LUNAME        SERVING  NN
```

Figure 12-19. An Example of the Associated LUs Worksheet

Use the procedure "Filling In Worksheet 17—Associated LUs" on page 12-50 to complete this worksheet.

Filling In Worksheet 17—Associated LUs

Step **1** Locate "Worksheet 17—Associated LUs" on page A-29. The following steps guide you through the worksheet.

Step **2** The CPNAME column is a protected field and is automatically filled in if LUs = X was specified for this CPNAME on the previous Network Resources worksheet.

Step **3** Fill in the LUNAME columns.

An LU name is a name of a logical unit that enables end users to communicate with each other. For example, it is the name associated with a particular application used in an APPN Network.

These 4 fields represent LUNAMES and are to be filled in with up to 8-alphanumeric characters. A maximum of 4 LUs may be defined for each of a maximum of 120 CPNAMES. (All 240 CPNAMES cannot have LUs defined to them).

Refer to "Character Set Supported" on page 12-45 and "Unique Names" on page 12-45 for information about how to assign names.

Step **4** Fill in the Serving NN column.

For network nodes (type 3), this field may be left blank. Since a network node must be its own server, the default is the CPNAME of the NN. During customizing, an error is given if a specific Serving NN name does not match the CPNAME.

For a LEN end node or end node (type 1 or 2), then the CPNAME of the Serving NN may be specified. If left blank, the default Serving NN is this 3174 NN which you are customizing.

If you choose to define a Serving NN, it can be any NN in the entire network. Be sure that it is a network node because error checking cannot be done by this 3174.

Refer to "Character Set Supported" on page 12-45 and "Unique Names" on page 12-45 for information about how to assign names.

A Sample Associated LUs Worksheet

A sample of the Associated LUs Worksheet is defined in Figure 12-20.

```
                              _____ Associated LUs _____


    CPNAME        LUNAME        LUNAME        LUNAME        LUNAME        SERVING  NN


    CPD           LUD1          LUD2          _____       _____       CPD
    CPG           LUG1          LUG2          LUG3          LUG4          CPE
    CPC           LUC1          LUC2          _____       _____       _____
    _____       _____       _____       _____       _____       _____
    _____       _____       _____       _____       _____       _____
    _____       _____       _____       _____       _____       _____
    _____       _____       _____       _____       _____       _____
    _____       _____       _____       _____       _____       _____
    _____       _____       _____       _____       _____       _____
    _____       _____       _____       _____       _____       _____
    _____       _____       _____       _____       _____       _____
    _____       _____       _____       _____       _____       _____
    _____       _____       _____       _____       _____       _____
    _____       _____       _____       _____       _____       _____
```

Figure 12-20. An Example of the Associated LUs Worksheet

The following describes the areas on this worksheet:

CPNAME

This is a protected field, and the CPNAMES of CPD, CPG, and CPC are automatically filled in because an X was specified in the LUs column on the Network Resources worksheet for these CPNAMES. They represent the control point names (CPNAMES).

LUNAME

There can be a maximum of four LUNAMEs for each CPNAME defined. An LUNAME is a name that enables end users to communicate with each other.

SERVING NN

The SERVING NN is the CPNAME of the network node that is providing NN services to this node.

Because CPD is a network node, if specified, it *must* have the same name for it's SERVING NN name.

CPG is a LEN end node, but because its SERVING NN is not this NN (CPA), a SERVING NN name must be defined for it.

CPC is a LEN node that is served by this NN (CPA), and therefore, the Serving NN is left blank.

The COS Definition Worksheet

The COS Definition worksheet is used to select which COS Definition to create or modify. It provides a list of currently defined Classes of Service.

Be sure that you have read "An Overview of Class of Service" on page 12-32 and all of the steps that follow before filling in the worksheets. An example configuration is provided. The example is designed to show you how to fill out the COS Definition worksheet.

Planner: These worksheets only need to be completed if you want to define your own classes of service or mode names. IBM defaults will automatically be available if APPN (question 510 = 1) is selected.

The IBM supplied defaults may also be modified, but we do not recommend this. If they are modified, then every NN in the network must be modified to contain the same values.

Warning: If you choose to define your own COS or Mode names, these names and their values *MUST* remain consistent throughout the network, including non-3174 nodes. This includes all APPN network nodes and end nodes. Otherwise, unpredictable results will occur. CSCU and CSCM will be very useful to ensure network-wide consistency for other 3174s.

```
_____ COS Definition _____


COS Definition Number - __         Model Definition Number - __
(1-14)                             (0-14)

                    _____ Definition Numbers _____

              0.  Clear Definition
              1.  #BATCH          8.  _____
              2.  #BATCHSC        9.  _____
              3.  #INTER         10.  _____
              4.  #INTERSC       11.  _____
              5.  #CONNECT       12.  _____
              6.  _____       13.  _____
              7.  _____       14.  _____

      When using models 1-5, IBM-supplied defaults will always be invoked.
```

Figure 12-21. COS Definition

Use the procedure "Filling In Worksheet 18—COS Definition" on page 12-53 to complete this worksheet.

Note: If you do *not* fill out this worksheet, you will not need to fill out the three worksheets that follow.

Filling In Worksheet 18—COS Definition

Step 1 Locate "Worksheet 18—COS Definition" on page A-30. The following steps guide you through the worksheet.

Step 2 Fill in the COS Definition Number field.

This field represents the number of the COS that you want to add or modify.

Response:

A numeric value from 1—14.

Step 3 Fill in the Model Definition Number field.

This field represents the number of the COS to be used as the model (one of the default values shown).

Response:

A numeric value from 0—14.

Notes:

a. If a new COS definition number is selected and no model definition number is selected, then the Clear Definition will be used.

b. If an existing COS definition number is selected and no model is selected, then the existing COS information will be displayed.

c. If no COS definition number is selected and a model definition is selected, then an error message will be displayed.

d. If an existing COS definition number is selected and a different model number is selected, then a warning message will be displayed stating that data may be overwritten.

e. The IBM supplied values are always accessible. If you have modified an IBM supplied COS definition, you have actually modified a copy of the IBM supplied definition. Whenever an IBM supplied COS is used as a model, the original IBM supplied COS definition will be displayed. The modified data will be used for routing purposes.

f. If a COS definition number 1 - 5 (IBM defaults) is modeled on itself, then a warning message will also be displayed.

g. SNASVCMG and CPSVCMG are IBM reserved names and not allowed as input.

A Sample COS Definition Worksheet

A sample of the COS Definition Worksheet is defined in Figure 12-22.

```
                        _____ COS Definition _____


    COS Definition Number -  6            Model Definition Number - __
    (1-14)                                (0-14)

                        _____ Definition Numbers _____

             0.  Clear Definition
             1.  #BATCH          8. _____
             2.  #BATCHSC        9. _____
             3.  #INTER         10. _____
             4.  #INTERSC       11. _____
             5.  #CONNECT       12. _____
             6.  _____       13. _____
             7.  _____       14. _____

    When using models 1-5, IBM-supplied defaults will always be invoked.
```

Figure 12-22. An Example of the COS Definition Worksheet

The following describes the areas on this worksheet:

COS Definition Number

We have chosen to select a **6** in this field. This represents the number of the COS that you want to add or modify for this example. In this case, we are adding a new COS.

Model Definition Number

We have left this field blank which means that this example will be modeled after the *Clear Definition*.

A numeric value from 0—14 is allowed.

Definition Numbers

The five Definition Numbers shown represent IBM's default values. In our example, we did not use one of these, but you have the option of using any of these, or creating your own.

The COS Node Definition Worksheet

The COS Node Definition worksheet is used to define minimum and maximum sets of values for Route Addition Resistance and Congestion, and to provide a Node Weight for these sets of values to be used by the COS manager when calculating routes. You also set the Transmission Priority and name the new COS on this worksheet.

```
_____ COS Node Definition _____


COS Name = _____
Transmission Priority (1,2,3) = _


                                1    2    3    4    5    6    7    8

Node Weight                     —    —    —    —    —    —    —    —
(0-255)

Route Addition      Min         —    —    —    —    —    —    —    —
Resistance          Max         —    —    —    —    —    —    —    —
(0-255)

Congestion          Min         _    _    _    _    _    _    _    _
(0,1)               Max         _    _    _    _    _    _    _    _
```

Figure 12-23. An Example of the COS Node Definition Worksheet

Use the procedure "Filling In Worksheet 19—COS Node Definition" on page 12-56 to complete this worksheet.

Filling In Worksheet 19—COS Node Definition

Step **1** Locate "Worksheet 19—COS Node Definition" on page A-31. The following steps guide you through the worksheet.

Step **2** Fill in the COS Name field.

For IBM supplied defaults, the COS Name cannot be modified. If you are not using IBM supplied defaults, fill in this field with a new COS name.

This is a required field if other information is to be supplied.

Response:

Up to 8 alphanumeric characters (first character must be alphabetic and no blanks/spaces between characters) are allowed.

Notes:

    a. The IBM default names are the only names that are allowed to begin with a X'7B' (represented here by the # sign).

    b. CPSVCMG and SNASVCMG are IBM reserved names and cannot be entered as either a Mode or COS name.

Step **3** Fill in the Transmission Priority field.

This field is used to select the priority of the traffic.

Response:

    1 = High (interactive)
    2 = Medium (normal)
    3 = Low (usually for batch).

Step **4** Fill in the Node Weight fields.

You may define up to eight sets of weighted values. Lower values indicate that the node is more desirable in session route calculations. The value specified in column 1 should be lower than the value specified in columns 2 through 8.

For example, the characteristics of a column should make preceding columns more desirable than the next column. (The value specified in column 1 should make that column preferable to the values specified in column 2.)

When the parameters in the column match the 3174's parameters, the node weight of that column is used for route computation.

Response:

A numeric value from 0—255.

Step 5 Fill in the Route Addition Resistance fields.

These fields indicate how desirable one Network Node is compared to another Network Node for routing intermediate sessions through them.

Any COS requiring an RAR less than 128 will not be routed through the 3174. The 3174 is set to a value of 128.

Response:

A numeric value from 0—255.

     0 = Most desirable
    255 = Least desirable.

Step 6 Fill in the Congestion fields.

These fields indicate whether a highly congested node should be used.

Response:

    0 = Use only nodes with low congestion.
    1 = Use nodes with both low and high congestion.

For example:

    Min = 0, Max = 0: use only low congestion nodes.
    Min = 0, Max = 1: use both high and low congestion nodes.

Notes:

1. The COS Name must not be a duplicate of any other COS name.
2. All "Min" values must be less than or equal to their paired "Max" values.
3. If any field has been specified in a column, all fields must be specified for that column.

A Sample COS Node Definition Worksheet

A sample of the COS Node Definition Worksheet is defined in Figure 12-24.

```
_____ COS Node Definition _____


COS Name = NEWCOS
Transmission Priority (1,2,3) = 2


                            1    2    3    4    5    6    7    8

Node Weight                10   20   30   60   100  120  140  __
(0-255)

Route Addition     Min     0    0    0    0    128  128  128  __
Resistance         Max     50   80   128  128  160  200  255  __
(0-255)

Congestion         Min     0    0    0    0    0    0    0    _
(0,1)              Max     0    0    0    1    1    1    1    _
```

Figure 12-24. An Example of the COS Node Definition Worksheet

The following describes the areas on this worksheet:

COS Name

> NEWCOS is the COS Name for the new class of service we are defining.

Transmission Priority

> This field represents the priority of the traffic. We have selected a 2 for transmission priority which represents medium or normal priority.

Node Weight

> You can define up to eight sets of weighted values with the lower values being the most desirable. The lower values should be specified first. We have started with a value of **10** and gone up to **140**.

Route Addition Resistance

> This field represents how desirable one NN is compared to another NN for routing immediate sessions through them. The lower values are more desirable. In our example, we have selected a range of **0—255**

Congestion

> This field represents whether or not a highly congested node should be used.
>
> The first three columns indicate that only uncongested nodes are to be used. Columns 4 - 7 indicate that either uncongested or congested nodes can be used which allows for more traffic.

The COS Transmission Group Definition Worksheet

The COS Transmission Group Definition worksheet is used to define minimum and maximum sets of values for Cost/Connect, Cost/Byte and three User-Defined fields.

```
_____ COS Transmission Group Definition _____


COS Name = _____      1   2   3   4   5   6   7   8

TG Weight (0-255)       __  __  __  __  __  __  __  __

Cost/Connect    Min     __  __  __  __  __  __  __  __
(0-255)         Max     __  __  __  __  __  __  __  __

Cost/Byte       Min     __  __  __  __  __  __  __  __
(0-255)         Max     __  __  __  __  __  __  __  __

User-Defined 1  Min     __  __  __  __  __  __  __  __
(0-255)         Max     __  __  __  __  __  __  __  __

User-Defined 2  Min     __  __  __  __  __  __  __  __
(0-255)         Max     __  __  __  __  __  __  __  __

User-Defined 3  Min     __  __  __  __  __  __  __  __
(0-255)         Max     __  __  __  __  __  __  __  __
```

Figure 12-25. COS Transmission Group Definition

Use the procedure "Filling In Worksheet 20A—COS Transmission Group Definition" on page 12-60 to complete this worksheet.

Filling In Worksheet 20A—COS Transmission Group Definition

Step 1 Locate "Worksheet 20A—COS Transmission Group Definition" on page A-32. This worksheet has two parts. The following steps guide you through the worksheet.

Step 2 The COS Name field will already be defined with the name from the COS Node Definition Panel. It is a protected field and cannot be altered.

Step 3 Fill in the Transmission Group (TG) Weight field. This field represents the weight of the link. It is used in computing the best link to take. The lower values are more desirable and the most desirable weights should precede the least desirable weights.

If all of the parameters in a column match the desired TG, the TG weight of the first match will be used.

Response:

A numeric value from 0—255.

Step 4 Fill in the Cost/Connect field.

This field represents the relative cost of being connected over the line.

Response:

A numeric value from 0—255.

Step 5 Fill in the Cost/Byte field.

This field represents the relative cost per byte of sending and receiving data over the line.

Response:

A numeric value from 0—255.

Step 6 Fill in the User-Defined fields (1, 2, and 3).

Use 1, 2, or 3 of these fields to describe any unique characteristics you want to have control over.

Response:

A numeric value from 0—255.

Notes:

a. All "Min" values must be less than or equal to their paired "Max" values.

b. If any field has been specified in a column, all fields must be specified for that column.

A Sample COS Transmission Group Definition Worksheet

A sample of the COS Transmission Group Definition Worksheet is defined in Figure 12-26.

```
_____ COS Transmission Group Definition _____


COS Name = NEWCOS          1     2     3     4     5    6    7    8

TG Weight (0-255)          10    20    30    40    __   __   __   __

Cost/Connect      Min      0     0     0     0     __   __   __   __
(0-255)           Max      30    60    90    120   __   __   __   __

Cost/Byte         Min      0     0     0     0     __   __   __   __
(0-255)           Max      30    60    90    120   __   __   __   __

User-Defined 1    Min      0     0     0     0     __   __   __   __
(0-255)           Max      255   255   255   255   __   __   __   __

User-Defined 2    Min      0     0     0     0     __   __   __   __
(0-255)           Max      255   255   255   255   __   __   __   __

User-Defined 3    Min      0     0     0     0     __   __   __   __
(0-255)           Max      255   255   255   255   __   __   __   __
```

Figure 12-26. An Example of the COS Transmission Group Definition Worksheet

The following describes the areas on this worksheet:

COS Name

Again, this is the name of the new class of service being defined which is NEWCOS.

TG Weight

The transmission group weight field represents the weight of the link and is used in computing the best link to take. The lower values are more desirable and should precede the least desirable weight. In our example, the minimum TG Weight is **10** and the maximum is **40**.

Note: This example only shows four columns filled in. There is no correlation between the COS Node Definition worksheet and this worksheet. For example, the number of entries do not have to match on these two worksheets, but Part 2 of this worksheet must have the same columns filled in.

Cost/Connect

This field represents the relative cost of being connected over the line. In our example, we only want links where the cost is low. Therefore, there is no guarantee that you will get a path since the maximum we have defined is **120**.

Cost/Byte

This field represents the relative cost per byte of sending and receiving data over the line. In our example, we have defined a minimum of **0** and a maximum of **120**. Again, there is no guarantee of getting a path since our main objective is low cost.

User-Defined 1-3

These are extra fields that allow you to specify any additional characteristics you want to describe the TG in your network. In our example, we have defined **0** as the minimum and **255** as the maximum in all four columns.

Note: This characteristic is not definable on the 3174 but is used by other IBM products with APPN, such as the AS/400.

The COS Transmission Group Definition Worksheet (Part 2)

This COS Transmission Group Definition worksheet is an extension of the previous worksheet. This worksheet must be completed if the previous worksheet was filled in. It is used to define minimum and maximum sets of values for Link Speed, Security, and Propagation Delay fields.

```
_____ COS Transmission Group Definition Continued _____


COS Name = _____      1    2    3    4    5    6    7    8

Link Speed      Min     __   __   __   __   __   __   __   __
                Max     __   __   __   __   __   __   __   __

(0=MIN  1=1.2K  2=2.4K  3=4.8K  4=7.2K  5=9.6K  6=14.4K  7=19.2K  8=48K
 9=56K  10=64K  11=4M   12=16M  13=MAX)
Security        Min     __   __   __   __   __   __   __   __
                Max     __   __   __   __   __   __   __   __

(0=NONSECURE 1=PUBSWTNET 2=UNDRGRDCB 3=SECURECND 4=GUARDCND 5=ENCRYPTED
 6=MAX)

Propagation     Min     __   __   __   __   __   __   __   __
Delay           Max     __   __   __   __   __   __   __   __

(0=MIN 1=LAN 2=TELEPHONE 3=PKTSWTNET 4=SATELLITE 5=MAX)
```

Figure 12-27. An Example of COS Transmission Group Definition (Part 2)

Use the procedure "Filling In Worksheet 20B—COS Transmission Group Definition" on page 12-64 to complete this worksheet.

Filling In Worksheet 20B—COS Transmission Group Definition

Step 1 Locate "Worksheet 20B—COS Transmission Group Definition" on page A-33. This is the second part of the worksheet. The following steps guide you through the worksheet.

Step 2 The COS Name field will already be defined with the same name as on the previous COS Transmission Group Definition worksheet.

Step 3 Fill in the Link Speed field. This field represents the data rate for the link.

The worksheet contains acceptable link speed values.

Response:

A numeric value from 0—13.

  0 = Minimum speed
  13 = Maximum speed.

Step 4 Fill in the Security field.

This field represents the security of the medium over which the data is sent.

The worksheet contains acceptable link speed values.

Response:

A numeric value from 0—6.

  0 = Not secure
  6 = Maximum security.

Step 5 Fill in the Propagation Delay field.

This field represents the time required for the signal to travel from one end of the link to another.

The worksheet contains acceptable link speed values.

Response:

A numeric value from 0—5.

  0 = Minimum time
  5 = Maximum time.

A Sample COS Transmission Group Definition Worksheet (Part B)

A sample of the COS Transmission Group Definition Worksheet is defined in
Figure 12-28.

```
_____ COS Transmission Group Definition Continued _____


COS Name = NEWCOS        1    2    3    4    5    6    7    8

Link Speed       Min     9    7    5    3    __   __   __   __
                 Max     13   13   13   13   __   __   __   __

(0=MIN  1=1.2K  2=2.4K  3=4.8K  4=7.2K  5=9.6K  6=14.4K  7=19.2K  8=48K
 9=56K  10=64K  11=4M  12=16M  13=MAX)
Security         Min     0    0    0    0    __   __   __   __
                 Max     6    6    6    6    __   __   __   __

(0=NONSECURE 1=PUBSWTNET 2=UNDRGRDCB 3=SECURECND 4=GUARDCND 5=ENCRYPTED
 6=MAX)

Propagation      Min     0    0    0    0    __   __   __   __
Delay            Max     5    5    5    5    __   __   __   __

(0=MIN 1=LAN 2=TELEPHONE 3=PKTSWTNET 4=SATELLITE 5=MAX)
```

Figure 12-28. An Example of the COS Transmission Group Definition Worksheet

The following describes the areas on this worksheet: This is a continuation of the
previous worksheet.

COS Name

Again, this is the same name (NEWCOS).

Link Speed

This field represents the data rate for the link. The minimum is
represented by a **0** and the maximum is represented by a **13**. In
this example, the lowest acceptable speed is **4.8K** (represented in
column four). If there is a link with a slower speed, it will not be
considered for this COS.

Security

This field represents the security of the medium over which the
data is sent. In our example, we are selecting a range from
nonsecure to the maximum security, so we will have no trouble
sending information.

Propagation Delay

This field represents the time required for the signal to travel from
one end of the link to another. In our example, we are selecting a
range of **0—5** which gives us the greatest flexibility.

The Mode/COS Correlation Worksheet

The Mode/COS Correlation worksheet allows you to correlate a mode name with a particular class of service and customize up to 14 pairs of Mode/COS names.

The mode name is an identifier of a set of session parameters for an LU-LU session. It is used as an index into a mode name-to-COS table. The predefined mode names correspond to the COS names. When a mode name is specified, a COS name must also be specified and vice versa. All mode names must be unique to all other mode names, and they must be consistent throughout the network.

```
_____ Mode/COS Correlation _____

Mode Name   #  COS Name          Mode Name   #  COS Name

#BATCH__    _  #BATCH__          _____    _  _____

#BATCHSC    _  #BATCHSC          _____    _  _____

#INTER__    _  #INTER__          _____    _  _____

#INTERSC    _  #INTERSC          _____    _  _____

blank       _  #CONNECT          _____    _  _____

_____    _  _____           _____    _  _____

_____    _  _____           _____    _  _____


Define Mode/COS pairs.  To specify IBM-supplied COS names, place 1-5 in
the #-column.  1=#BATCH  2=#BATCHSC  3=#INTER  4=#INTERSC  5=#CONNECT
```

Figure 12-29. An Example of the Mode/COS Correlation Worksheet

Use the procedure "Filling In Worksheet 21—Mode/COS Correlation" on page 12-67 to complete this worksheet.

Filling In Worksheet 21—Mode/COS Correlation

Step 1 Locate "Worksheet 21—Mode/COS Correlation" on page A-34. The following steps guide you through the worksheet.

Step 2 Fill in the Mode Name field.

The first five mode names are protected and contain the IBM supplied defaults. The mode name is an eight character symbolic name that identifies a subset of rules and protocols to be used between a pair of LUs.

Response:

Up to 8 alphanumeric characters (first character must be alphabetic and no blanks/spaces between characters) are allowed.

Notes:

   a. The IBM default names are the only names that are allowed to begin with X'7B' represented by the # sign.

   b. CPSVCMG and SNASVCMG are IBM reserved names and cannot be entered as either a Mode or COS name.

Step 3 Fill in the # field.

If you want to correlate a mode name with an IBM default COS name, use the # field to select the COS. Otherwise, fill in a COS name in the COS Name field.

Response:

1, 2, 3, 4, or 5 are the only valid responses.

These correlate to the IBM supplied COS names. When you enter a number in this field, the related COS Name field must be blank.

Step 4 Fill in the COS Name field.

The COS Name field can be correlated to any name you desire.

Response:

Up to 8 alphanumeric characters (first character must be alphabetic and no blanks/spaces between characters) are allowed.

When a COS name is specified, a mode name must also be specified. All COS names used with a mode name must have been defined on the previous COS Definition worksheet, and must be consistent network wide.

A Sample Mode/COS Correlation Worksheet

A sample of the Mode/COS Correlation Worksheet is defined in Figure 12-30.

```
                    _____ Mode/COS Correlation _____

        Mode Name   #  COS Name          Mode Name   #  COS Name

        #BATCH__    _  #BATCH__           _____    _  _____

        #BATCHSC    _  #BATCHSC           _____    _  _____

        #INTER__    _  #INTER__           _____    _  _____

        #INTERSC    _  #INTERSC           _____    _  _____

        blank       _  #CONNECT           _____    _  _____

        NEWMODE     _  NEWCOS             _____    _  _____

        _____    _  _____           _____    _  _____


        Define Mode/COS pairs.  To specify IBM-supplied COS names, place 1-5 in
        the #-column.  1=#BATCH  2=#BATCHSC  3=#INTER  4=#INTERSC  5=#CONNECT
```

Figure 12-30. An Example of the Mode/COS Correlation Worksheet

The following describes the areas on this worksheet:

Mode Name In this example, we have added a new Mode Name called NEWMODE that we want to correlate with NEWCOS.

This field is left blank because we are not selecting one of the IBM default values. If you are creating your own COS Name and are not basing it on one of the IBM defaults, this field is left blank.

COS Name The COS Name chosen is NEWCOS which was defined in the previous example. All COS names used with a mode name must have been defined on the COS Definition worksheet, or be an IBM supplied default.

Chapter 13. Planning for 3174 Peer Communication

An Overview of 3174 Peer Communication

Before you start planning, you need:

- "Worksheet 22 – 3174-Peer Definition" on page A-35
- "Worksheet 23 – 3174-Peer Bridge Profile" on page A-36
- "Worksheet 24 – LAN Manager Profile" on page A-37.

3174 Peer Communication provides peer-to-peer communication among devices connected to a 3174 Establishment Controller through 3270 Connection Adapters or 3278/3279 Emulation Adapters. 3174 Peer Communication provides an additional communication function for intelligent devices whose current uses are primarily host-interactive communication.

The devices running a 3174-Peer device driver (3174 Workstation Peer Communication Support, P/N 96X5677, or equivalent), operate as stations on a single 3174-Peer segment, analogous to a single Token-Ring LAN segment. 3174 Peer Communication allows you to run LAN applications and provides:

- Bridge function
- Local management functions
- LAN Manager support.

Bridge Function

3174 Peer Communication allows devices to have access to a Token-Ring network. When the 3174-Peer Bridge function is customized, the controller forms a bridge that attaches one 3174-Peer segment to a Token-Ring LAN segment. It operates as a medium access control (MAC) relay station, using source routing as described in the *IBM Token-Ring Network Architecture Reference.*

You must have a 3174 Type 3A Dual Speed (16/4Mbps) Communications Adapter for the controller to act as a 3174-Peer bridge. You can configure the adapter to attach to a Token-Ring that operates at either 4Mbps or 16Mbps.

With Bridge Support, a 3174-Peer device may obtain Token-Ring Gateway services similar to any other DSPU that is bridged to a Token-Ring Gateway. A 3174-Peer device may receive Token-Ring Gateway services or APPN network node services from the 3174 to which it is attached only if the 3174 Type 3A Dual Speed Communications Adapter is installed and Bridge Support is selected.

Because the controller is the only bridge to the 3174-Peer segment, it forwards single-route broadcast frames allowing the 3174-Peer segment to function in a network using spanning tree protocols.

Local Management Functions

If the 3174 is not customized for LAN Manager support (question 652 = no), and is customized for 3174-Peer Online Test Updates (question 653 = yes), the Local Management functions allow full local management of the 3174-Peer through the online tests. If the 3174 is customized for LAN Manager support (question 652 = yes), and is customized for 3174-Peer Online Test Updates (question 653 = yes), the online tests will allow you to change the passwords to the LAN Manager.

LAN Manager Support

LAN Network Manger is a network management program and problem determination aid for a LAN composed of one or more IBM Token-Ring Network segments or various other types of LAN segments. It runs on a PS/2 under OS/2 and can communicate with the NetView program at the host. The IBM LAN Network Manager monitors activity on the LAN segment to which it is attached and on remote LAN segments connected by bridges.

The IBM LAN Network Manager allows management of a LAN by maintaining records, monitoring the status of LAN segments and attaching devices, and by determining the source of problems. In addition, LAN Network Manager has the capability to test a LAN segment to ensure that data is flowing to it and to remove those devices found to be functioning incorrectly.

When functioning as a bridge between a Token-Ring and a 3174-Peer segment, the 3174 reserves four reporting links. A LAN Network Manager may connect to any of the reporting links, allowing up to four LAN Network Managers to be simultaneously supported. The LAN Reporting Mechanism (LRM) is a server function that maintains and establishes the reporting links. The following management server functions are supported across each established reporting link:

- LAN Bridge Server (LBS)
- Ring Parameter Server (RPS)
- Configuration Reporting Server (CRS) (3174-Peer segment only)
- Ring Error Monitor (REM) (3174-Peer segment only).

If LAN Manager support is not customized (question 652 = no), and Bridge support is customized (question 651 = yes), RPS support is provided for the Token-Ring.

LAN Network Manager Version 1.1 or higher is required. For more information on the IBM LAN Manager, see *IBM LAN Network Manager User's Guide*.

Peer Communication Planning

There are several areas that require planning in order to take advantage of 3174 Peer Communication functions. These are:

- Planning the network
- Planning the customizing of your controller
- Planning the customizing of the Token-Ring Gateway
- Planning the installation of the 3174-Peer device drivers
- Planning the central site distribution
- Planning network management.

Planning the Network

Before you plan for 3174 Peer Communication, you must plan for communication on the Token-Ring network. You must plan:

- Individual addresses
- Segment and bridge numbers
- Hop counts
- Application programs
- Network hardware and performance objectives.

For some of these items, you can use the defaults provided. For others, you must change the defaults. The following sections describe how to plan for each of these items. For assistance in LAN planning, refer to the books listed under "Related Publications," which is located in the Preface.

Individual Addresses

Each device that functions as a 3174-Peer device must have an individual address that is unique across the network. You have two options for assigning individual addresses:

- Accept the default individual addresses provided by 3174 Peer Communication. This option is valid only if the addresses are unique to the network.

- Assign addresses as you configure each device. You can assign addresses as you install the 3174-Peer device driver. If you assign individual addresses at the device, port swapping is easier because the devices are independent of the port configuration.

Regardless of the option you choose, the addresses of the 3174-Peer devices must be entered into the Token-Ring Gateway customizing. If LAN Manager is customized (question 652 = yes), the 3174 has an individual address on the 3174-Peer segment. Its individual address is described in "660: 3174-Peer Port Address Range" on page 13-12.

Segment and Bridge Numbers

- The Token-Ring segment number is the number of the Token-Ring to which the controller is attached.

- The 3174-Peer segment number is the number for the LAN formed by the 3174-Peer devices connected to the 3174-Peer controller.

- The bridge number is the number assigned to the controller with 3174 Peer Communication.

If you have more than one 3174-Peer segment on the same Token-Ring:

- The Token-Ring segment numbers must be the same
- The 3174-Peer bridge numbers can be the same
- The 3174-Peer segment numbers must be different.

If your network has a device running the IBM Token-Ring Bridge Program, the Token-Ring segment number must match the number that program gives to the Token-Ring segment.

For more information on the IBM Token-Ring Bridge Program, see the *IBM Token-Ring Network Bridge Program.*

Hop Counts

The *hop count* is the number of bridges that you allow information to cross. 3174 Peer Communication allows your controller to act as a bridge to the Token-Ring, so information completes one hop as it crosses the controller in either direction (from the Token-Ring into the 3174-Peer segment or from a 3174-Peer device into the Token-Ring).

Because the 3174-Peer devices attach directly to the 3174-Peer controller, the hop count for the 3174-Peer segment is always one and cannot be changed. The hop count for the Token-Ring can be set to a maximum of seven. However, you may choose to set the hop count lower to limit communication across the controller.

Application Programs

When you configure certain LAN application programs, you need to know the maximum information field size so that the devices on your 3174-Peer segment can use these programs. The 3174-Peer controller enforces a maximum information field size of 2052 bytes.

Network Hardware and Performance Objectives

When you plan the network hardware and performance objectives, consider the number of 3174-Peer devices attached to each controller and how these devices are used. If your network topology permits, attach file servers and print servers directly to the Token-Ring.

To improve performance, you may have to upgrade your 3270 Connection Card or 3278/3279 Emulation Adapter. The following cards in the workstation are candidates for upgrading:

- 3270 Connection Card P/N 83X9702
- 3278/3279 Emulation Adapter P/N 1602507
- 3278/3279 Emulation Adapter P/N 8665789
- 3278/3279 Emulation Adapter P/N 83X9670
- 3278/3279 Emulation Adapter P/N 8575427.

Planning the Customizing of Your Controller

In order to help you plan for Peer Communication, the following worksheets have been provided:

- "Worksheet 22 – 3174-Peer Definition"
- "Worksheet 23 – 3174-Peer Bridge Profile"
- "Worksheet 24 – LAN Manager Profile."

These worksheets are located in Appendix A and the information that you will need to start filling them out, starts with "The 3174-Peer Definition Worksheet" on page 13-10. There is a separate procedure for filling in each worksheet. The number of worksheets you fill out and the procedures you will follow, depends on the level of Peer Communication support you wish to have on your 3174. For example, if you don't want the Bridge function and LAN Manager Interface function, it won't be necessary to fill out "Worksheet 23 – 3174-Peer Bridge Profile" and "Worksheet 24 – LAN Manager Profile."

While performing the procedures for filling in the Peer Communication worksheets, you will be responding to configuration questions that define the level of Peer Communication support, its attributes, and parameters. Always start with "Filling In Worksheet 22 – 3174-Peer Definition" on page 13-11.

Planning the Customizing of the Token-Ring Gateway

With the 3174-Peer configuration, the individual 3174-Peer devices can connect to the host through a Token-Ring Gateway. The Token-Ring Gateway to the host views the 3174-Peer devices as DSPUs on a bridge-connected LAN segment, not as dependent stations on the controller.

When you plan the configuration of the Token-Ring Gateway, do not use the controller address to set up communication for the 3174-Peer devices. Use the unique addresses that you determined in "Individual Addresses" on page 13-5, and use these same numbers to plan the configuration of the 3174-Peer devices.

It is the configuration of the 3174-Peer device addresses into the Token-Ring Gateway that determines host connectivity for the 3174-Peer devices instead of the Port Assignment Table. For more information on planning for a 3174 Token-Ring Gateway, see Chapter 16, "Planning for Gateways (Token-Ring and ISDN)."

Planning the Customizing with APPN

With the 3174 Peer Communication, the individual 3174-Peer device can be a LEN end node for connectivity to the host or other APPN nodes. The APPN Network Node views the 3174-Peer device as a bridge-connected LAN segment, not as a device attached to the controller.

When planning your APPN configuration, use the unique LAN addresses that you determined in "Individual Addresses" on page 13-5.

The LEN end node in a 3174-Peer configuration can access network node services of this controller or any NN on the Token-Ring Network using the Bridge function.

Planning the Installation of the 3174-Peer Device Driver

Devices must have a 3174-Peer device driver installed to communicate as 3174-Peer devices. Refer to the *IBM 3174 Workstation Peer Communication Support Program User's Guide*, available with the 3174-WPCSP, P/N 96X5677, or the documentation for an equivalent device driver for instructions on installing the support program.

Planning Network Management

The customizing process described below includes several 3174-Peer parameters as well as 3174-Peer options. When you specify the 3174-Peer options, determine which of the following you want to use as your primary means for updating 3174-Peer parameters.

- Customized Parameters (local or by using CSCM)
- LAN Manager Support
- Online Tests Updates (either locally or by using CSCF).

Updated parameters are retained across subsequent IMLs of the controller.

Customized Parameters

The first time you customize for Configuration C, the customized parameter values become the initial operational values when the controller is IMLed. These may be the default values or those explicitly customized.

If neither LAN Manager Support nor Online Test Updates are customized, the 3174-Peer parameter values you select become operational when the controller is IMLed.

If the last time you customized the controller neither LAN Manager Support (question 652 = no) nor Online Test Updates (question 653 = no) were customized, and this time you are customizing for either of them, the customized values become the initial operational values when the controller is IMLed. Subsequent updates are performed as described in "LAN Manager Support" and "Online Tests Updates."

LAN Manager Support

If you customize for LAN Manager Support (your response to question 652 = yes), you may update any of the 3174-Peer parameters from the LAN Network Manager. Refer to "3174-Peer Parameters" for a list of the parameters.

If after IMLing you want to recustomize and your response to question 652 = yes, then the updates to the customized 3174-Peer parameters are saved but do not take effect until you recustomize again and your response to questions 652 = no and 653 = no.

Online Tests Updates

If LAN Manager Support is not customized (question 652 = no) and Online Test Updates are customized (question 653 = yes), you can update each of the 3174-Peer parameters from various options in online test 9, described in the *3174 Customer Problem Determination*, GA23-0217.

If after IMLing you want to recustomize and your response to question 653 = yes, then the updates to the customized 3174-Peer parameters are saved but do not take effect until you recustomize again and your response to questions 653 = no and 652 = no.

If LAN Manager support is customized (question 652 = yes), and if you also customize for Online Test Updates (question 653 = yes), the only 3174-Peer Online Test parameters you can update are the reporting link passwords required by LAN Network managers.

3174-Peer Parameters

If you select 3174-Peer, you automatically get the 3174-Peer Station parameters which are:

660 — 3174-Peer Port Address Range
661 — Percentage of Discard Threshold.

If you select Bridge Support, you also get the 3174-Peer Bridge Support parameters which are:

670 — Bridge Number
671 — Token-Ring Segment Number
672 — 3174-Peer Segment Number
673 — Token-Ring Hop Count
674 — Frame Forwarding Active
675 — Bridge Performance Threshold
676 — Logging Interval
677 — Alert Threshold.

If you select LAN Manager Support, you also get the LAN Manager Profile parameters which are:

  690 — Reporting Link 0 Password
  691 — Reporting Link 1 Password
  692 — Reporting Link 2 Password
  693 — Reporting Link 3 Password.

Planning the Central Site Distribution

3174-Peer Parameters are saved on the control disk. If the 3174-Peer Parameters may be updated from online tests or LAN Manager support, conventions need to be adopted to ensure the latest parameters are retained.

For additional information on central site distribution planning, see the *Central Site Customizing User's Guide*, GA27-3868.

The 3174-Peer Definition Worksheet

In order to plan for 3174-Peer Communication support, fill out "Worksheet 22 − 3174-Peer Definition" (Figure 13-1).

_____ 3174-Peer Definition _____

3174-Peer Support

    650 − __   3174-Peer Support

3174-Peer Options

    651 − __   Bridge Support
    652 − __   LAN Manager Support
    653 − __   3174-Peer Online Test Updates

3174-Peer Station Parameters

    660 − 4000 __ __ __ __ __ __ PN 3174-Peer Port Address Range
    661 − __ __   Percentage of Discard Threshold

Figure 13-1. An Example of the 3174-Peer Definition Worksheet

Use the procedure "Filling In Worksheet 22 − 3174-Peer Definition" on page 13-11 to complete this worksheet.

Filling In Worksheet 22 — 3174-Peer Definition

Planner: The following questions appear on "Worksheet 22 — 3174-Peer Definition."
Locate "Worksheet 22 — 3174-Peer Definition" on page A-35. Write your responses
to the questions on the worksheet.

650: 3174-Peer Support

Response:

Y = Yes
N = No

The default is N (No).

Enter:

- Y, if 3174 Peer Communication is to be configured or reconfigured and is to be
  operational when the controller is IMLed.

- N, if 3174 Peer Communication is not to be operational when the controller is
  IMLed.

  Note: If your response to question 650 = yes, then you must respond to
  question 660.

651: Bridge Support

Response:

Y = Yes
N = No

The default is N (No).

Enter:

- Y, if 3174-Peer devices will communicate with devices (which could be
  Token-Ring Gateways) that are not directly attached to the same 3174-Peer
  segment. Ring Parameter Server (RPS) function is provided for the
  Token-Ring.

  If 3174-Peer devices will communicate to this 3174 NN, Bridge must be
  supported. If question 150 digit 1 = 1 (Token-Ring Gateway is selected), and
  3174-Peer devices wish to receive Token-Ring Gateway or APPN NN, Bridge
  must be supported.

- N, if you do not have a Token-Ring Adapter.

652: LAN Manager Support

Response:

Y = Yes
N = No

The default is N (No).

Enter:

- Y, if the 3174-Peer segment will be managed by LAN Network Manager(s). LAN Network Managers provide support for the LAN Reporting Mechanism (LRM) and the following server functions:

  - LAN Bridge Server (LBS)
  - Ring Parameter Server (RPS)
  - Configuration Report Server (CRS) (3174-Peer segment only)
  - Ring Error Monitor (REM) (3174-Peer segment only)

  Note: If your response to this question is Yes, your response to question 651 must also be Yes.

- N, if LAN Manager support is not required.

653: 3174-Peer Online Test Updates

Response:

Y = Yes
N = No

The default is N (No).

- If question 98 is left unconfigured, you cannot use the 3174-Peer Online Test Updates feature.

- If questions 652 = Y and 653 = Y, then the operator is allowed to provide updates from the online test 9 option 12.

- If questions 652 = N, 651 = Y, and 653 = Y, then the operator is allowed to provide updates from the online test options 9 and 10.

- If questions 652 = N, 651 = N, and 653 = Y, then the operator is allowed to provide updates from online test 9 option 9.

660: 3174-Peer Port Address Range

Response: A 12-digit hexadecimal address.

A response is required if question 650 = Y.

Address:

The address you specify, represents a range of default addresses that will be used for 3174-Peer devices. Enter the range that you determined from "Individual Addresses" on page 13-5. The address range is in the following format:

```
4000 XXXX XX PN
```

where X is the user assigned portion of the address and PN is the 3174-Peer port number to which the device is attached. HG 26-00 through 26-31 maps to X'00—1F', and HG 27-00 through 27-31 maps to X'20—3F'.

If LAN Manager is customized, the 3174 has an individual address on the 3174-Peer segment. It is X'4000 XXXX XXFF' where X is the user portion of the address specified for the default address of the attached device. An acceptable response is in the range from X'4000 0000 00' to X'4000 FFFF FF'.

Note: The System Programmer will need to know the actual LAN individual address that will be used by the 3174-Peer devices since this value will be used when configuring the Token-Ring Gateway. The 3174-Peer device may accept the address customized for the 3174 port to which it attaches, or provide its own address.

If 3174-Peer Support is selected (question 650 = yes), and Bridge Support is selected (question 651 = yes), 940 ring entries cannot be 4000 XXXX XXFF and questions 106, 107, and 900 cannot be in the range of 4000 XXXX XX00 through 4000 XXXX XX3F, or be 4000 XXXX XXFF, (where X is the user portion of the address specified in question 660).

661: Percentage of Discard Threshold

Response: 00 − 99 (percent)

The default is 5.

The response to this question specifies the percentage of frames destined to this device that may be discarded within one minute before the device is considered to be congested. The 3174-Peer device is considered to be congested only if the percentage of frames discarded exceeds the specified threshold. If zero is specified, the device is considered to be congested at the end of any minute during which a frame is discarded.

Planner: *You have completed filling in "Worksheet 22 − 3174-Peer Definition." If you:*

- *Responded to questions 650 = Y and 651 = Y, proceed to "The 3174-Peer Bridge Profile Worksheet" on page 13-14.*

- *Responded to question 651 = N, return to the divider page labeled "Microcode Customization Planning." See step 8 to determine if you need to fill out additional worksheets before you continue with the next step.*

You may also refer to the divider page labeled "Worksheet Summary" to determine where to proceed next.

Keep records of your configuration by using one of the methods described under "Customization Records" on page 5-6.

The 3174-Peer Bridge Profile Worksheet

Use the "Worksheet 23 — 3174-Peer Bridge Profile" (Figure 13-2), to define the parameters under which your 3174-Peer Bridge will operate.

```
                              _____ 3174-Peer Bridge Profile _____

   670 —  __            Bridge Number
   671 —  __ __ __      Token-Ring Segment Number
   672 —  __ __ __      3174-Peer Segment Number
   673 —  __            Token-Ring Hop Count
   674 —  __            Frame Forwarding Active
   675 —  __ __ __ __   Bridge Performance Threshold
                        (Frames Discarded Per 10,000)
   676 —  __ __ __ __   Logging Interval
   677 —  __ __ __      Alert Threshold
```

Figure 13-2. An Example of the 3174-Peer Bridge Profile Worksheet

Use the procedure "Filling In Worksheet 23 — 3174-Peer Bridge Profile" on page 13-15 to complete this worksheet.

Filling In Worksheet 23 – 3174-Peer Bridge Profile

Planner: *The following questions appear on "Worksheet 23 – 3174-Peer Bridge Profile." Locate "Worksheet 23 – 3174-Peer Bridge Profile" on page A-36. Write your responses to the questions on the worksheet.*

670: Bridge Number

Response: A hexadecimal value in the range of X'0' to X'F'.

The default is 1.

The bridge number is required to perform source routing. See "Segment and Bridge Numbers" on page 13-5 for additional considerations when answering this question.

671: Token-Ring Segment Number

Response: A hexadecimal value in the range of X'001' to X'FFF'.

There is no default; input is required.

- The Token-Ring segment number is required to perform source routing.

- LAN segments within the same network cannot have the same segment number.

- All bridges must know the Token-Ring by the same segment number.

- The Token-Ring segment number cannot be the same as the 3174-Peer segment number.

Note: If the Token-Ring to which your controller is connected has a device running the IBM Token-Ring Network Bridge Program, its segment number must match the segment number assigned on the 3174-Peer Bridge Profile worksheet. If the numbers do not match, the 3174-Peer bridge does not communicate on the Token-Ring.

672: 3174-Peer Segment Number

Response: A hexadecimal value in the range of X'001' to X'FFF'.

There is no default; input is required.

- The Token-Ring segment number is required to perform source routing.

- LAN segments within the same network cannot have the same segment number.

- The 3174-Peer segment number cannot be the same as the Token-Ring segment number.

673: Token-Ring Hop Count

Response: A value in the range from 1 to 7.

The default is 7.

The Hop Count specifies the maximum number of bridges that a broadcast frame can cross. For more information on hop counts, see "Hop Counts" on page 13-5.

674: Frame Forwarding Active

Response:

Y = Yes
N = No

The default is Y (Yes).

Enter:

- Y, if you want the 3174-Peer bride to forward frames as well as process frames received from the Token-Ring.

- N, if you don't want the 3174-Peer bridge to forward frames received from the Token-Ring. In addition, the 3174-Peer bridge will discard any frames it receives and stop incrementing the discard counters.

675: Bridge Performance Threshold

Response: A value in the range from 0000 to 9999.

The default is 10.

The Bridge Performance Threshold allows specification of the maximum percentage of Information fields that may be discarded by the bridge within one minute before a count is incremented. The number specified is in hundredths of a percentage (or frames per 10,000). A separate count is maintained for frames received from the Token-Ring and frames received from the 3174-Peer.

676: Logging Interval

Response: A value in the range from 00 Hours 00 Minutes to 99 Hours 59 Minutes.

The default is 02 00 (every two hours).

This field defines the time span allowed to elapse during bridge congestion before the Log Manager is invoked to log a bridge congestion entry.

If the Logging Interval is 00 Hours and 00 minutes (00 00), bridge connection is not logged, otherwise the Logging Interval is not measured until the bridge is congested. When the bridge is congested, one minute has elapsed. When the Logging Interval is complete, the Log Manager is invoked.

677: Alert Threshold

Response: A value in the range from 000 to 255.

The default is 010.

This field defines the number of minutes allowed to elapse before an alert is sent for bridge congestion.

If the number of minutes the bridge is congested within the logging interval reaches the Alert Threshold, the logging interval is treated as if it has completed.

Planner: *You have completed filling in "Worksheet 23 – 3174-Peer Bridge Profile."*
If you:

- *Responded to questions 650 = Y, 651 = Y, and 652 = Y proceed to "The LAN Manager Profile Worksheet" on page 13-18.*

- *Responded to question 652 = N, return to the divider page labeled "Microcode Customization Planning." See step 8 to determine if you need to fill out additional worksheets before you continue with the next step.*

You may also refer to the divider page labeled "Worksheet Summary" to determine where to proceed next.

Keep records of your configuration by using one of the methods described under "Customization Records" on page 5-6 .

The LAN Manager Profile Worksheet

Use the "Worksheet 24 – LAN Manager Profile" (Figure 13-3), to define passwords for your LAN Manager Reporting Links.

```
_____ LAN Manager Profile _____


690 – _____  Reporting Link 0 Password
691 – _____  Reporting Link 1 Password
692 – _____  Reporting Link 2 Password
693 – _____  Reporting Link 3 Password
```

Figure 13-3. An Example of the LAN Manager Profile Worksheet

Use the procedure "Filling In Worksheet 24 – LAN Manager Profile" on page 13-19 to complete this worksheet.

Filling In Worksheet 24 — LAN Manager Profile

Planner: The following questions appear on "Worksheet 24 — LAN Manager Profile." Locate "Worksheet 24 — LAN Manager Profile" on page A-37. Write your responses to the questions on the worksheet.

The response to each of the following questions consists of a password for each of your Reporting Links. The passwords are not required to be unique; however, each password that is defined must be six to eight characters in length.

690: Reporting Link 0 Password

Response: An alphanumeric password with characters in the range of 0 − 9 and A − Z. Blanks preceding or imbedded in the password are not permitted.

The default is blanks.

691: Reporting Link 1 Password

Response: An alphanumeric password with characters in the range of 0 − 9 and A − Z. Blanks preceding or imbedded in the password are not permitted.

The default is blanks.

692: Reporting Link 2 Password

Response: An alphanumeric password with characters in the range of 0 − 9 and A − Z. Blanks preceding or imbedded in the password are not permitted.

The default is blanks.

693: Reporting Link 3 Password

Response: An alphanumeric password with characters in the range of 0 − 9 and A − Z. Blanks preceding or imbedded in the password are not permitted.

The default is blanks.

Planner: You have completed filling in "Worksheet 24 — LAN Manager Profile." Return to the divider page labeled "Microcode Customization Planning." See step 8 to determine if you need to fill out additional worksheets before you continue with the next step.

You may also refer to the divider page labeled "Worksheet Summary" to determine where to proceed next.

Keep records of your configuration by using one of the methods described under "Customization Records" on page 5-6.

Chapter 14. Planning for the Asynchronous Emulation Adapter

An Overview of the Asynchronous Emulation Adapter

Before you start planning, you need:

- Worksheets 25 through 37 from Appendix A

- Documentation supporting the ASCII display stations, printers, and hosts you plan to use or attach (for example, ASCII display station and host setup or customizing records).

The Asynchronous Emulation Adapter (AEA) allows:

- 3270 displays and/or printers to communicate with ASCII hosts
- ASCII displays and/or printers to communicate with IBM hosts
- ASCII displays and/or printers to communicate with ASCII hosts.

The Asynchronous Emulation Adapter provides three major modes of operation:

3270 Terminal Emulation allows ASCII terminals to emulate an IBM 3178 Display Station Model C2, 3279 Color Display Station Model 2A, or 3287 Printer Model 2 for connection to an IBM host.

Note: When configured for Multi-Host Support, terminals involved in 3270 emulation can communicate only with the primary host on the primary link.

ASCII Terminal Emulation allows an IBM 3270 display station to emulate an IBM 3101 Display Station, or a Digital Equipment Corporation (DEC) VT100 or VT220, or a Data General D210**, and allows an IBM 3270 printer to emulate an ASCII printer. 3270 terminals can thereby connect to ASCII hosts or public data networks.

ASCII Pass-Through allows ASCII terminals to connect through the 3174 Establishment Controller to ASCII hosts or to public data networks.

Note: To use the AEA, you need the AEA microcode that was supplied with the adapter and a second disk drive or fixed disk to download the microcode. You may need to plan for merging the AEA microcode onto a DSL disk; see the *3174 Utilities Guide*, GA27-3863, for the Merge DSL procedure.

AEA Terminology

The following terms are used throughout this chapter.

Connection Menu A list of all available host connections as defined by station names during customizing. The display station users may select alternate host connections from this list provided they have customized authorization.

Terminal Type Menu A list of all the available names and terminal types for the port to which you are currently connected. Names and terminal types are taken from the station sets defined during customization.

Default Destination A host to which a terminal or printer is connected when it is initially turned on. *If a host is not defined as the default destination for a display station, the Connection Menu is displayed.*

Note: A default destination is required for printers.

AEA station A 3270 or ASCII display station, printer, or host that is involved in asynchronous communication through the AEA.

AEA station set One or more AEA stations with the same attributes[1], such as:

- Station type (for example, 3270 display station or DEC VT100 display station)

- Default destination (for example, the IBM 3270 host or an ASCII host)

- Flow control, line speed, parity, and various other attributes, described later in this chapter.

Station set names for host stations will appear on the connection menu for all devices with AEA access. Station set names for terminals will appear in the terminal type menu, provided that more than one station set is defined.

AEA port set One or more controller ports that have the same physical characteristics such as port type (switched, direct, nonswitched), speed, parity, and so on. A port set supports one or more station sets. All ports in a port set provide access to the same station sets.

Note: Station sets supported by a port set must have the same default destination and different station types.

Port pools A group of ports (a port set) that offers multiple access points to the same resource. When the controller receives a request to connect to a host, it scans the port set for a non-busy (available) port. If one is found, it is selected as the port through which the connection is processed.

---

[1] For customizing purposes, two stations have the same attributes if all the station set questions have the same answers.

AEA Concepts

To plan and set up a communication network, you should be familiar with network components and configurations. In this section are examples of 3270 and ASCII Terminal Emulation with the basic components required for data communication. These examples should help you understand the concepts and functions of asynchronous communication with the AEA feature.

Example 1: This example (see Figure 14-1) shows a 3270 Terminal Emulation configuration in which a remote ASCII terminal accesses an IBM host by connecting over telephone lines to the 3174. The components of the configuration are labeled, and the specific AEA terms that apply to these components are shown below, in **bold**.
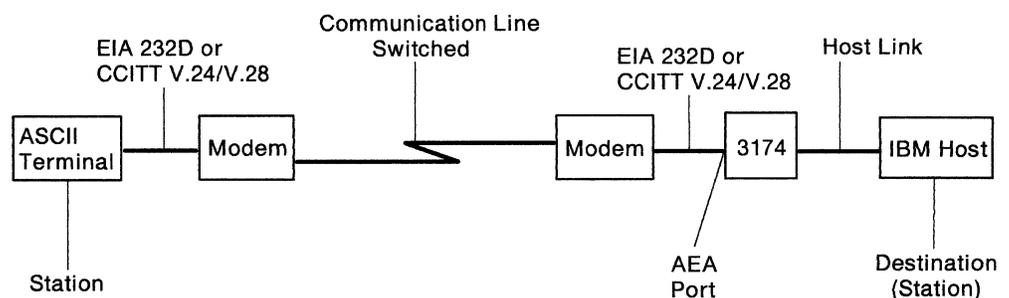
Figure 14-1. 3270 Terminal Emulation Example

The **ASCII terminal** is called a *station*. In general, any display, printer, or host (IBM or ASCII) involved in asynchronous communication through the AEA is called a *station*. In AEA customizing, ASCII terminal stations are identified by a range of characteristics, including *station type* (such as IBM 3101, DEC VT100, Hewlett-Packard 2621B**), *destination* (in this case, the IBM host), *flow control type* (in this case, XON/XOFF), *line speed,* and *parity.*

Modems convert the digital signals from terminals or computers to analog communication signals at one end of the line, and convert the analog communication signals back to digital signals at the other end of the line. In AEA customizing, the modem attached to an AEA port is identified by its *modem type*; the four modem type designations are *Hayes, Micom**, IBM,* and *Other.* Limited-distance modems (LDM) do not have a modem type designation. The Hayes, Micom, IBM, or equivalent auto-call modems are required only for dialing out from the 3174 controller to an ASCII host or public data network. In Figure 14-1, an auto-call modem would be useful at the terminal end of the line; at the 3174 end of the line, an auto-call modem is not required to process calls coming in to the 3174 controller. The modem attached to the remote ASCII terminal must use the same speed and modulation technique as the associated modem attached to the AEA port. Also, the remote modem's type is not relevant to AEA configuration.

The AEA feature supports nonswitched-line, switched-line, and limited-distance modems that provide duplex asynchronous operation and equal transmit and receive speeds, and that conform to EIA 232D/CCITT V.24/V.28 specifications. The AEA feature also supports auto-call[2] modems that conform to the EIA 232D/CCITT V.24/V.28 specifications and to the IBM Attention Command Set (AT), the Hayes AT command set, the Micom auto-dial procedure and other autodial modems, or the AEA manual calling[3] requirement.

The **Communication line** provides a data path between modems. In this example, the communication line is a *switched* line. Switched lines (also called dial lines) use the same equipment and transmission lines that are used for voice (telephone) communication. A connection must be established between the terminal and the host before data can be transmitted. To establish a connection with the IBM host, the remote ASCII terminal user must dial (call) the 3174 just as with voice communication. A user dials the 3174 phone number either by using a telephone connected to the nearby modem, or by using a communication application program and either selecting the number from an automatic call directory or entering the dial digits at the keyboard.

The 3174 then makes the IBM host connection, either immediately or after selection from the Connection Menu.

ASCII terminals can also be connected to the 3174 either *directly* or via *nonswitched* lines. In Figure 14-1 on page 14-5, if the ASCII terminal is no more than 15 meters (50 feet) away from the 3174, it can be connected directly to an AEA port; the two modems and the communication line are not needed for direct connection.

Unlike switched lines, nonswitched lines (also called leased lines or dedicated lines) do not require dialing to establish communication; the line is permanently connected instead of being routed through switching equipment.

Be aware that for nonswitched connections the AEA does not determine whether the connecting device is present or not. While this provides a more flexible interface, connections are sometimes made to nonexistent or powered-off devices. For ASCII host lines, if the user gets a nonswitched connection where the ASCII host is powered off or not connected, the characters will not be echoed (the ASCII host is responsible for character echoing). The user should return to the Connection Menu, disconnect, and try the connection again. This time the AEA will try another host line if one is defined and available.

In Example 1, an **AEA** *port* connects a modem to the 3174. In AEA customizing, ports are identified by their *port type*; the port type reflects the kind of communication line or connection supported between the terminal and the 3174; the port types that can be used by ASCII stations are designated *Switched, Direct,* and *Nonswitched.* The AEA port type in Figure 14-1 on page 14-5 is a *switched* port.

---

[2] An auto-call modem accepts dial digits from the AEA over the data leads. In AEA operation, auto-call is a feature whereby dial digits (an ASCII host phone number) are stored in the 3174 Establishment Controller. These digits are sent to the auto-call modem when the user requests a connection to the ASCII host.

[3] In AEA operation, manual calling means that the terminal user enters the modem commands and dial digits from the keyboard in order to initiate a connection to an ASCII host.

In general, a **destination** is a host to which a terminal user has access. A *default destination* can be specified while planning for the AEA; the default destination is the host to which an ASCII terminal is connected when the user calls into an AEA port on the 3174. If a default destination is not specified, or if the default destination cannot be connected, the user is presented with a *Connection Menu* that consists of a list of host destinations from which the user can select a particular host or application.

Example 2: This example (see Figure 14-2) shows an ASCII Terminal Emulation configuration in which a 3270 terminal accesses a remote ASCII host. The components of the configuration are labeled, and the specific AEA terms that apply to these components are shown below, in **bold**; only those components that differ from the 3270 Terminal Emulation example are described.

EIA 232D or CCITT V.24/V.28   Communication Line   EIA 232D or CCITT V.24/V.28

```
ASCII Host ─── Modem ─── Communication Line ─── Modem ─── 3174 ─── IBM Host
```

Destination (Station)   AEA Port   TA Port   3270 Terminal   Destination (Station)
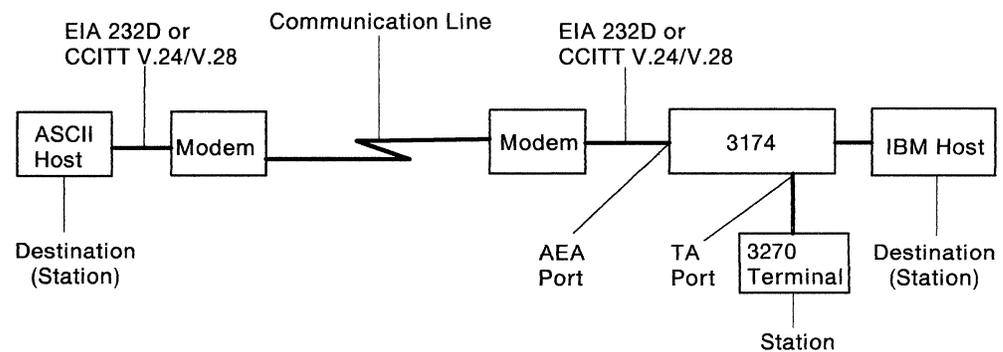
Station

Figure 14-2. ASCII Terminal Emulation Example

In AEA customizing, a **3270 terminal** involved in asynchronous communication is also called a *station*. 3270 terminal stations are identified by their station type (display station or printer) and their destination configuration.

The port type of *coax* is designated for **Terminal Adapter (TA) ports** that connect 3270 terminal stations.

The modem attached to an **AEA port** used for calling out to an ASCII host over switched lines must be a Hayes, Micom, IBM, or equivalent auto-call modem.

The default destination in this case is the host to which a 3270 terminal station is connected when the user switches on the terminal, or toggles the Normal/Test switch. As in the previous example, if a default destination is not specified, the user is presented at connection time with a Connection Menu. In this example, the IBM host could be the default destination; the ASCII host would then have been reached through the Connection Menu.

Planning and Setup Tasks

You must coordinate customizing and site planning activities. Those responsible for customizing the 3174 and for site planning must plan and implement their activities together.

Analyze Your Communication Requirements

You must identify which 3270 and ASCII stations attach to the 3174. In addition, you must decide how the ASCII stations will be connected to the 3174; ASCII stations can be connected either directly or through switched (dialed) or nonswitched telecommunication lines.

When choosing what kind of lines to use, consider that although auto-call modems are more expensive than ordinary modems, switched lines requiring auto-call modems are less expensive to rent and use than nonswitched lines. Over time, the expense of auto-call modems will be recovered by the savings realized on switched line costs.

Nonswitched lines are used to provide immediate access to a dedicated resource and to provide users with more reliable data communication. Nonswitched lines may be conditioned by the common carrier (the company that supplies communication services) to reduce transmission errors and signal distortion, and to increase the speed capability of the line. Switched lines cannot be conditioned.

You must carefully evaluate your communication requirements when deciding on switched or nonswitched lines.

Remember that each asynchronous communication line can support only one session at a time. Therefore, if you have eight users of an ASCII host, and they all need to be connected all day to the same resource, your controller will require eight communication lines to that resource. This may be an unlikely circumstance, so you need to perform a traffic analysis to compute how many lines are required to support the users of a particular resource. For these eight users, you need to evaluate the amount of connect-time per user per hour. You may find that three or four AEA ports are sufficient to prevent an *all ports busy* condition.

Create a System Specification

Planners must work from an overall 3174 controller specification or layout plan. You should provide such a controller specification that consists of 3174 Attachment Diagrams that identify all the attached 3270 (synchronous) and/or ASCII (asynchronous) displays, printers, and hosts. The 3270 and ASCII Attachment Diagrams are in Appendix A, "Configuration Worksheets." The diagrams account for a controller that has up to sixty-four 3270 devices connected to the Terminal Adapters (direct-attached or through a multiplexer), and up to 24 ASCII devices (local and remote terminals or hosts). These diagrams provide much of the information required to fill out configuration worksheets.

Things to Do

You can proceed to the tasks below after you have:

- Identified all the 3270 and ASCII attachments that will use the AEA feature
- Resolved your data communication requirements
- Ordered the AEA feature.

Skip any tasks that do not pertain to your situation.

1. Copy and fill out the 3174 Attachment Diagrams from Appendix A and give copies to those responsible for customizing the 3174 controller and preparing the site.
2. Order communication lines.
3. Subscribe to an information service.
4. Order cables.
5. Order modems.
6. Order test equipment.
7. Prepare the site.
8. Plan for and customize the microcode to support the AEA.
9. Set up AEA hardware (when not installed at the IBM facility).
10. Check out the system — Phase 1 (3174 hardware checkout).
11. Check out the system — Phase 2 (customization checkout).
12. Check out the system — Phase 3 (operational checkout).

Fill Out the 3174 Attachment Diagrams

The 3174 Attachment Diagrams are provided so that you can identify all the 3270 and ASCII displays, printers, and hosts that will be connected to the 3174 Establishment Controller. Follow the instructions that accompany each attachment diagram, and use the completed attachment diagrams to complete the customizing and site planning worksheets.

Things to Order

Order Communication Lines: Contact your communication service (either the telephone company or your in-house communication department), and order the number and kind of communication lines that meet your data communication requirements.

Subscribe to an Information Service: Information services provide databases that meet various information needs. These services advertise in many trade magazines and journals. If your establishment requires an information service, call and request a subscription. The service will provide you with the resource phone number, a user ID and password, and asynchronous communication protocol configuration information. This information will include such items as line speed, parity, number of stop bits, and host data stream type (VT100 or 3101). You will use this information when customizing the AEA ports that will access this information service.

Order Cables: IBM does not provide cables with the AEA feature. You must order or assemble these cables. The cable's wiring must conform to the cabling specification described in *3174 Site Planning*, GA23-0213. Make sure that your vendor provides cables that match this specification.

Order Modems: For auto-dialing out from the 3174 over switched lines, use Hayes, Micom, IBM, or equivalent intelligent modems. The documentation provided with these modems describes how to configure the modem for your specific operations. For answering calls from remote ASCII terminals, ordinary switched modems can be used. Refer to the *3174 Terminal User's Reference for Expanded Functions*, GA23-0332, for modem specifications and configuration switch settings. For nonswitched connections over in-house wiring, limited-distance modems can be used.

Order Test Equipment: The following equipment may be needed to monitor or test AEA operation:

- Test headset or test telephone to check telecommunication lines to remote sites.

- Datascope and a break-out box to examine leads.

- EIA connector gender changer. To run cable wrap tests with the wrap plug supplied with the AEA feature, you may need a connector that changes the gender of the end of the cable.

Prepare the Site

Refer to *3174 Site Planning*, GA23-0213, for such details of site preparation as modem power and equipment rack space requirements. Plan also to terminate the telecommunication lines somewhere near the modems.

Site planning worksheets must be filled out in accordance with the 3174 Attachment Diagrams.

Plan for and Customize the Microcode to Support the AEA

Some of the major customizing activities required for AEA operation are described under "AEA Microcode Customization Planning" on page 14-13. Refer to that section for this information. The configuration worksheets must be filled out in accordance with the 3174 Attachment Diagrams.

Set Up AEA Hardware

The 3174 must be accessible from the front and back to install the AEA, the back panels, and a ground strap. Customer installation and checkout instructions are provided with the AEA feature.

System Checkout

System checkout consists of three phases:

1. Customer installation and cable checkout
2. Customization and modem checkout
3. Operational checkout.

Phase 1 — Customer Installation and Cable Checkout

1. After hardware setup is completed, run offline diagnostics (Alt 2 IML and Alt 1 IML tests) as described in the customer installation instructions that accompany the AEA feature. These tests verify the proper operation of the 3174 and the AEA.

2. Attach cables to the AEA ports.

3. Check the continuity of cables. For cables wired for connection to a modem, the wrap plug is attached to the end of a cable. ALT 1 IML wrap tests are run on the selected AEA port[4] (refer to the *3174 User's Guide* for test procedures). The procedure should be repeated for each cable. You should repair or replace any cable attached to a port that failed a wrap test and run the test again.

Phase 2 — Customization and Modem Checkout

1. Connect cables to modems, limited-distance modems, or "null modems."[5]
2. Connect communication lines to the modems.
3. Connect ASCII stations to the other end of the communication line.
4. IML the 3174 with customized microcode.
5. Configure and test the modems using online test 12 (refer to the *3174 Customer Problem Determination*, GA23-0217, for more information).

Phase 3 — Operational Checkout: In this phase, with all stations attached and the 3174 IMLed, exercise normal 3270 communications and any AEA modes of operation that apply.

1. Sign on from 3270 display stations, and try to access the IBM host. This step verifies normal terminal/computer operations.

2. If applicable, turn on a directly attached ASCII display station, and check for the Connection Menu[6], terminal type prompt, or IBM host screen, whichever applies. (Press carriage return; or press carriage return, type a period (.), then press carriage return again.)

   Try to access the IBM host; communication between an ASCII terminal and an IBM host exercises 3270 Terminal Emulation.

3. From a 3270 display station (if ASCII Terminal Emulation is configured), request the Connection Menu (if necessary), and verify that the IBM and ASCII hosts are listed. Try to access an ASCII host.

---

[4] Wrap tests work only on cables wired for connection to modems; wrap tests do not work on cables wired for direct connection of terminals or computers.

[5] A null modem is a device with two 25-pin D-shell connectors that attaches to the station end of a standard, straight-through, pin-for-pin EIA 232D/CCITT V.24/V.28 cable. The null modem does the crossing-over of the appropriate leads required for the direct connection of a terminal or computer to an AEA port (see *3174 Site Planning*, GA23-0213).

[6] Refer to the *3174 Terminal User's Reference for Expanded Functions* for Connection Menu procedures.

4. Request a connection to the IBM host from a supported remote ASCII display station, or one configured to emulate a supported station. Communication between the ASCII terminal and the IBM host exercises 3270 Terminal Emulation and all the hardware components of remote access.

5. If applicable, request a connection to an ASCII host from an ASCII display station to exercise ASCII Pass-Through.

AEA Microcode Customization Planning

The controller requires information about the stations attached to the AEA. Unlike coax-attached stations, most of this information must be provided through customizing because ASCII stations do not have a standardized way of identifying themselves to the controller at connection time. Information about the AEA ports, their use by 3270 stations, and the ASCII stations must be provided to the controller through customizing.

Planning for customizing the 3174 Establishment Controller to support the Asynchronous Emulation Adapter involves:

- Configuring for the AEA
- Specifying what default destinations display stations and printers will have
- Assigning display stations, printers, or hosts to groups called *station sets*
- Assigning station sets to *port sets* (a port or group of ports)
- Mapping (assigning) the ports supporting the station sets to the port sets
- Defining terminal tables and translate tables.

Note: When ASCII display stations with attached printers are defined with unique port assignment entries, host applications can communicate with both at the same time through the same port.

AEA configuration planning involves grouping devices and ports with similar attributes into sets. This process is used to reduce the amount of information that would normally have to be keyed in. For example, instead of keying in the information for each display station attached to the controller, you key in the information *once* for a group of display stations with the same characteristics.

To group the devices and assign them to sets, you need specific information about the display stations, printers, and hosts, and the ports they are attached to:

- What types they are (for example, 3270 or ASCII)
- What their characteristics are (for example, the line speed they require)
- Which ports they are attached to
- How they are attached to the controller
- What host the printers will default to when they are turned on
- Whether the display stations will default to a specific host session or the Connection Menu when they are turned on (for 3270 display stations when the MLT function has been configured, you also need to know what additional default destinations must be specified).

Using this information, you are guided through three worksheets: "Worksheets 25A and 25B—3270 Attachment Diagram", and "Worksheet 26—ASCII Attachment Diagram." You may have already received completed diagrams; if you have, you may proceed to "Numbering the AEA Station Sets on the Attachment Diagrams" on page 14-36 when you are ready.

You use the three completed attachment diagrams to complete the AEA worksheets.

The three diagrams are an important aid in planning the AEA configuration.
Starting on page 14-19, you are guided through the procedures for filling in the attachment diagrams and the AEA worksheets. Examples of how to fill out the worksheets are provided in these procedures. Additional planning examples are provided in Appendix B, "AEA Planning Examples."

Station Sets and Port Sets

In many instances, much of the information about stations and ports is the same for groups of stations and ports. Customizing provides a way to put stations and ports into *station sets* and *port sets*, respectively, and to assign station and port characteristics on a "set" basis. All members of a set share the same characteristics.

Examples

1. Eight ports on a single AEA are to be used to connect to IBM 3163 display stations over in-house lines running at 9600 bps. The display stations can be grouped into a station set that defines the common station type, line speed, parity, default destination, and other station characteristics. The ports can be grouped into a port set that defines the common port type as *nonswitched*. The station set would be assigned to the port set.

2. Twelve ports (eight on one AEA, four on another) are to be used to provide access to a public database through auto-dialing IBM modems. The ASCII host that has the public database would be a station set that defines the host's attributes, such as the phone number for the host, line speed, parity, and flow control type. The ports can be grouped into a single port set (named, for example, "CALL OUT") that defines the common port type as *switched*, and the common modem type as *IBM*.

3. If VT100s, 3163s, and PCs emulating 3101s all called in to a pool of 20 AEA ports, they would be defined in three station sets all pointing at the same port set: "CALL IN."

4. A switched port set may be used for both incoming calls from displays and for outgoing calls to hosts. The port sets, CALL OUT and CALL IN (in examples 2 and 3), could be combined into one port set, "IN OUT."

Defining port sets and station sets for fixed connections (coax, nonswitched, or direct ports) is usually straightforward: ports that connect stations with the same attributes are assigned to a port set, and stations of the same type are described in a single station set that is assigned to that port set.

Figure 14-3 on page 14-15 shows an example of station set and port set groupings. There are two station sets in the figure: one of ASCII displays and one of ASCII printers. There are also two port sets, made up of groups according to port type.

In this example, each station set connects to one of the port sets; however, if both station sets connected to switched ports, the port set containing switched ports would connect both station sets.
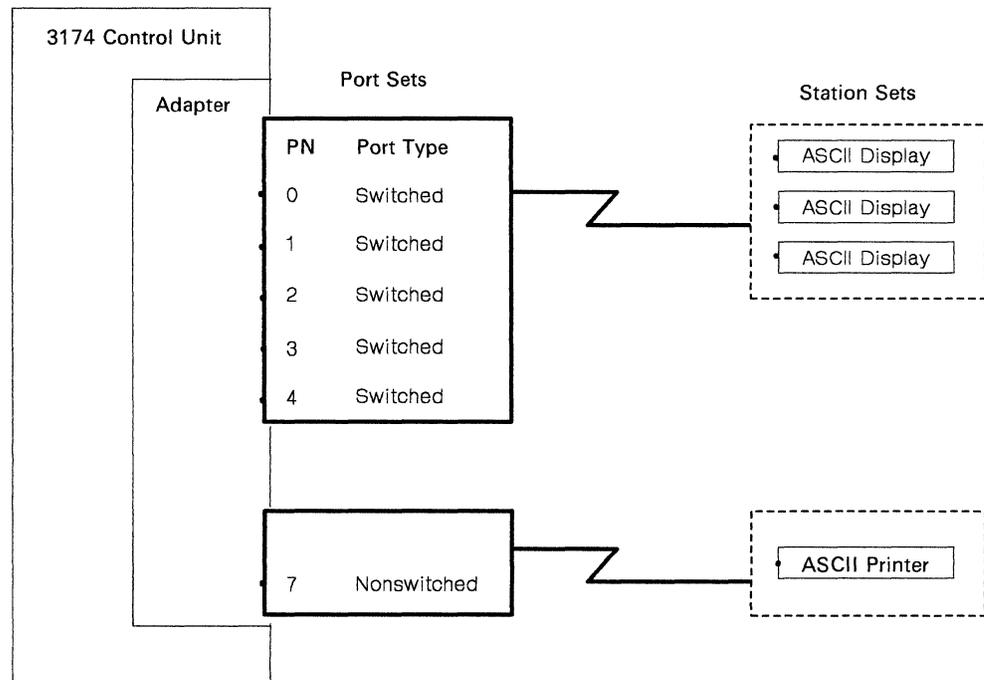
Figure 14-3. Station Sets and Port Sets

Notes:

1. Station sets supported by a port set must have the same default destination.

2. Separate port sets must be defined for ASCII printer station sets and ASCII terminal station sets that are connected to the AEA either directly or over nonswitched lines.

Switched connections offer a wider range of possible configurations; this makes customization for switched connections more complex. Again, stations that have the same attributes are defined in a station set. Several different station sets can be assigned to a single port set. The port set thus becomes a pool of ports that can be used by stations of different types.

When defining port sets, remember that the controller distinguishes the station sets within a port set by their station type. This has several specific implications:

- Display station sets assigned to one port set **must** have different station types. When a display station calls in, the controller determines its station set by the user's response to the station type prompt.

- Display station sets assigned to one port set **must** have identical attachment parameters (such as speed, parity, stop bits, and number of bits per character); they must all use the same speed/parity or autobaud so that the controller knows what to expect when stations call in.

- ASCII Host Station sets assigned to one port set **do not** require identical attachment parameters (speed, parity, or stop bits) within a port set.

- Printers and display stations **must** be in different port sets. When a call arrives, the controller must know whether the call is made from a display or a printer. The printer cannot respond to a station type prompt.

- A display with an attached printer is treated as a display; however, you must inform the 3174 that the display has an attached printer at the time of connection.

In general, assigning as many ports as possible into a single switched port set improves the probability of a port being available. For example, if an eight-port pool for outgoing calls to hosts and an eight-port pool for incoming calls from display stations are combined into one 16-port pool, the outgoing calls can use any available (idle) ports that had been formerly assigned to the incoming port pool. Conversely, the incoming calls can use any available ports that had been formerly assigned to the outgoing port pool.

A reason for limiting the size of port sets is to reduce terminal prompting; if two station sets with different line speeds are assigned to the same port set (line speed must be specified in customizing as *auto*), users are required to enter autobaud sequences and to respond to a station type prompt. These steps can be avoided if separate port sets are defined for the different station sets.

The station set names for hosts appear in the Connection Menu[7]. If more than one display station type can connect to a port, their station set names appear in a *terminal type menu* when the display station connects to the 3174. Users of the system need to understand these station set names, so station set names should be chosen that are self-explanatory. For example, "VAX System 4" is more specific and understandable than "A-Host."

AEA Planning Considerations

The following sections discuss what you should consider when planning for the AEA.

MLT

MLT is a 3174 function that allows 3270 CUT or ASCII display stations to access multiple host sessions. If ASCII MLT support is configured, a display user can interact with, and connect to, up to five host sessions. The host sessions are to the 3270 host 1A and one or more ASCII hosts. 3270 MLT support also enables the display user to interact with, and connect to, up to five host sessions. The sessions are to one or more IBM hosts (through the primary or secondary host links), one or more ASCII hosts, or both. Configuring the AEA to support the MLT function requires planning for special station and port set definitions and host access.

If MLT has been configured, display stations can have as many as five default destinations defined. The default destination configuration (the number and order of default destinations) is specified on a station-set basis; for each default destination configuration, you need to define a station set and associated port set.

If you specify an ASCII host as a default destination, the host connection is established when the display station is turned on; an AEA port supporting that host is dedicated to the display station. In dedicating an AEA port supporting that host, access to that host for other display stations and printers will be limited to the remaining ports supporting that host.

---

[7] If Multi-Host Support is used, the Host Descriptor, if defined, appears instead of the station set name for the 3270 hosts.

For more information regarding the MLT function, see Chapter 6, "Planning to Configure" and Chapter 7, "Planning for Port Assignment."

Storage

The overall storage of the controller must be sufficient to support the AEA and any other function that you may want configured. If controller storage is insufficient for the AEA and other functions you have configured, they will be deconfigured during IML. The resulting configuration will be a minimal system described in Chapter 3, "Planning for Controller Storage" on page 3-1.

The "Storage Planning Procedure" on page 3-5 helps you to determine the storage requirements for the AEA and any other functions you are planning to configure.

Multi-Host Support

If you have configured for Multi-Host Support, then a Logical Terminal Assignment (LTA) is defined to identify which hosts each 3270 display and printer can access. The LTA is defined either through planning or with defaults that are determined when the device is turned on. The LTA determines which logical terminals (LTs) may be used to access ASCII hosts. If the LTA entry for an LT indicates a host session for a CCA-attached host (Host ID 2A-2D or 3A-3D), then the Connection Menu and ASCII hosts cannot be accessed from that LT. The default destination for that LT is ignored; only the session indicated in the LTA is used. However, if the LTA entry for an LT indicates a host session with a host on the primary link (Host ID 1A—1H), then the AEA Default Destination determines whether the LT is first assigned to the Connection Menu, an ASCII host, or a 3270 host. If the AEA Default Destination indicates a 3270 host, then the host session for the LT is the one indicated by the LTA entry.

Note: ASCII devices cannot use Multi-Host Support; therefore, LTA is not used for ASCII devices.

Terminal Tables and Translate Tables

The AEA provides a means for interpreting data from any device and sending data that can be understood by the device. With ASCII stations, this can be difficult, because many ASCII stations communicate using widely varying command sequences. Other factors are the character set that the device supports and the language for which the 3174 is configured. For example, the command sequence for clearing the screen of one station type may have a different effect on another station type. Or a symbol interpreted one way at a 3270 host may be interpreted differently at the ASCII device.

The AEA solves this difficulty by enabling you to define special tables for communicating between 3270 hosts and ASCII station types. There are two types of user-defined tables: *User-Defined Terminal tables (UDT tables)* and *User-Defined Translate tables (UDX tables)*. Each can be defined for inbound and outbound communication.

UDT tables enable the AEA to interpret and send sequences and commands to different ASCII station types in 3270 emulation. These tables map ASCII keyboard sequences to 3270 commands and 3270 sequences to ASCII commands. The AEA provides terminal tables for several commonly used station types; you can define more tables to support other station types.

UDX tables provide information about the character set supported by that station type, the language configured for its 3174 controller, and matching symbols in each

data stream to equivalent symbols in the other data stream. The AEA provides translate tables for several commonly used station types; you can define more tables to support other station types.

The AEA provides several terminal and translate tables that are already defined. If your devices match the station types of these tables and you do not wish to change the tables at all, you can use them for your system. In this case, the necessary information is provided as default values on the customization panels; the customizer simply uses the default values.

For more information on terminal and translate tables, see "Filling In Worksheet 32—Terminal Tables" on page 14-66 and "Filling In Worksheet 35—Translate Tables" on page 14-78.

ASCII Display Stations Supported by the AEA

The following list of ASCII display stations are supported by the AEA:

- ADDS Viewpoint A2**
- ADDS Viewpoint/78**
- Hazeltine 1500**
- Esprit Executive 10/78**
- Hewlett-Packard 2621B
- IBM 3101
- IBM 3151
- IBM 3161
- IBM 3162
- IBM 3163
- IBM 3164
- Cypress, Cedar, and Juniper terminals
- Lear Siegler ADM 3A Dumb Terminal**
- Lear Siegler ADM 5**
- Lear Siegler ADM 11**
- Lear Siegler ADM 1178**
- Lear Siegler ADM 12**
- ANSI 3.64 terminal*
- TeleVideo 912**
- TeleVideo 970**
- DEC VT52**
- DEC VT100
- DEC VT220
- DEC VT240
- DEC VT241**
- Personal Computers running FTTERM
- Tektronix 4205
- WYSE 50/60**
- Minitel 1B**.

Planner: The following procedures for filling in the Attachment Diagrams (3270 and ASCII) are the first step in planning for the AEA. The information on these Attachment Diagrams (when complete) will be used to fill out the remaining AEA worksheets.

Filling In Worksheet 25—3270 Attachment Diagram

Locate and remove "Worksheet 25—3270 Attachment Diagram". This worksheet has two pages; make sure you get both (25A and 25B). The following steps guide you through the worksheet. **Read all these steps before filling in the worksheet.** Throughout these steps, an example configuration is provided. The example is designed to show a variety of connection possibilities and the resulting AEA configuration. This example configuration does not use Multi-Host Support. (You can find additional AEA planning examples in Appendix B.)

The examples shown are for HG 26. Worksheet 25B is for HG 27. You will fill out Worksheet 25B exactly the same for HG 26. The example configuration consists of:

- Hosts:

  - An IBM host named "VMSYS2"
  - Two ASCII hosts named "VAX VMS" and "PARTS"

- ASCII terminal emulation:

  - 3270 display stations accessing the IBM and ASCII hosts
  - 3270 printers accessing the IBM host
  - Use of the MLT function

- 3270 terminal emulation

  - IBM 3151 display stations accessing the IBM host
  - DEC VT100 display stations accessing the IBM host
  - Televideo 912 display stations accessing the IBM host.

Step **1** Fill in the host Station Set Name and Station Set Number columns.

In the response key on the top of the worksheet, fill in a name for each host you want your attached 3270 and ASCII display stations and printers to be able to access. See Figure 14-4.

	Station Set Name	Station Set Number
IBM Host =	VMSYS2	= 1
ASCII Host =	VAX VMS	= 2
ASCII Host =	PARTS	= 3
ASCII Host =		=
ASCII Host =		=
ASCII Host =		=
ASCII Host =		=
ASCII Host =		=
ASCII Host =		=

Figure 14-4. The 3270 Response Key

Note: When Multi-Host Support is used, the "3270 Host" station set is used for all the 3270 hosts that have been configured.

The name may be up to 24 characters long, and up to 28 ASCII hosts may be defined as station sets. The station set for IBM hosts has already been numbered *Station Set Number 1.* Number each additional host sequentially (for example, the next host would be

Station Set Number 2). Use the back of the photocopied worksheet for additional ASCII hosts.

When naming the hosts, use easily recognized names as they will appear in the Connection Menu. Figure 14-4 gives an example of how to fill in these columns.

Step   2   Fill in the Station Type column.

Refer to the completed site planning worksheets to determine what kind of device (a display station or printer) is attached to each of the controller ports. Use the Station Type abbreviations listed in the response key to fill in the Station Type column for each port of the 3270 Terminal Adapter. The Station Type column is used to indicate whether a printer or a display station is attached to the controller port. Figure 14-5 gives an example of how to fill in this column on the worksheet.

Figure 14-5. Filling In the Station Type Column on the 3270 Attachment Diagram

In Figure 14-5, ports 26-00 through 26-16 are all the same Station Type — 3D — which indicates they are 3270 display stations. Ports 26-17 through 26-19 are all Station Type 3P, which indicates they are 3270 printers. Ports 26-20 through 26-31 are Station Type 3D, which indicates they are 3270 display stations.

Step **3** Fill in the Default Destination columns.

The Default Destination columns are used to indicate the initial default destinations of the display stations and printers attached to the 3174 Establishment Controller. In the case of 3270 display stations (when MLT has been configured), they list the concurrent default destinations. For printers, you must specify a host. For display stations, you may or may not specify a host. *If you do not specify a host, write in* CM for Connection Menu. "CM" indicates the 3270 display will have the Connection Menu displayed after powering on.

If you specify an ASCII host as a default destination, the host connection is established when the display station or printer is initially turned on; an AEA port supporting that host is dedicated to the display station or printer. In dedicating an AEA port supporting an ASCII host, access to that host for other displays and printers will be limited to the remaining ports supporting the host. It is recommended that you specify an ASCII host as a default destination only if that ASCII host will be the sole host connection for the display station or printer. *CM* for Connection Menu should be indicated for all display stations that will require occasional access to ASCII hosts. If the Connection Menu is not the default destination, you will be able to display the Connection Menu on the display station by use of the Connection Menu key sequence.

Fill in Default Destination column 1 with either a host station set number (listed in the response key) to indicate a specific host session or *CM* to indicate the Connection Menu.

Fill in Default Destination columns 2 through 5 for display stations, only if MLT has been configured. Write in either a host station set number (from the response key) to indicate a specific host session or *CM* to indicate the Connection Menu for each concurrent default destination.

Notes:

a. If you have 3270 display stations with more than one default destination, it is recommended that you put IBM host sessions first, because of Port Assignment restrictions. See Chapter 7 if you need additional information regarding Port Assignment.

b. When Multi-Host Support is used, the Default Destination entries are ignored for logical terminals that are assigned (using Logical Terminal Assignment) to hosts 2A-2D and 3A-3D. See "Multi-Host Support" on page 14-17 for more information.

c. For 3270 or ASCII display sessions with an attached printer, the default destination for the printer LT is ignored. Instead, a 3270 host connection is assumed.

Figure 14-6 on page 14-22 gives an example of how to fill in the Default Destination columns on the 3270 Attachment Diagram.

3270 Attachment Diagram				Station Set Name	Station Set Number	
			IBM Host = VMSYS2		= 1	
			ASCII Host = VAX VMS		= 2	
			ASCII Host = PARTS		= 3	
			ASCII Host =		=	
			ASCII Host =		=	
	Note: For 3270 Stations Port Type = Coax = 1		ASCII Host =		=	3270 Display=3D Printer=3P
			ASCII Host =		=	
			ASCII Host =		=	
			ASCII Host =		=	

Terminal Adapter HG-26	Port Set Name	Station Set Name	Default Destinations					Station Type
			LT1	LT2	LT3	LT4	LT5	
26-00			1	CM				3D
26-01								
26-02								
26-03								
26-04								
26-05								
26-06								
26-07								
26-08								
26-09								
26-10								
26-11								
26-12								
26-13								
26-14								
26-15								
26-16			↓	↓				↓
26-17			1					3P
26-18			↓					↓
26-19								
26-20			CM					3D
26-21								
26-22								
26-23								
26-24								
26-25								
26-26								
26-27								
26-28								
26-29								
26-30								
26-31			↓					↓

Figure 14-6. Filling In the Default Destination Columns

In Figure 14-6, display stations at ports 26-00 through 26-16 have been given the IBM host as their first default destination and then the Connection Menu. The printers on ports 26-17 through 26-19 have been given the IBM host as their default destination. The display stations on ports 26-20 through 26-31 have been given the Connection Menu.

Step 4 Fill in the Station Set Name column.

To fill in the Station Set Name column, sort the Station Types listed in the Station Type column into the two main types: printers and display stations. *The name may be up to 24 characters long.*

Printers

Sort the printers into groups with the same default destination. Name each **group** and put the corresponding name in the Station Set Name column for each printer in the group.

Display stations

Sort the display stations into groups with the same default destinations and in the same order. Name each **group** and put the corresponding name in the Station Set Name column for each display station in the group.

Figure 14-7 gives an example of how to group the 3270 stations into station sets.

Figure 14-7. An Example of 3270 Station Sets

In Figure 14-7, display stations at ports 26-00 through 26-16 have been given the IBM host as their first default destination and then the Connection Menu. This group has been named **3270 Displays 1**. The printers attached to ports 26-17 through 26-19 have the IBM 3270 Host as their default destination. This group has been named **3270 Printers**. The display stations on ports 26-20 through 26-31 have been given only the Connection Menu. This group has been named **3270 Displays 2**.

The display stations have been grouped and assigned to two different station sets because one group has only one default destination and the other group has a default destination and the Connection Menu (two host sessions).

Step **5** Fill in the Port Set Name column.

The station sets you named can now be assigned to individual port sets.

Assign a port set name to each of the station sets and write the name in the Port Set Name column for the station set assigned to that port set. *The name may be up to 8 characters long.* Figure 14-8 gives an example of how to sort the station sets and assign them to port sets.

Figure 14-8. An Example of 3270 Port Sets

In Figure 14-8, station set 3270 Displays 1 becomes a port set named **3270D1**. Station set 3270 Displays 2 becomes a port set named **3270D2**; this station set must be assigned to a different port set because it has only one default destination (host session). The station set **3270 Printers** has been assigned to port set 3270P.

Planner: *You have completed the 3270 Attachment Diagrams. Proceed to "Filling In Worksheet 26—ASCII Attachment Diagram."*

Filling In Worksheet 26—ASCII Attachment Diagram

Locate and remove "Worksheet 26—ASCII Attachment Diagram" on page A-40. The following steps guide you through the worksheet.

Step   1   Fill in the host Station Set Name and Station Set Number columns.

Copy the station set names and numbers listed in the response key of the 3270 Attachment Diagrams into the response key for the ASCII Attachment Diagram (see Figure 14-9). *The name may be up to 24 characters long.* Figure 14-9 gives an example of how to fill in these columns.

	Station Set Name		Station Set Number
IBM Host =	VMSYS2	=	1
ASCII Host =	VAX VMS	=	2
ASCII Host =	PARTS	=	3
ASCII Host =		=	
ASCII Host =		=	
ASCII Host =		=	
ASCII Host =		=	
ASCII Host =		=	
ASCII Host =		=	

Figure 14-9. ASCII Response Key

In Figure 14-9, the IBM host has been named **VM SYS 2** and has been numbered **Station Set Number 1**. The two ASCII hosts have been named **VAX VMS** and **PARTS** and numbered **Station Set 2** and **Station Set 3**.

Step   2   Fill in the Station Type column.

Using the Station type abbreviations listed at the bottom of the worksheet, fill in the Station Type column for each port of the AEA.

Notes:

a. If several different Station Types will be attached through a modem pool that allows them to access a range of ports, list the Station Types for that range of ports in the Station Type column. A modem pool consists of one or more modems of the same type (for example, three Hayes modems) which are used by several display stations, printers, or hosts to access several controller ports.

b. Be sure to fill in the Station Type column for any ASCII hosts listed in the response key.

Figure 14-10 gives an example of how to fill in this column on the worksheets.

Figure 14-10. Filling In the Station Type Column on the ASCII Attachment Diagram

In Figure 14-10, ports 21-00 through 21-07 have a variety of ASCII display stations, which will be accessing them through this range of ports. The responses listed at the bottom of the worksheet indicate that the **V1** indicates DEC VT100 display stations, the **I1** indicates IBM 3101 display stations, and the **T1** indicates TeleVideo 912 display stations. The ASCII host named **VAX VMS** will be using ports 22-00 through 22-04 to communicate and has been indicated with a station type of AH. The other ASCII host (named **PARTS**) will be using ports 22-05 through 22-07 and has also been indicated by an AH in the station type column.

Step **3** Fill in the Default Destination column.

The Default Destination Column is used to indicate a specific host session or the Connection Menu. The Station Type dictates whether a host or the Connection menu may be specified:

- For printers, a host must be specified.

- For display stations, you may or may not specify a host. *If you do not specify a host, write in* CM.

- For display stations with a printer, only the default destination for the display can be specified

- For hosts, do not specify a default destination.

- For 3270 or ASCII display sessions with an attached printer, the default destination for the printer LT is ignored. Instead a 3270 host connection is assumed.

Fill in the Default Destination column for each printer and display station with either a host station set number (from the response key) or *CM* to indicate Connection Menu.

If you specify an ASCII host as a default destination, the host connection is established when the display station or printer is initially turned on; an AEA port supporting that host is dedicated to the display station or printer. In dedicating an AEA port supporting an ASCII host, access to that host for other display stations and printers will be limited to the remaining ports supporting the host. It is recommended that you specify an ASCII host as a default destination only if that ASCII host will be the sole host connection for the display station or printer. *CM* for Connection Menu should be indicated for all display stations that will require occasional access to ASCII hosts. Figure 14-11 on page 14-28 gives an example of how to fill in the Default Destination column on the ASCII Attachment Diagram.

Figure 14-11. Filling In the Default Destination Column on the ASCII Attachment Diagram

In Figure 14-11, all the display stations in the range of ports (21-00 through 21-07) have been given the IBM Host as their default destination; the IBM Host has been indicated by 1, that being the number assigned to it in the response key.

Step 4 Fill in the Port Type.

This column specifies what type of physical connection will be used to attach the display stations, printers, and hosts to the AEA ports.

Using the Port Type abbreviations listed in the response key, fill in the Port Type column for each of the AEA ports. The following list defines the three possible responses:

2 = Switched — Connection is made through modems attached to the Public Telephone network.

3 = Direct — Connection is made through null modems or by using a DTE cable.

4 = Nonswitched — Connection is made through privately owned or leased lines or by using a DTE cable.

Figure 14-12 gives an example of how to fill in this column on the worksheets.

Figure 14-12. Filling In the Port Type Column

In Figure 14-12 on page 14-29, ports 21-00 through 21-07 all have the same Port Type — 2 — which indicates that the display stations are connected through switched lines. Ports 22-00 through 22-04 have a Port Type of 2, which indicates that this ASCII host is also connected through switched lines. Ports 22-05 through 22-07 have a port type of 3, which indicates that this ASCII host is connected through direct lines.

Step **5** Fill in the Modem Type.

This column specifies what type of modem will be used for the display station, printer, or host on AEA ports using switched lines (having a port type of 2); the modem specified is the modem attached to the controller.

Using the Modem Type abbreviations listed in the response key, fill in the Modem Type column for any AEA ports with a port type of 2. The following list defines the four possible responses:

1 = Hayes (or Hayes-compatible)
2 = Micom (or Micom-compatible)
3 = IBM
4 = Other (modems that meet the AEA specifications).

Figure 14-13 gives an example of how to fill in this column on the worksheets.

ASCII Attachment Diagram

	Station Set Name	Station Set Number
IBM Host	= VMSYS2	= 1
ASCII Host	= VAX VMS	= 2
ASCII Host	= PARTS	= 3
ASCII Host	=	=
ASCII Host	=	=
ASCII Host	=	=
ASCII Host	=	=
ASCII Host	=	=
ASCII Host	=	=

Switched = 2
Direct = 3
Non-switched = 4

Hayes = 1
Micom = 2
IBM = 3
Other = 4

See Station Type Table below

	Port Type	Modem Type	Port Set Name	Station Set Name	Default Destination	Station Type
AEA HG-21						
21-00	2	1			1	V1
21-01						
21-02						
21-03						I1
21-04						
21-05						
21-06						
21-07						T1
AEA HG-22						
22-00	2	2				AH
22-01						
22-02						
22-03						
22-04						
22-05	3					
22-06						
22-07						
AEA HG-23						
23-00						
23-01						
23-02						
23-03						
23-04						
23-05						
23-06						
23-07						

Station Type Table

ASCII Host	= AH	FTTERM (Monochrome)	= FM	Lear Siegler 1178	= L7	Televideo 912	= T1
ASCII Plotter	= AL	Hewlett Packard 2621 B	= H2	IBM 3162 Model 870	= R0	Televideo 970	= T7
ASCII Printer	= AP	IBM 3101	= I1	ROLM Cypress,Cedar,Juniper	= R1	DEC VT100	= V1
ADDS Viewpoint A-1,A-2	= A2	IBM 3151, 3161, 3162, 3163	= I2	ANSI 3.64 Terminal	= S1	DEC VT241	= V2
ADDS Viewpoint 78	= A7	IBM 3151,3161,3162,3163	= I3	UDT5	= U5	DEC VT52	= V5
Esprit Hazeltine 1500	= E1	IBM 3164	= I4	UDT6	= U6	DEC VT220	= V6
Esprit Executive 78	= E7	Lear Siegler ADM 11/12	= L1			Tektronix 4205	= X4
FTTERM (Color)	= FC	Lear Siegler ADM 3A/5	= L3			WYSE 50/60	= W1
UDT1	= U1	UDT3	= U3			Minitel 1B	= M1
UDT2	= U2	UDT4	= U4				

Figure 14-13. Filling In the Modem Type Column

In Figure 14-13, ports 21-00 through 21-07 have the same Modem Type — 1 — which indicates that these display stations all communicate using Hayes modems. Ports 22-00 through 22-04 have a modem type of 2, which indicates that this ASCII host communicates through Micom modems. The ASCII host on ports 22-05 through 22-07 has a port type of 3, which indicates that it is connected through direct lines and therefore does not use a modem.

Step 6 Fill in the Station Set Name column.

To fill in the AEA Station Set column, sort the station types listed in the Station Type column into three main types: hosts, printers, and display stations.

Hosts

Write the station set names for each AEA host (found in the response key) in the Station Set Name column of the AEA ports over which the host will communicate.

Printers

Sort the printers into groups that have the same port type, modem type, and default destination responses. Name each group and write the corresponding name in the Station Set Name column for each printer in the group.

Display stations

Sort the display stations into groups (station sets) that have the same station type, port type, modem type, and default destination responses. Name each group and write the corresponding name in the Station Set Name column for each display station in the group. **Use a name that the display station user can recognize**. If more than one AEA station set of different display stations is assigned to an AEA port set, the display station users will be prompted to identify their display station; the station set names assigned to that port set will be displayed and the display station user will select from the list.

The name can be up to 24 characters long. Figure 14-14 gives an example of how to sort the stations into station sets.

ASCII Attachment Diagram

	Station Set Name	Station Set Number
IBM Host	= VMSYS2	= 1
ASCII Host	= VAX VMS	= 2
ASCII Host	= PARTS	= 3
ASCII Host	=	=
ASCII Host	=	=
ASCII Host	=	=
ASCII Host	=	=
ASCII Host	=	=
ASCII Host	=	=

Switched=2	Hayes =1
Direct =3	Micom=2
Non- =4	IBM =3
switched	Other =4

See Station Type Table below

	Port Type	Modem Type	Port Set Name	Station Set Name	Default Destination	Station Type
AEA HG-21						
21-00	2	1		DECVT100	1	V1
21-01						
21-02						
21-03				IBM3101		I1
21-04						
21-05						
21-06				TELEVIDEO912		
21-07						T1
AEA HG-22						
22-00	2	2		VAX VMS		AH
22-01						
22-02						
22-03						
22-04						
22-05	3			PARTS		
22-06						
22-07						
AEA HG-23						
23-00						
23-01						
23-02						
23-03						
23-04						
23-05						
23-06						
23-07						

Station Type Table

ASCII Host	= AH	FTTERM (Monochrome)	= FM	Lear Siegler 1178	= L7	Televideo 912	= T1
ASCII Plotter	= AL	Hewlett Packard 2621 B	= H2	IBM 3162 Model 870	= R0	Televideo 970	= T7
ASCII Printer	= AP	IBM 3101	= I1	ROLM Cypress,Cedar,Juniper	= R1	DEC VT100	= V1
ADDS Viewpoint A-1,A-2	= A2	IBM 3151, 3161, 3162, 3163	= I2	ANSI 3.64 Terminal	= S1	DEC VT241	= V2
ADDS Viewpoint 78	= A7	IBM 3151,3161,3162,3163	= I3	UDT5	= U5	DEC VT52	= V5
Esprit Hazeltine 1500	= E1	IBM 3164	= I4	UDT6	= U6	DEC VT220	= V6
Esprit Executive 78	= E7	Lear Siegler ADM 11/12	= L1			Tektronix 4205	= X4
FTTERM (Color)	= FC	Lear Siegler ADM 3A/5	= L3			WYSE 50/60	= W1
UDT1	= U1	UDT3	= U3			Minitel 1B	= M1
UDT2	= U2	UDT4	= U4				

Figure 14-14. Filling In the AEA Station Set Name Column

In Figure 14-14, the display stations on the range of ports from 21-00 through 21-07 have the same port type, modem type, and default destination responses; they have been assigned to individual station sets because their station types differ. The display stations with station type V1 have been assigned to station set DECVT100; the display stations with station type I1 have been assigned to station set IBM3101, and the display stations with station type T1 have been assigned to station set TELEVIDEO912. The two ASCII hosts have already been named **VAX VMS** and **PARTS**, and the names have been written in the Station Set Name column.

Step **7** Fill in the Port Set Name column.

To fill in this column, sort the station sets into three groups: station sets made up of display stations, printers, and hosts.

Station sets made up of display stations

Sort these station sets into groups that have the same port type, modem type, and default destination. Name each group and write the corresponding name in the Port Set Name column for each station set assigned to that port set.

Station sets made up of printers

Assign each printer station set to an individual port set and name the port set. Write the corresponding name in the Port Set Name column for each station set.

Station sets made up of hosts

Sort the host station sets into groups with the same port and modem type. Name each group and write the corresponding name in the Port Set Name column for each station set assigned to that port set.

Note: ASCII host station sets and display station sets can be assigned to the same port set if they have the same port and modem type. This results in more efficient use of the modems.

A port set name can be up to 8 characters long. Figure 14-15 gives an example of how to sort the station sets and assign them to port sets.

ASCII Attachment Diagram

Station Set Name	Station Set Number
IBM Host = VMSYS2	= 1
ASCII Host = VAX VMS	= 2
ASCII Host = PARTS	= 3
ASCII Host =	=
ASCII Host =	=
ASCII Host =	=
ASCII Host =	=
ASCII Host =	=
ASCII Host =	=

Switched=2 | Hayes =1
Direct =3 | Micom=2
Non- =4 | IBM =3
switched | Other =4

See Station Type Table below

	Port Type	Modem Type	Port Set Name	Station Set Name	Default Destination	Station Type
AEA HG-21						
21-00	2	1	SWDSPLYS	DECVT100	1	V1
21-01						
21-02						
21-03				IBM3101		I1
21-04						
21-05						
21-06						
21-07				TELEVIDEO912		T1
AEA HG-22						
22-00	2	2	SWHOST	VAX VMS		AH
22-01						
22-02						
22-03						
22-04						
22-05	3		DIRHOST	PARTS		
22-06						
22-07						
AEA HG-23						
23-00						
23-01						
23-02						
23-03						
23-04						
23-05						
23-06						
23-07						

Station Type Table

ASCII Host	= AH	FTTERM (Monochrome)	= FM	Lear Siegler 1178	= L7	Televideo 912 = T1
ASCII Plotter	= AL	Hewlett Packard 2621 B	= H2	IBM 3162 Model 870	= R0	Televideo 970 = T7
ASCII Printer	= AP	IBM 3101	= I1	ROLM Cypress,Cedar,Juniper = R1	DEC VT100 = V1
ADDS Viewpoint A-1,A-2= A2	IBM 3151, 3161, 3162, 3163 = I2	ANSI 3.64 Terminal = S1	DEC VT241 = V2
ADDS Viewpoint 78	= A7	IBM 3151,3161,3162,3163	= I3	UDT5 = U5	DEC VT52 = V5
Esprit Hazeltine 1500 = E1	IBM 3164 = I4	UDT6 = U6	DEC VT220 = V6
Esprit Executive 78 = E7	Lear Siegler ADM 11/12 = L1		Tektronix 4205= X4
FTTERM (Color) = FC	Lear Siegler ADM 3A/5 = L3		WYSE 50/60 = W1
UDT1 = U1	UDT3 = U3		Minitel 1B = M1
UDT2 = U2	UDT4 = U4		

Figure 14-15. An Example of AEA Port Sets

In Figure 14-15, the station sets DECVT100, IBM3101, and TELEVIDEO912 can be assigned to the same port set because their station types are different and their port and modem types are the same; they have both been assigned to port set SWDSPLYS. The first ASCII host station set, named **VAX VMS**, cannot be assigned to the same port set as the second ASCII host station set, named **PARTS**, because their port types differ; station set VAX VMS has been assigned to port set SWHOST and station set PARTS has been assigned to port set DIRHOST.

Planner: You have completed the ASCII Attachment Diagram. Proceed to "Numbering the AEA Station Sets on the Attachment Diagrams" on page 14-36.

Numbering the AEA Station Sets on the Attachment Diagrams

The host station sets have already been numbered in the response keys. Start numbering the station sets sequentially on the 3270 Attachment Diagram from the last number you assigned to a host in the response key. For example, if the last host was numbered 3, number the next station set 4. When you have completed numbering the station sets on the 3270 Attachment Diagram, number the station sets on the ASCII Attachment Diagram **using the next sequential number**.

Number each station set **once** and then write that number beside the station set name each time the name occurs. Figure 14-16 gives an example of how to number the station sets.
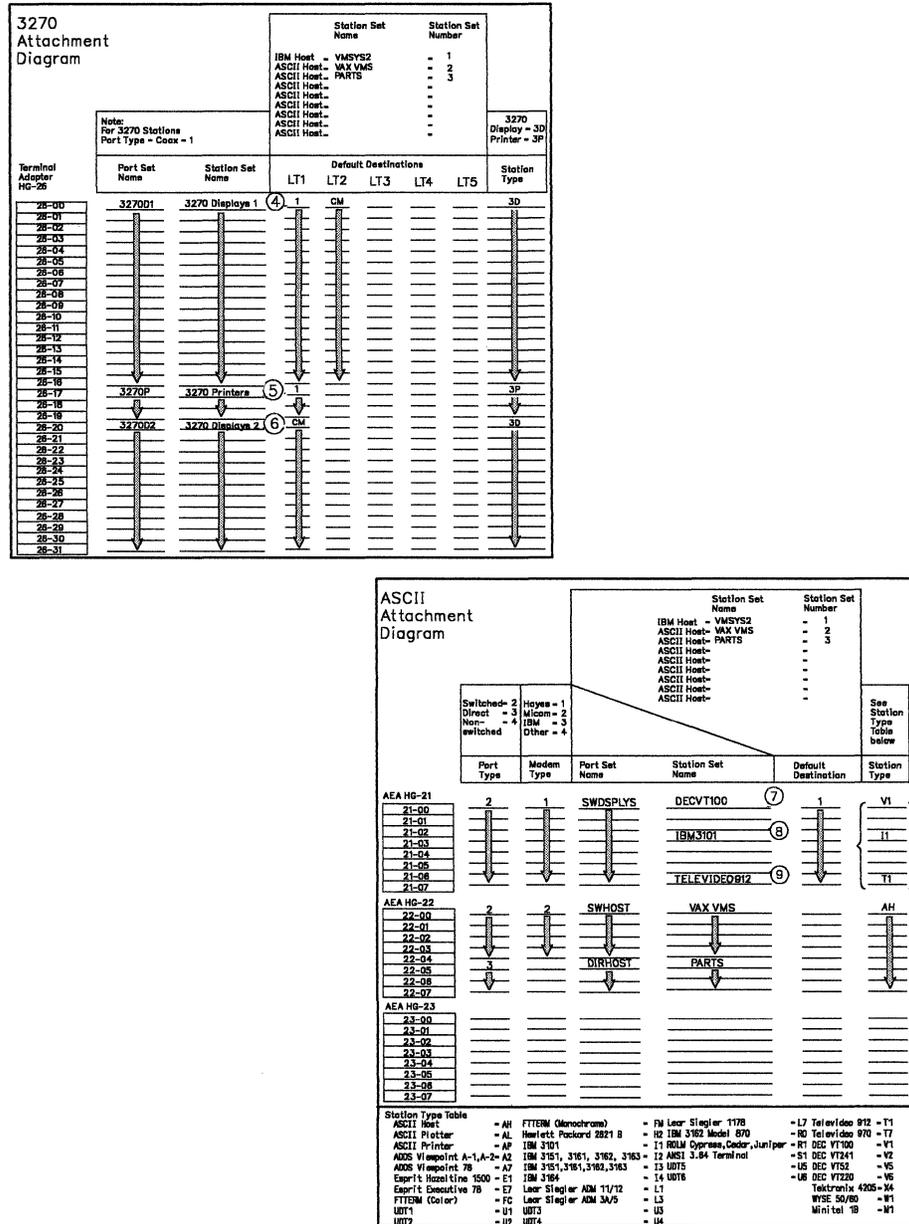
Figure 14-16. An Example of AEA Station Set Numbering

In Figure 14-16 on page 14-36, the IBM 3270 Host and two ASCII hosts have been numbered 1, 2, and 3. The 3270 Attachment Diagrams have already been completed, and three station sets have been numbered; station set **3270 Displays 1** has been numbered 4, station set **3270 Printers** has been numbered 5, and station set **3270 Displays 2** has been numbered 6. On the ASCII Attachment Diagram, the AEA station set **DECVT100** has been numbered 7, the station set **IBM3101** has been numbered 8, and the station set **TELEVIDEO912** has been numbered 9.

Planner: You have finished the first step in completing the remaining AEA worksheets. Use the three worksheets you just completed and the following information to fill out Worksheets 27 through 37. Worksheets 27 through 37 are needed by the person customizing the 3174 Establishment Controller to support the AEA.

Remove Worksheets 27 through 37 from Appendix A and read all of the following information before filling them out. These worksheets should be filled out in their numerical order.

Filling In Worksheet 27—AEA Configure

Following is a description of the questions on the worksheet and the possible responses. Read these descriptions and write your responses on the worksheet.

700: Configure the AEA Feature

Response:

0 = Turns off the AEA feature and maintains any AEA configuration data previously stored.

1 = Initiates Configure or Reconfigure procedure for the AEA feature and turns on the AEA.

The default response is 0.

Note: The microcode upgrade process defaults this question to a 0 during upgrade from Release B2.

702: Control Key Assignment

Response:

0 = Use the ALT key to provide the control function for ASCII Emulation users.

1 = Use the control key to provide the control function for ASCII emulation users.

The default response is 1.

If you select 0, the same end-user keyboard interface is provided as in 3174 Configuration Support B1.

Notes:

1. Option 0 is valid only for U.S.A. English.

2. If option 0 is selected, DEC VT220 and Data General D210 emulation are not permitted.

3. When option 0 is selected, KDU mappings are ignored during ASCII Emulation; the keyboard diverts back to its normal layout.

4. The microcode upgrade process defaults this question to a 1 during upgrade from Release B2.

703: Request MLT for AEA

Response:

0 = No AEA MLT support.

1 = Request AEA MLT support.

The default response is 0.

If this question = 1 and question 700 = 1, then question 110 cannot = 0.

710: Miscellaneous ASCII Feature Options (A)

Response: Eight digits (0 or 1).

0 = No
1 = Yes.

The default response is 00000000.

Digits are numbered from left to right.

Digit	Description
1	Reverse Video Option
2	Automatic New Line After End of Print
3	DSR Timing for Deactivating Connections
4	DSR Timing for Activating Connections
5	Printer Keyboard Option
6	Status Line Update Option
7	Ignore DG D210 Dim On/Dim Off Sequences
8	Reserved

Digit 1 - Reverse Video Blanks-to-Hyphens Option: For 3270 displays *without* EABs, specifying this bit as 1 results in reverse video blanks displaying as hyphens.

Digit 2 - Automatic New Line After End of Print: Specifying this bit as a 1 results in an automatic new line only if the column pointer is in a position other than column 1. Specifying this bit as a 0 results in an automatic new line regardless of where the column pointer is located.

Digit 3 - DSR Timing For Deactivating Connections: When this bit is specified as a 1, the AEA will not immediately deactivate a connection for a direct or switched port when DSR drops. Instead, it will time how long DSR remains low. If it is low for less than two seconds, the connection will remain active. If it is low for more than two seconds, the connection will be deactivated.

When this bit is specified as a 0, the AEA will deactivate a connection for direct and switched ports as soon as DSR drops.

For additional information on port deactivation, see the 3174 *AEA Description and Reference*, GA27-3872.

Digit 4 - DSR Timing for Activating Connections: Specifying this bit as a 1 results in the AEA recognizing that a connection has been established on switched or direct ports if DSR remains high for 500 milliseconds in response to the AEA raising DTR and RTS. This allows for faster connections on lines where the leads are stable.

When this bit is specified as a 0, DSR must remain high for two seconds in response to the AEA raising DTR and RTS.

For additional information on port activation, see the 3174 *AEA Description and Reference*.

Digit 5 - Printer Keyboard Option: When this bit is set, it causes the AEA to ignore all inputs from the ASCII printer except the pacing data.

Digit 6 - Status Line Update Option: When this bit is set, it causes the AEA to update the status line after it finishes updating the data portion of the screen. If

you are using FTHLLAPI programs that expect the status line to be updated after the entire screen is written, you must set this bit.

Digit 7 - Ignore Dim On/Dim Off Sequence: For ASCII emulation of the Data General D210, specifying this bit as 1 results in the sequences for turning the dim attribute on and off being ignored.

Digit 8 - Reserved: This digit is reserved.

711: Miscellaneous ASCII Feature Options (B)

Response: Eight digits (0 or 1).

0 = No
1 = Yes.

The default response is 00000000.

Digits are numbered from left to right.

Note: This customization question is reserved for use in defining non-standard feature options.

Digit	Description
1	Send TERMSELF when Device Disconnect
2	SLU Capability Vector of Notify = 00
3	Disconnect on UNBIND
4	Reserved
5	Reserved
6	Reserved
7	Reserved
8	Reserved

Digit 1 - Send TERMSELF when Device Disconnects: Specifying this bit as a 1 results in TERMSELF being sent when a device in session with a 3270 SNA host application disconnects.

Specifying this bit as a 0 results in an UNBIND being sent when a device in session with a 3270 SNA host application disconnects.

Digit 2 - SLU Capability of Power Off Request: Specifying this bit as a 1 results in a value of X'00' for the Secondary LU capability byte of control vector X'0C' for Power Off Notify requests. This prevents a SNA host application from retaining data between sessions.

Specifying this bit as a 0 results in a value of X'10' for the Secondary LU capability byte of control vector X'0C' for a Power Off Notify Request.

Digit 3 - Disconnect on UNBIND: For ASCII devices in 3270 emulation mode, the device will be disconnected upon receipt of an UNBIND other than types 2 or 3.

When the AEA port is defined with multiple sessions, an UNBIND on any of the sessions causes the line connection to be broken. This function allows a host application to not only terminate the LU-LU session, but also to terminate the switched line connection as well.

Digits 4 through 8 - Reserved: These digits are reserved.

712: Miscellaneous ASCII Feature Options (C)

Response: Eight digits (0 or 1).

$$0 = \text{No}$$
$$1 = \text{Yes.}$$

The default response is 00000000.

Digits are numbered from left to right.

Note: This customization question is reserved for use in defining non-standard feature options.

Digit	Description
1	Reserved
2	Reserved
3	Reserved
4	Reserved
5	Reserved
6	Reserved
7	Reserved
8	Reserved

713: Miscellaneous ASCII Feature Options (D)

Response: Eight digits (0 or 1).

$$0 = \text{No}$$
$$1 = \text{Yes.}$$

The default response is 00000000.

Digits are numbered from left to right.

Note: This customization question is reserved for use in defining non-standard feature options.

Digit	Description
1	Reserved
2	Reserved
3	Reserved
4	Reserved
5	Reserved
6	Reserved
7	Reserved
8	Reserved

Filling In Worksheet 28—AEA Port Set

Following is a list of the different response areas for the worksheet and information on where the responses can be found on the 3270 and ASCII Attachment Diagrams. *Fill in the response areas for each unique port set name.*

Name

Port Set Name column of the worksheets.

Be sure to list all the port set names you wrote in on "Worksheet 25A—3270 Attachment Diagram," "Worksheet 25B—3270 Attachment Diagram," and "Worksheet 26—ASCII Attachment Diagram." *A maximum of 16 is allowed.*

Session Limit

Total number of default destinations (and CMs) listed for the port sets on the 3270 Attachment Diagram. Put the number of default destinations for each port set beside the corresponding port set name on "Worksheet 28—AEA Port Set."

If the number of host addresses is less than the session limit when questions 117 and 118 are being answered, those sessions without host addresses will not be permitted to access the 3270 (IBM host). However, access to ASCII hosts will be permitted. If the address defined for questions 117 and 118 exceeds the session limit number, those addresses will be unused by the controller since no device will have a session corresponding to those addresses.

Note: 3270 and ASCII port sets can have one to five session limits. If a port set is defined without a session limit, the system defaults the limit to 1.

Port Type

Port Type column of the ASCII Attachment Diagram.

For 3270 port sets, respond with a 1.

1 = 3270 Port Set.
2 = Switched — Connection is made through modems attached to the public telephone network.
3 = Direct — Connection is made through null modems.
4 = Nonswitched — Connection is made through privately owned or leased lines.

Note: For nonswitched ports, the AEA will assume the device is attached and will not recognize that the device is powered off.

Modem Type

Modem Type column of the ASCII Attachment Diagram.

For 3270 port sets, do not respond to this question.

1 = Hayes (or Hayes-compatible)
2 = Micom (or Micom-compatible)
3 = IBM
4 = Other (modems that meet the AEA specifications).

Note: Not all of the models made by Hayes, Micom, and IBM are supported. For the modem models and command sets that are supported, see the *3174 Terminal User's Reference for Expanded Functions*, GA23-0332.

Password   8-character response for which the user is prompted. This password is not required. If no password is entered on the AEA Port Set panel, no prompt is given.

Filling In Worksheet 29—AEA Port-to-Port Set Map

Refer to the 3270 and ASCII Attachment Diagrams and determine which controller ports support each port set. On "Worksheet 29—AEA Port to Port Set Map," indicate these ports by writing the number of the port set in the corresponding response area for each controller port. (The port sets are numbered on "Worksheet 28—AEA Port Set.") Figure 14-17 on page 14-44 gives an example of mapping (assigning) the controller ports to the port sets.

In Figure 14-17 on page 14-44, port set 1 is named **3270D1**, port set 2 is **3270P**, port set 3 is **3270D2**, port set 4 is **SWDSPLYS**, port set 5 is **SWHOST**, and port set 6 is **DIRHOST**. Using the numbers of the port sets, you **assign** the 3174 ports to the specific port sets.

In the example:

- 3174 ports 26-00 through 26-16 have been assigned to port set 1 (3270D1).
- Ports 26-17 through 26-19 have been assigned to port set 2 (3270P).
- Ports 26-20 through 26-31 have been assigned to port set 3 (3270D2).
- Ports 27-00 through 27-31 have **not** been assigned to a port set.
- Ports 21-00 through 21-07 have been assigned to port set 4 (SWDSPLYS).
- Ports 22-00 through 22-04 have been assigned to port set 5 (SWHOST).
- Ports 22-05 through 22-07 have been assigned to port set 6 (DIRHOST).

AEA Port Set

	Name	Session Limit	Port Type	Modem Type	Password
1	**3270D1**	**2**	**1**	—	
2	**3270P**	**1**	**1**	—	
3	**3270D2**	**1**	**1**	—	
4	**SWDSPLYS**	—	**2**	**1**	
5	**SWHOST**	—	**2**	**2**	
6	**DIRHOST**	—	**3**	—	
7		—	—	—	
8		—	—	—	
9		—	—	—	
10		—	—	—	
11		—	—	—	
12		—	—	—	
13		—	—	—	
14		—	—	—	
15		—	—	—	
16		—	—	—	

AEA Port to Port Set Map

3270 Ports	0	1	2	3	4	5	6	7
26-00 to 26-07	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
26-08 to 26-15	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
26-16 to 26-23	**1**	**2**	**2**	**2**	**3**	**3**	**3**	**3**
26-24 to 26-31	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
27-00 to 27-07	—	—	—	—	—	—	—	—
27-08 to 27-15	—	—	—	—	—	—	—	—
27-16 to 27-23	—	—	—	—	—	—	—	—
27-24 to 27-31	—	—	—	—	—	—	—	—

AEA Ports	0	1	2	3	4	5	6	7
21-00 to 21-07	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**
22-00 to 22-07	**5**	**5**	**5**	**5**	**5**	**6**	**6**	**6**
23-00 to 23-07	—	—	—	—	—	—	—	—

Figure 14-17. Example of Port-to-Port Set Mapping (Assignment)

Filling In Worksheet 30—AEA Station Set

Each AEA Station Set Worksheet represents a single station set. Make copies of this worksheet, one worksheet for each station set. To fill out these worksheets, refer to the numbers you assigned each station set on the 3270 and ASCII Attachment Diagrams. The first station sets are the host station sets (numbered in the response key). **Station sets must have only one number assigned.**

Using the numbers assigned to each station set, write the number in the response area to the left of question 721 on the Station Set Worksheets. You fill out the Station Set Worksheets in the order in which you numbered them.

Proceed to Table 14-1 on page 14-46. This table contains the questions applicable for each station type. Beginning with station set 1 (the IBM host), answer the questions listed under 3270 host; the questions can be found immediately following the chart.

After you have completed all the AEA Station Set Worksheets, continue with "Filling In Worksheet 31—AEA Default Destination" on page 14-64.

Table 14-1 on page 14-46 lists the questions that must be answered for each type of display station, host, and printer. If a $\sqrt{}$ appears beneath the station type, answer that question. For example, answer questions 721, 722, and 723 for a station set made up of 3270 printers.

Table 14-1. AEA Station-Type-Specific Questions

Question	ASCII Stations				3270 Stations			
	Host	Display Station	Printer	Display Station/ Printer	Host	Display Station	Printer	Display Station/ Printer
721: Station Set Name	√	√	√	√	√	√	√	√
722: Station Type	√	√	√	√	√	√	√	√
723: Port Set Name	√	√	√	√		√	√	√
725: Host Connection Menu Option		√		√		√		√
731: Flow Control	√	√	√	√				
732: XON/XOFF Transmission Resumption	√	√	√	√				
733: Line Speed	√	√	√	√				
734: Line Speed (Host Upper Limit)	√							
735: Parity	√	√	√	√				
736: Stop Bits	√	√	√	√				
737: Maximum Modem Line Speed	√	√	√	√				
741: Switched Disconnect Timeout								
742: Inactivity Timeout	√	√	√	√				
743: Prompt for Universal/Specific Keyboard Map		√		√				
744: Number of Bits per Character	√	√	√	√				
745: ASCII Display Character Set		√		√				
746: Translate Option		√		√				
751: Data Stream Supported by the ASCII Host	√							
752: ASCII Host Phone Number	√							
761: Auto XON/XOFF (DEC VT100/VT220)	√							
762: Wraparound Option (DEC VT100/VT220)	√							
763: New Line Option (DEC VT100/VT220)	√							
764: Margin Bell Option (DEC VT100/VT220)	√							
765: DEC Host ASCII Character Set (DEC VT100/VT220 Data Stream)	√							
771: Automatic Line Feed for Cursor Control (IBM 3101)	√							
772: Carriage Return/ Carriage Return—Line Feed Selection	√							
773: Automatic New Line for Cursor Control (IBM 3101)	√							
774: Scrolling (IBM 3101)	√							
775: Line Turnaround Character	√							
776: IBM ASCII Host Character Set	√							
781: Shared Printer Prompt				√				
782: Use of Form Feed			√	√				
783: Page Length			√	√				
784: Printer Character Set			√	√				
785: ASCII Printer Options			√	√				
786: Page Width			√	√				
787: LU 1 SCS Transparency Translation			√	√				

721: **Station Set Name**

Response: Up to 24 alphanumeric characters (blanks are permitted).

Fill in this response area with the station set name from the Station Set Name column on the attachment diagram. This name represents a group of display stations, printers, or hosts with the same attributes. When naming station sets made up of displays, use a name the display station users can recognize as representing their display stations. If more than one station set of different ASCII display stations is assigned to a port set, the display station users will be prompted to identify their display station; the station set names assigned to that port set will be displayed and the display station user will select from the list.

722: **Station Type**

Response:

Station Set Type	ASCII Respond With	3270 Respond With
Host	AH	3H
Plotter	AL	
Printer	AP	3P
Display Station:		3D
ADDS Viewpoint A1 and A2	A2	
ADDS Viewpoint/78	A7	
Esprit Executive 10/78	E7	
Hazeltine 1500	E1	
FTTERM Color* (IBM File Transfer/Terminal Emulator Program)	FC	
FTTERM Monochrome* (IBM File Transfer/Terminal Emulator Program)	FM	
Hewlett-Packard 2621B	H2	
IBM 3101	I1	
IBM 3151, 3161, 3162, 3163	I2	
IBM 3151, 3161, 3162, 3163	I3	
IBM 3164	I4	
IBM 3151, 3161, 3162, or 3163 with 3708 cartridge	I5	
Lear Siegler ADM 11 or ADM 12	L1	
Lear Siegler ADM 3A or ADM 5	L3	
Lear Siegler ADM 11/78	L7	
IBM 3162 Model 870	R0	
Cypress, Cedar, and Juniper terminals	R1	
ANSI 3.64 terminal	S1	
TeleVideo 912	T1	
TeleVideo 970	T7	
DEC VT100	V1	
DEC VT241	V2	
DEC VT52	V5	
DEC VT220	V6	
Tektronix 4205	X4	
WYSE 50/60	W1	

Minitel 1B	M1
User-Defined Terminal table 1	U1
User-Defined Terminal table 2	U2
User-Defined Terminal table 3	U3
User-Defined Terminal table 4	U4
User-Defined Terminal table 5	U5
User-Defined Terminal table 6	U6

Fill in this response area with the station type listed for this station set in the Station Type column of the applicable attachment diagram.

723: Port Set Name

Response: Up to 8 alphanumeric characters (blanks permitted).

Fill in this response area with the port set name listed for this station set on the applicable attachment diagram, except when the response to question 722 is for 3270 host (or 3H).

This name represents the port set to which this station set has been assigned.

725: Host Connection Menu Option

Response:

0 = The display station users in this station set will not be allowed to select alternative host connections from the Host Connection Menu. They can access only the connection defined in their Default Destination.

1 = The display station users in this station set will be allowed to select alternative host connections from the Host Connection Menu.

The default response is 1.

Planner: Use the following sources of input while gathering information needed to respond to the remaining questions:

* *Persons responsible for setting up ASCII hosts*
* *ASCII host, display station, and printer customizing records*
* *ASCII device-supporting documentation*
* *External database documentation (for example, subscription information for remote ASCII databases).*

731: Flow Control Type

Response:

    0 = None
    1 = XON/XOFF
    2 = DTR (applicable only for nonswitched port types)
    3 = RFS (applicable only for direct port types).

The default response is 1.

Your response specifies the type of flow control to be used between the controller and the ASCII host, display station, or printer.

0 = None   The AEA will not recognize or apply any type of flow control.

1 = XON/XOFF   The AEA will transmit and receive control codes XON and XOFF for data flow control. XOFF is used to halt data transmission. XON is used to allow data transmission to resume.

If this type of flow control is selected for an ASCII host using the D210 data stream, the flow control is one-directional for ASCII terminal emulation. The AEA sends XON/XOFF to the ASCII host to resume or halt the transmission of data. However, if the AEA receives an XON or XOFF control code from the ASCII host, it handles the control code as if it were a normal character and will not use it for pacing.

2 = DTR   When the AEA detects a drop of the signal on the Data Set Ready (DSR) lead, it will stop sending data. To stop data transmission from an attached device, the AEA will drop the signal on the Data Terminal Ready (DTR) lead, which is cabled to the attached device's DSR lead.

3 = RFS   When the AEA recognizes lead changes in Ready for Sending (RFS), it starts or stops sending data. To start or stop data transmission from an attached device, the AEA changes the signal on the Request To Send (RTS) lead.

Note: The correct flow control is required; if an incorrect response is made to this question, overrun errors can result. The DTE cable wiring diagram in *3174 Site Planning*, GA23-0213, must be followed exactly for DTR or RFS flow control to function properly.

Refer to the host, display station, or printer setup information for your response.

732: XON/XOFF Transmission Resumption

Response:

    1 = Resume after any character is received.
    2 = Resume only after XON is received.

The default response is 1.

If XON/XOFF is used, the response to this question indicates the signal the controller must receive to resume transmitting after it has received XOFF. Your response specifies whether transmission will be resumed only after XON is received by the adapter, or after any character is sent to the adapter.

You should use the default, because this precludes display station "hangups" caused by an accidental transmission of XOFF.

733: Line Speed

Response: 0 through 7.

0 = Autobaud/Autoparity	4 = 2400 bps
1 = 300 bps	5 = 4800 bps
2 = 600 bps	6 = 9600 bps
3 = 1200 bps	7 = 19 200 bps.

The default response is 0 and cannot be specified for a host or printer.

Autobaud/Autoparity (0), indicates the AEA will determine the speed and parity of the connecting terminal from the first three characters received. The user must type in CR.CR (carriage return, period, carriage return).

If you are answering this question for a host that supports a range of speeds (for example, 300 to 1200 bits per second), your response should be the lower limit (in this example, 300 bits per second).

If the line speed for the host is not a range, but a specific number (for example, 2400 bits per second), respond to this question and *skip* the next question, 734.

Note: If *Autobaud (0)* is not specified, all terminals assigned to the same port set must be set at the same speed. If the line speed specified is incorrect, response to transmissions may be absent or garbled.

734: Line Speed (ASCII Host Upper Limit)

Planner: This question applies only to ASCII hosts that support autobaud and have a range, as described in question 733. If you responded to question 733 with a specific speed (for example, 2400 bits per second), do not respond to question 734.

Response:

2 = 600 bps	5 = 4800 bps
3 = 1200 bps	6 = 9600 bps
4 = 2400 bps	7 = 19 200 bps.

There is no default response for this question.

This field specifies the host's upper-limit line speed.

Notes:

1. If the host supports autobaud and has a range, the response to this question is the upper limit of the range and must be greater than the response to question 733. Question 733 should **not** be answered as Autobaud (0) for ASCII hosts, but should indicate the lowest data rate supported by both the ASCII host and the AEA.

2. Ensure that the speed you specify for question 734 is not higher than the speed you plan to specify for question 737. Setting 734 higher than 737 will prevent dialing out.

735: Parity

Response:

0 = Autobaud/Autoparity   3 = None
1 = Odd   4 = Space
2 = Even   5 = Mark.

The default response is 0 and applies only to display stations; it cannot be used for hosts or printers.

If Autobaud is specified in question 733, then Autoparity (0) must be specified here.

Note: If *Autobaud (0)* is not specified, all terminals assigned to the same port set must be set at the same speed.

Your response specifies the parity and is required for ASCII hosts and printers. (See the Glossary for a definition of *parity*.)

Notes:

1. If the parity specified is incorrect, response to transmissions will be absent or garbled.

2. Because of hardware limitations, 8-bit Mark and Space parity is not supported.

3. If your device is sending 7 bits no-parity, and autobaud/autoparity is customized on the AEA, you should also configure your device to send two stop bits. Your response to question 736 must be 1 (1 stop bit) to insure the correct parity on the AEA.

736: Stop Bits

Response:

1 = 1 stop bit
2 = 2 stop bits.

The default response is 1.

Your response specifies whether the ASCII characters sent or received require 1 or 2 stop bits. If the number of stop bits specified is incorrect, response to transmissions may be absent or garbled.

737: Maximum Modem Line Speed

Response:

1 = 300 bps   5 = 4800 bps
2 = 600 bps   6 = 9600 bps
3 = 1200 bps   7 = 19 200 bps.
4 = 2400 bps

There is no default response for this question.

Notes:

1. A response must be given if you are using a Hayes or IBM modem on switched lines and responded to question 733 with a 0.

2. Ensure that the speed you specified for question 734 is not higher than the speed you specify for question 737. Setting 734 higher than 737 will prevent dialing out.

Hayes and IBM modem users: If *Autobaud (0)* is specified in question 733, the answer to question 737 will determine the speed that commands are transmitted to your modem. To get the full use of the modem, respond to this question with the highest speed the attached modem it is capable of supporting.

741: Switched Disconnect Timeout (3270 Hosts Only)

Planner: *This question applies only to 3270 hosts using BSC or local non-SNA protocols.*

Response: A three-digit number ranging from 000 to 254, representing a number of minutes (use leading zeros).

The default response is 000.

This question provides additional security function in the event of disconnection of a switched-line ASCII terminal. The response to this question specifies how long (in minutes), after the disconnection, the AEA port associated with this address should be held unavailable to take advantage of a host session timeout security feature. Ask your IBM host system programmer for this response.

742: Inactivity Timeout

Response: Value from 000 to 254, representing a number of minutes (use leading zeros).

The default response is 015. A response of 0 indicates that the device may remain inactive for an indefinite period (no inactivity timeout set).

A nonzero response to this question defines the time an AEA port may remain idle before the connection is broken and the port made available to other users. The timer is reset when data is received from ASCII display stations or hosts. For printer connections, the timer is reset whenever data is sent to the printer.

In deciding what response to make to this question, consider relating time that a display station remains inactive to lost resource. Your response should be made considering the following:

- Line (phone) cost
- Importance of this station set's access
- Port value (access of other display stations).

This question decides the amount of time allowed for a display station, printer, or host to remain idle before the connection is broken.

743: Prompt for Universal/Specific Keyboard Map

Response:

0 = Do not display prompt.
1 = Display prompt.

The default response is 1.

This question decides whether the terminal user is prompted with a choice of using the specific map supporting the display station or a universal map that supports all the terminal types supported by the AEA. A response of 0 indicates the user will be using the specific keyboard map and should not be prompted for a choice.

The specific keyboard map takes advantage of keyboard nomenclature (for example, cursor movement keys) and is recommended if only a few different types of ASCII display stations are in use.

The universal keyboard map is constant for all ASCII display stations and is recommended if many different display stations will be used by the same display station user.

744: Number of Bits per Character

Response:

0 = 7 bits per character
1 = 8 bits per character

The default response is 0.

If question 735 is answered with a 3, option 0 indicates a start bit, 7 data bits, and either 1 or 2 stop bits. If question 735 is answered with a 3, option 1 indicates 8 data bits and no parity bit.

If question 735 is answered with anything other than a 3, the frame includes the parity bit.

Note: Because of hardware limitations, 8-bit Mark and Space parity is not supported.

This question must be answered the same for all stations in a port set.

745: ASCII Display Character Set

Response:

0 = US ASCII
1 = IBM 3101 CS1
2 = IBM 316x CS1 and CS2
3 = ISO 8859/1.2
4 = DEC MCS (requires 8-bit option for question 744)
5 = DEC NRC

The default response is 0.

This question applies only to ASCII displays.

If you are planning for devices that support multiple languages through the AEA, only options 1 through 5 apply.

If you are planning for devices that support one language through the AEA, only option 1 applies.

Notes:

1. If the controller will be configured for U.S.A. English **and** the station type supports the appropriate character set, options 1 through 5 are valid.

2. The answer given to this question may determine which predefined translate table is used for transmitting and receiving data. See question 746.

746: Translate Option

Response:

0 = Default table (US ASCII, CS1, CS1/2, ISO 8859, MCS, NRC)
1 = User-Defined Translate table 1
2 = User-Defined Translate table 2
3 = User-Defined Translate table 3

The default response is 0.

These two digits specify the translate tables to be used for transmitting and receiving data. The first (leftmost) digit specifies the transmit table. The second digit specifies the receive table.

You can define up to three of your own translate tables or use the default table provided by the AEA. For instructions on planning for your own table definitions, see "Filling In Worksheet 35—Translate Tables" on page 14-78.

If you select to use a table provided by the AEA, your response to question 745 determines which default table will be used.

751: Data Stream Supported by the ASCII Host

Response:

1 = Host uses VT100 data stream.
2 = Host uses 3101 data stream.
3 = Host uses Data General D210 data stream (U.S.A. English only).
4 = Host uses a VT220 data stream, 7-bit control.
5 = Host uses a VT220 data stream 8-bit control.

There is no default for this question. This entry is required for ASCII hosts.

752: ASCII Host Phone Number

Planner: A response to this question is required if this host is the default destination of a printer and the Port Type is switched (a response of 2 on "Worksheet 26—ASCII Attachment Diagram" or "Worksheet 28—AEA Port Set").

Response: Up to 48 alphanumeric characters.

This field contains the phone number of the ASCII host. This number will be sent to an autodial modem when a connection to this host is requested. This phone number can contain control characters the modem uses to perform certain operations (for example, "wait for second dial tone").

Certain modem control characters that are not usually allowed during customizing have substitutes provided. Other control characters can be inserted into the dial string by coding the hexadecimal representation of the required ASCII character (for example, X'52' = R).

See Table 14-2 for the modem control characters that must be substituted for IBM or Hayes modems; see Table 14-3 for the modem control characters that must be substituted for Micom modems.

Notes:

1. If you are accessing a public database, refer to your subscription information for your response.

2. Refer to the modem supporting documentation for information on the specific modem requirements and information on control characters.

3. If the Port Type for this station set has been defined as switched (2) and this number is **not** specified, the display station user will be required to send the dial digits to the modem from his display station keyboard (perform a manual dial operation).

4. ATD does not have to be entered. The controller automatically supplies the ATD when dialing the number for Hayes and IBM modems.

Table 14-2. IBM and Hayes Modem-Embedded Character Substitutions

IBM and Hayes Embedded Character	3174 Customization Substitution
P	P
T	T
,	W

The control characters used by IBM and Hayes modems are as follows:

, — Pause (usually to allow for second dial tone)
P — Switch to pulse dialing
T — Switch to tone dialing
0 through 9 — Numbers supported.

Table 14-3. Micom Modem-Embedded Character Substitutions

Micom Embedded Character	3174 Customization Substitution
$	P
&	T
K	K

The control characters used by Micom modems are as follows:

$ — Switch to pulse dialing
& — Switch to tone dialing
K — Wait for second dial tone
0 through 9 — Numbers supported.

Example 1 illustrates control character substitution. In the example, "WW" is used to generate ",," in the dial string. There is no substitute for the "R" in the dial string; therefore, the hexadecimal code X'52' is used to generate "R". The Hayes string shown in the example would become the following string:

```
T9,,P1234567R
```

```
┌── Example 1 ─────────────────────────────────────────────────────────────┐
│                                                                           │
│   T9 WW P123 4567 X52                                                     │
│      ──        ───                                                        │
│      ┬          ┬                                                         │
│      │          │                                                         │
│      │          The hexadecimal code (translates to the character R)      │
│      │                                                                    │
│      The substituted control characters (translates to the characters ,,) │
│                                                                           │
└───────────────────────────────────────────────────────────────────────────┘
```

Note: Spaces are not required between the characters.

If you have a modem type of "other," the phone number can be any character A-Z or 0-9; the 3174 sends the ASCII hexadecimal equivalents for each character to the modems. To generate characters other than A-Z or 0-9, use the hexadecimal X to indicate that the two characters following it are ASCII data and are not to be translated.

The phone number shown below is for a modem type of "other." It contains no control characters or substitutions.

```
ATDT1,,8005551212
```

This phone number is generated by the string shown in Example 2. The characters ,, in the dial string are generated by the hexadecimal code X'2B'.

```
┌── Example 2 ─────────────────────────────────────────────────────────────┐
│                                                                           │
│   ATDT 1  X2BX2B 800 555 1212                                             │
│      ───  ──────                                                          │
│      ┬      ┬                                                             │
│      │      │                                                             │
│      │      The hexadecimal code (translates to the characters ,,)        │
│      │                                                                    │
│      The modem orders                                                     │
│                                                                           │
└───────────────────────────────────────────────────────────────────────────┘
```

761: Auto XON/XOFF (DEC VT100/VT220 Data Stream)

Planner: Questions 761 through 765 apply to ASCII host stations that use a DEC VT100/VT220 data stream. They define the VT100/VT220 setup options the host expects the VT100/VT220 to use.

Refer to DEC VT100/VT220 setup information and to supporting documentation for currently operating local VT100/VT220 display stations. The DEC VT100/VT220 host expects these options to have been set up on the terminals. You may also want to see the 3174 Terminal User's Reference for Expanded Functions, GA23-0332.

Response:

    0 = Auto XON/XOFF disabled
    1 = Auto XON/XOFF enabled.

The default response is 1.

This field specifies whether Auto XON/XOFF is activated.

762: Wraparound Option (DEC VT100/VT220 Data Stream)

Response:

    0 = Wraparound option disabled
    1 = Wraparound option enabled.

The default response is 1.

This field identifies whether the wraparound option is operational. If you leave this question set to its default (1), a new line will be generated when a character is typed after the cursor has reached the right margin.

763: New Line Option (DEC VT100/VT220 Data Stream)

Response:

    0 = New line option disabled
    1 = New line option enabled.

The default response is 1.

This field identifies whether carriage return alone, or both carriage return and line feed will occur.

If the new line option is enabled, pressing the Return key will result in a carriage return and line feed. The receipt of a line feed will also result in a carriage return and line feed.

764: Margin Bell (DEC VT100/VT220 Data Stream)

Response:

0 = Margin bell disabled
1 = Margin bell enabled.

The default response is 1.

This field identifies whether the margin bell is operational. If you leave this question set to its default (1), an audible alarm will be generated when the cursor reaches the 72nd position.

765: DEC Host ASCII Character Set (DEC VT100/VT220 Data Stream)

Response:

0 = DEC NRC
1 = DEC MCS

The default response is 0.

This field identifies the character set used by the ASCII host using the DEC VT100 or DEC VT220 data stream.

771: Automatic Line Feed for Cursor Control (IBM 3101 Data Stream)

Planner: Questions 771 through 776 apply to ASCII host stations that use the IBM 3101 data stream. They define the 3101 setup option that the host expects the 3101s to use.

Refer to the setup information for the currently functioning 3101 terminal and to the IBM 3101 Display Terminal Description, GA18-2033, for information to answer the following questions.

Response:

0 = Automatic line feed disabled
1 = Automatic line feed enabled.

The default response is 1.

This field identifies whether the automatic line feed is operational. If you leave this question set to its default (1), the receipt of a carriage return will result in a carriage return and line feed.

772: Carriage Return/Carriage Return—Line Feed Selection (IBM 3101 Data Stream)

Response:

0 = Carriage Return
1 = Carriage Return and Line Feed.

The default response is 1.

This field identifies whether carriage return alone, or both carriage return and line feed, will occur.

773: Automatic New Line for Cursor Control (IBM 3101 Data Stream)

Response:

0 = Automatic new line disabled
1 = Automatic new line enabled.

The default response is 1.

This field identifies whether the cursor will automatically move to the first
character position on the next line after it reaches the 80th position.

774: Scrolling (IBM 3101 Data Stream)

Response:

0 = Scrolling disabled
1 = Scrolling enabled.

The default response is 1.

This field identifies whether scrolling will be supported for the display stations.

775: Line Turnaround Character (IBM 3101 Data Stream)

Response:

0 = EOT (end of transmission)
1 = CR (carriage return)
2 = XOFF (transmitter off)
3 = ETX (end of text).

The default response is 1.

This field identifies the line turnaround character.

776: IBM ASCII Host Character Set

Response:

1 = ISO - 8859/1.2
2 = IBM 3101 CS1
3 = IBM 316x CS1 and CS2

The default response is 1.

781: Attached Printer Prompt

*Planner: Questions 781 through 787 apply to ASCII printers. They define printer
attributes.*
Response:

0 = No
1 = Yes
2 = Assumed (no prompt but printer attachment is assumed).

The default response is 0.

Some ASCII displays allow for attachment of a printer. The printer can be managed by the AEA as a separate device on the same line. For instance, printing can be accomplished from the ASCII display or initiated from the host.

Note: Display stations with attached printers will not operate if you do not respond to question 781 with a 1.

If you respond to this question with a 1 (Yes), the following prompt will appear at connection time.

```
DO YOU HAVE A PRINTER ATTACHED TO THIS TERMINAL?
(1=YES, 0=NO) ======> _
```

When the prompt appears, users of ASCII display stations with attached printers can decide whether or not to let the AEA manage the attached printers. System prints will be allowed to print on the attached printer if a second host address is assigned to the port and the user responds with yes to the prompt.

782: Use of Form Feed

Response:

0 = Printer does not support form feed
1 = Printer supports form feed.

The default response is 0.

This field identifies whether a printer can perform a form feed.

783: Page Length

Response: Value from 001 to 255 (use leading zeros).

The default response is 066.

This field defines the page length for an attached printer. If the printer does not support form feed, this count will be used to emulate form feeds in 3270 data streams.

784: Printer Character Set

Response:

1 = US ASCII
2 = ISO - 8859/1.2
3 = DEC MCS
4 = PC code page 850
5 = User-Defined Translate table 1
6 = User-Defined Translate table 2
7 = User-Defined Translate table 3

The default response is 1.

The AEA provides translate tables for printers. If you choose not to use one of the supplied tables, you can define your own (options 5, 6, and 7). See "Filling In Worksheet 35—Translate Tables" on page 14-78 for more information.

785: ASCII Printer Options

Response: Eight digits (0 or 1).

0 = No
1 = Yes.

The default response is 11111000. Digits are numbered from left to right.

Digit	Description
1	Options
2	Options
3	Options
4	Options
5	Options
6	Options
7	Options
8	Reserved

Note: These options apply to LU3 (DSC/DSE) datastream and local copies. The 3174 treats a local copy as if it were an LU3 (DSC/DSE) print.

Digit 1 - Options:

0 = A carriage return (CR) at maximum print position (MPP) +1 performs a new line (NL) function.
1 = A CR at MPP+1 performs a CR. The NL function is suppressed.

Digit 2 - Options:

0 = A NL at MPP+1 performs two NL operations.
1 = A NL at MPP+1 performs one NL operation.

Digit 3 - Options:

0 = An FF (Form Feed) followed by data takes up a print position. This causes a space to be printed in the first print position of the first print line on the next page. The print element will be left at the second print position of the first print line on the next page.
1 = An FF followed by data does not take up a print position. Therefore, no space is printed and the print element is left at the first print position of the first print line on the next page.

Digit 4 - Options: Note that this option is affected by Option 7.

If Option 7 is configured for a 1, then Option 4 is overridden.

If Option 7 is configured for a 0 then the following descriptions apply.

0 = When an FF is in the last buffer position of the print buffer, the FF operation moves the print element to the second print position of the first line of the next page and the execution of the FF ends the print. Because Option 7 is configured for a 0, an automatic NL operation moves the print element to the first print position of the second line. The result is a blank line at the top of the new page.

1 = When an FF is in the last buffer position, the FF is executed but no print position is used by the FF character. Therefore, the print element is positioned in the first print position of the first line on the next page. The automatic NL is suppressed and there is no blank line at the top of the new page.

Digit 5 - Options: (Only valid for LU3 (DSC/DSE) formatted prints)

0 = Lines that contain only non-printable fields or nulls are suppressed. Attributes, CR, NL and end-of-message (EM) are treated as nulls.

1 = Null lines are printed as blanks. CR, NL and EM are honored.

Digit 6 - Options:

0 = The FF is valid only in column 1 or at MPP+1; otherwise it is printed as a space.

1 = An FF is valid in any buffer position.

Refer to the tables below for details.

Digit 7 - Options:

0 = At the completion of a print operation, an automatic NL is executed.

1 = At the completion of a print operation, an automatic FF is executed.

When this option is configured for a 1, option 4 is overridden.

If you would like an FF after Local Copy, digit 7 must be configured as a 1. However, note that this will cause an FF after LU3 (DSC/DSE) print as well.

Assume the FF is at the end of the print and valid because it meets one or the other of the conditions for validity stated in Option 6.

- If Option 4 and Option 7 are configured for a 0 then the FF results in the print element being moved to the first print position of the second line of the new page.

- If Option 4 or Option 7 is configured for a 1 then the FF results in the print element being moved to the first print position of the first line of the new page.

Assume the FF is at the end of the print and invalid because Option 6 is configured for a 0 and the FF is not in column 1 or at MPP+1.

- Option 4 is ignored.

- If Option 7 is configured for a 0 then an automatic NL is executed at the completion of the print operation.

- If Option 7 is configured for a 1 then an automatic FF is executed at the completion of the print operation.

Digit 8 - Reserved: This digit is reserved.

786: Page Width

Response: Value from 001 to 255 (use leading zeros).

The default response is 132.

787: LU 1 SCS Transparency Translation

Response:

0 = LU 1 transparent data is not translated.
1 = LU 1 transparent data is translated.

The default response is 0.

This question determines how the printer LU 1 SCS transparency data is to be translated. If translation of data is selected, the table selected in question 784 is used.

If option 0 is selected, transparent data is passed through to the ASCII printer and should be in a format that is compatible with the printer.

Filling In Worksheet 31—AEA Default Destination

The LT1 at the top of this worksheet corresponds to the Default Destination column on the ASCII Attachment Diagram and the Default Destination 1 column on the 3270 Attachment Diagram. LT2 through LT5 correspond to the Default Destination columns LT2 through LT5 on the 3270 Attachment Diagram.

The station set numbers on "Worksheet 31—AEA Default Destination" correspond to the station set numbers on the 3270 and ASCII Attachment Diagrams.

There are considerations for the Default Destination when Multi-Host Support has been configured. Read the discussion on Multi-Host support under "AEA Planning Considerations" on page 14-16 if you have not done so already.

- ASCII Attachment Diagram

  The default destinations for each station set have already been specified in the Default Destination columns on the ASCII Attachment Diagram.

  For each station set number found on the ASCII Attachment Diagram, write in the Default Destination column responses for that station set number in the LT1 through LT5 columns of the AEA Default Destination worksheet. *If CM (for Connection Menu) is indicated for any default destination, leave the corresponding LT column on the AEA Default Destination worksheet blank for that station number.*

  Note: The session limit for ASCII printers is always 1.

- 3270 Attachment Diagrams

  The default destinations for each station set have already been specified in the Default Destination columns on the 3270 Attachment Diagrams.

  For each station set number found on the 3270 Attachment Diagrams, write in the Default Destination column responses for that station set number in the LT1 through LT5 columns of the AEA Default Destination Worksheet. *If CM (for Connection Menu) is indicated for any default destination, leave the corresponding LT column on the AEA Default Destination Worksheet blank for that station set number.*

See Figure 14-18 on page 14-65 for an example of how to complete this worksheet.

3270
Attachment
Diagram

	Station Set Name	Station Set Number
IBM Host	VMSYS2	1
ASCII Host	VAX VMS	2
ASCII Host	PARTS	3
ASCII Host		
ASCII Host		
ASCII Host		
ASCII Host		
ASCII Host		
ASCII Host		

Note:
For 3270 Stations
Port Type - Coax - 1

3270
Display - 3D
Printer - 3P

Terminal Adapter HG-26

Port Set Name	Station Set Name	Default Destinations LT1	LT2	LT3	LT4	LT5	Station Type
327001	3270 Displays 1 ④	1	CM	—	—	—	3D

26-00
26-01
26-02
26-03
26-04
26-05
26-06
26-07
26-08
26-09
26-10
26-11
26-12
26-13
26-14
26-15
26-16

_____ AEA Default Destination _____

Station Set	Station Set Name	Session Limit	Session LT1	LT2	LT3	LT4	LT5
1	___	__	—	—	—	—	—
2	___	__	—	—	—	—	—
3	___	__	—	—	—	—	—
4	___	__	1	—	—	—	—

Figure 14-18. Example of the AEA Default Destination Worksheet

In Figure 14-18, the display stations in Station Set Number 4 have a 1 in the Default Destination 1 column and CM in the Default Destination 2 column on the 3270 Attachment Diagrams. On the AEA Default Destination Worksheet, beside Station Set 4, a 1 is written in the LT1 column and nothing is listed in the LT2 column; a blank represents CM.

Filling In Worksheet 32—Terminal Tables

Planner: *The following procedures explain how to complete a set of worksheets for* **one** *User-Defined Terminal table. Worksheets 32-34 pertain to terminal tables definition; before filling them out, make a set of copies for each terminal table being defined.*

Locate and remove Worksheet 32. Using the descriptions given below, fill in each response area on the worksheet.

Note that this worksheet is divided into two sections. Each section represents a separate customization panel.

Section One: Identifying Each Table

The text below describes the responses needed for the first panel of UDT customization. This panel enables you to identify your UDT tables.

You can define your own tables or copy, modify, and rename tables that are already defined. Details about how to do this are provided in the following text.

Number

Number is the number of the UDT table being defined. The number must be in the range U1—U6. This field is required, and a maximum of six tables can be defined.

Note: If you build a new table by using another as a model and changing its values, save the changes under a new name unless you want to overwrite the model table. Default tables used as models are not overwritten. If you use a default table as a model, whether you make any changes or not, and then you file it away, the table is filed under the UDT number you selected, and the default one left intact.

Name

Name is a mnemonic name that helps you differentiate among the six tables. It can be up to 14 characters long, using any combination of supported characters. Once a UDT has been defined (and filed), its name is displayed on the customizing panel to the right of the table number that it describes.

This field is optional, but if the UDT table is new or previously defined and no name is given, the model name is defaulted to the model number.

Model

Model is a defined table, used as a model for the one you are creating. The list below contains names and IDs of terminal tables already supported. Tables U1-U6 are user-defined. Any existing UDT can be used as a model.

- U1. UDT-1
- U2. UDT-2
- U3. UDT-3
- U4. UDT-4
- U5. UDT-5
- U6. UDT-6
- I1. IBM 3101
- I3. IBM 3151/61/62/63
- I4. IBM 3164
- FC. FTTERM Color

- V1. DEC VT100
- V2. DEC VT241
- V5. DEC VT52
- V6. DEC VT220
- H2. HP 2621B
- L3. LS ADM 3A
- T1. Televideo 912
- T7. Televideo 970
- W1. WYSE 50/60
- X4. Tektronix 4205.

If you wish to use a table as a model, enter the ID of that table in the space provided on the worksheet. If no model is specified at customization, underscores appears in place of default values on subsequent panels.

Figure 14-19 gives an example of UDT selection. In the example, Table U1 is defined under the name DEC VT340. A defined table is being used as a model; it is Table V2, which contains default values for a DEC VT241 station type.

```
_____User-Defined Terminal (UDT) Selection_____

Type the new UDT number and name,
then type the Model ID for the initial UDT defaults.

                           --------------Options--------------
UDT Number..U1             U1-U6

Name........DEC VT340      14 Characters

Model.......V2
                           U1. UDT-1            V1. DEC VT100
                           U2. UDT-2            V2. DEC VT241
                           U3. UDT-3            V5. DEC VT52
                           U4. UDT-4            V6. DEC VT220
                           U5. UDT-5            H2. HP 2621B
                           U6. UDT-6            L3. LS ADM 3A
                           I1. IBM 3101         T1. Televideo 912
                           I3. IBM 3151/61/62/63 T7. Televideo 970
                           I4. IBM 3164         W1. WYSE 50/60
                           FC. FTTERM Color     X4. Tektronix 4205
```

Figure 14-19. Example of User-Defined Terminal (UDT) Selection

Section Two: Selecting Attributes for Tables

This section describes the responses needed for defining the terminal table you have selected. If you select a model terminal table, those attribute values associated with this model appear on the panel as defaults.

Attributes

The attributes are of the station type for which the table is being built. The second part of Worksheet 32 lists possible attributes of this station type. Complete the columns to the right of the Attributes list with appropriate responses.

Last Line Reserved for Status

Yes =   Station type supports a status line.
No =   Station type does not support a status line.

Indicates whether or not station supports an accessible status line (usually line 25). If you specify **No** for this attribute, the Status Line Character Set, Status Line Clear Option, and Use Cursor Seq on Status Line attributes are not applied to the table being built.

But responses to these attributes still must be given (or the default values used). Blanks can be entered as responses, or any of the valid entries described below can be entered. If anything other than blanks or valid entries are used as responses, an error condition results.

Status Line Character Set Valid entries are 0, 1, or 2. Each entry choice is listed and explained below.

0 =   Indicates that the status line characters are translated using the standard translation. This means that no special characters appear on the status line for this station. This option should be used for all stations with a status line that is turned on and off.
1 =   Indicates that the station supports special characters on the status line.
2 =   Indicates that special characters are supported on the status line as in option 1. This support corresponds to that provided by the Televideo 970 display station.

Status Line Clear Option Valid entries are 0, 1, 2, and 3. Each entry choice is listed and explained below. These options only apply if the terminal's last line is reserved for status.

0 =   The status line is not erased when a screen is cleared or on status line entry.
1 =   The status line entry sequence also erases the status line and the complete status line must be rewritten.
2 =   The clear screen command also erases the status line. The status line must be rewritten when the screen is cleared.
3 =   Status line is cleared on both a screen clear and on status line entry. In both cases, the status line must be rewritten.

Use Cursor Seq on Status Line

Yes =   The station's normal Set Cursor command can be used on the status line.
No =   Set Cursor cannot be used.

For example, if no cursor sequence is supported on a status line, then in order to write the clock symbol in columns 11 and 12 of the line, the entire line up to that point must be rewritten.

Scrolling On

Yes = The screen will scroll if a character is sent to the last screen position.
No = Character entry to the last screen position does not cause scrolling.

Indicates whether or not the station type is configured for scrolling ahead. If **Yes** is specified, the 3174 controller will not send characters to the last screen position.

Cursor Wraps at End of Line

Yes = Cursor wraps from column 80 to column 1 of next line.
No = The cursor does not wrap unless a Set Cursor command is sent.

Color Supported

Yes = Color is supported on this station.
No = Color is not supported on this station.

Cursor Class A decimal number from 0 to 5 that indicates how the Set Cursor command is formatted. The number represents a sequence of hexadecimal digits that are required for the station to perform a Set Cursor function. (Set Cursor and Cursor Sequence are described below.)

The Cursor Sequence attribute contains the actual hexadecimal sequence represented by this number. The following text gives more information about the Cursor Sequence attribute.

Cursor Sequence This attribute is a sequence of hexadecimal digits, two to five pairs long, which directs the station to perform a Set Cursor function. The sequences are shown below, each according to the Cursor Class value that represents it. The actual position numbers (line and column) are not included in the example sequences. Each sequence should be read left to right.

Cursor Class 0 is:

- Cursor sequence introducer, made up of any three ASCII characters
- The line number, made up of ASCII characters representing decimals
- An ASCII character separator
- The column number, made up of ASCII characters representing decimals
- An ASCII character trailer.

For example, to position the cursor at line 10, column 21, the sequence might be:

```
ESC   &    a    1    0    y    2    1    C ... (the sequence)
1B    26   61   31   30   79   32   31   43 ........ (in hex)
```

For a station that supports this cursor class, the entry for this example would be 1B26617943.

Cursor Class 1 is:

- Escape character
- Left bracket
- The line number, made up of ASCII characters representing decimals
- An ASCII character separator
- The column number, made up of ASCII characters representing decimals
- An ASCII character trailer.

An example sequence might be:

```
ESC   1b   1   0   ;   2   1   H ... (the sequence)
1B    5B   31  30  3B  32  31  48 ........ (in hex)
```

For a station that supports this cursor class, the entry for this example would be 1B5B3B48.

Cursor Class 2 is:

- Any two ASCII characters
- The line number, in hexadecimal plus X'20'
- The column number, in hexadecimal plus X'20'.

This sequence contains no separators or trailers. An example might be:

```
ESC   A   X'2A'   X'35' ... (the sequence)
1B    41  2A       35 ........ (in hex)
```

For a station that supports this cursor class, the entry for this example would be 1B41.

Cursor Class 3 is:

- One or two ASCII characters
- The column number, in hexadecimal
- The line number, in hexadecimal.

This sequence could have either one of two pairs of introducers, for example:

```
ESC   A   X'15'   X'0A' ... (the sequence)
1B    41  15       0A ........ (in hex)
```

For a station that supports this cursor class, the entry for this example would be 1B41. If only one character is required, that character should be entered.

Cursor Class 4 is

- One or two ASCII characters
- The column number, in hexadecimal plus X'20'
- The line number, in hexadecimal plus X'20'.

This sequence could contain either one or two pairs of introducers. An example might be:

```
ESC   A   X'35'   X'2A' ... (the sequence)
1B    41  35       2A ........ (in hex)
```

For a station that supports this cursor class, the entry for this example would be 1B41. If only one character is required, that character should be entered.

Cursor Class 5 is:

- Any two ASCII characters
- The line number, in hexadecimal
- The column number, in hexadecimal.

This sequence has two pairs of introducers; for example:

```
ESC   A    X'05'  X'15' ... (the sequence)
 1B  41     0A     15  ........ (in hex)
```

For a station that supports this cursor class, the entry for this example would be 1B41.

Note: Cursor classes 3 and 5 use absolute addressing for the cursor. For this reason, XON/XOFF pacing should not be used. Addressing line or column X'11' or X'13' would be interpreted as XON or XOFF.

Refer to your station documentation for information about cursor sequence selection.

Alternate Screen Size

0 = Screen size is 24 x 80 lines/column
1 = Screen size is 30 x 80 lines/column
2 = Screen size is 32 x 80 lines/column.

Sets the size of the station screen. The station's physical screen size must be at least as large as the options selected here. For information about planning for storage, see "Storage Planning Procedure" on page 3-5.

Graphics Query Reply An entry made for this attribute indicates that the device supports graphics and that OEM auxiliary data is passed through to and from the device. The host sends a Read Partition Query X'8F' to the display, and the device responds with a Character Set Query Reply indicating graphics support. A Character Set Query Reply is sent for ASCII devices only if this attribute is specified.

The response specifying Graphics Query Reply must be 8 characters long. The lack of a response in this field indicates that the device does not support graphics; in such a case, Graphic Input Wait Time, Graphics Input Ending Sequence, and Graphics Input Length do not need to be filled in. If a response *is* given for this field, a response must also be given for the Graphics Input Length field. The other two graphics attribute fields are still optional. (Any combination of the next three fields is valid, but the entries should match the capabilities of the device and application.)

Graphics Input Wait Time An entry here indicates the number of 100-millisecond intervals that this device will wait between transmissions to the 3174. After a specified time interval, if no additional data has been received, the controller sends what data it already has to the host.

This response must be a value between 0 and 99. A 0 response indicates that no timeout applies.

Graphics Input Ending Sequence This entry consists of ASCII hexadecimal codes. A maximum of five pairs of them can be entered. If a matching sequence of these characters is received while the station is in Graphics Input mode, the data

received is sent to the host. If this space is left blank, (no response is entered), no search is made for a sequence.

Graphics Input Length This entry indicates the maximum number of characters that can be received during Graphics Input mode before data is sent to the host. The value can be from 1 to 128. If a response is entered for the Graphics Query Reply attribute, this field is required.

Figure 14-20 on page 14-72 shows an example of attribute selection. This example shows the default values that would appear for the selections made in Figure 14-19 on page 14-67. They are the default values for station type DEC VT241 (model table V2).

```
                    U1 User-Defined Terminal Attributes

Tab to the Selection, then type the option.

                                     Selection        Options


Last Line Reserved for Status        N                Y=Yes      N=No
Status Line Character Set . .         0                0-2
Status Line Clear Option              0                0-3
Use Cursor Seq on Status Line        N                Y=Yes      N=No
Scrolling On . . . . . . . .          N                Y=Yes      N=No
Cursor Wraps at End of Line .        N                Y=Yes      N=No
Color Supported . . . . . .           Y                Y=Yes      N=No
Cursor Class . . . . . . . .          1                0-5
Cursor Sequence . . . . . .          1B5B3B48         ASCII hex codes
Alternate Screen Size . . . .         0                0-2
Graphics Query Reply . . . .         DEC340           8 Characters
Graphics Input Wait Time . .          2                0-99 (milliseconds)
Graphics Input Ending Seq . .        5D0D             ASCII hex codes
Graphics Input Length . . . .        128              1-128 Bytes
```

Figure 14-20. Example of User-Defined Terminal Attributes

Defaults

When a model table is used, the values for that model type appear in the response areas during customization and can be referred to as default values.

When planning to customize these tables for your establishment, you may choose to use a model, with default values, and modify those responses for your configuration. For each response being changed, write the new one in the corresponding response area of the worksheet.

Write only those responses that are *changed* in the response areas of the worksheets. You may wish to leave blanks for responses not being modified.

At any time during customization of these panels, if the customizer wishes to show default values, he presses PF4 (Default key). This key refreshes all screens of the panel and shows the original default responses. If a model table is not used, the customization panels display underscores.

Remember, the ASCII sequences are to be entered in hexadecimal. Blanks between hexadecimal characters in a field are not allowed. To see default values for each of the 14 predefined terminal tables, refer to the *IBM 3174 Establishment Controller AEA Description and Reference*.

Filling In Worksheet 33—Inbound Sequence Panels

Locate and remove Worksheet 33. This worksheet has two pages; make sure you get both (33A and 33B). Using the information provided below, fill in the appropriate response areas on the worksheet.

Because the Inbound Sequence Panel is extensive, it may require several screens to be displayed entirely. This is called *windowing*. The portion of the panel seen in each window differs according to the station type used for customizing. Worksheet 33 shows all panel entries grouped over two pages.

ASCII Inbound Sequences

Worksheet 33 shows the AEA-supported 3270 functions. The response areas are for ASCII command sequences the terminal sends inbound to the 3174. The command sequences must be in hexadecimal.

Each 3270 function can be invoked using one of two ASCII sequences: **primary** or **alternate**. The primary command sequence is the one the device should use to accomplish the function; the alternate sequence provides a second method for accomplishing the same function. It can be used for such situations as wanting to use two keys to perform the same function.

No sequence can duplicate another one, primary or alternate. Duplicate sequences are defined as sequences having no differing hexadecimal codes or those that are subsets of others. For example, 1B5B2A and 1B5B are duplicate sequences, whereas 1B5B4A and 1B5B2A are not. Sequence 1B5B is a subset of 1B5B2A.

Figure 14-21 shows the Inbound Sequence Panel with default values for the model table selected in Figure 14-19 on page 14-67 (model table V2). Notice that a primary sequence and an alternate sequence are not necessary for each 3270 function.

_____U1 Inbound Sequences - ASCII Device to 3174_____

Type the ASCII Sequence(s) for each 3270 function.

3270 Function	ASCII Sequence from Terminal Primary	Alternate
PF1	1B4F71	1B31
PF2	1B4F72	1B32
PF3	1B4F73	1B33
PF4	1B4F74	1B34
PF5	1B4F75	1B35
PF6	1B4F76	1B36
PF7	1B4F77	1B37
PF8	1B4F78	1B38
PF9	1B4F79	1B39
PF10	1B4F50	1B30
PF11	1B4F51	1B2D
PF12	1B4F52	1B3D
PF13	1B5B31377E	1B21
PF14	1B5B31387E	1B40
PF15	1B5B31397E	1B23
PF16	1B5B31307E	1B24
PF17	1B5B32327E	1B25
PF18	1B5B32337E	1B5E
PF19	1B5B32347E	1B26
PF20	1B5B32357E	1B2A
PF21	1B5B32367E	1B28
PF22	1B5B32387E	1B29
PF23	1B5B32397E	1B5F
PF24	1B5B33317E	1B2B
PA1	1B5B33327E	1B2C
PA2	1B5B33337E	1B2E
PA3	1B5B33347E	1B2F
ATTN	01	
SysRq	1B5B367E	1B73
Reset	12	
Dev Cancel .	18	
Enter	0D	
Clear Screen	03	
Cursor Select	0B	
Cursor Up . .	1B5B41	
Cursor Down .	1B5B42	0A
Cursor Left .	1B5B44	
Cursor Right	1B5B43	
Tab	09	
Backtab . . .	1B5B317E	
Newline . . .	1B5B347E	
Home	08	1B68
Change Screen	19	

Figure 14-21 (Part 1 of 2). U1 Inbound Sequences - ASCII Device to 3174 for a DEC VT340

```
              _____U1 Inbound Sequences - ASCII Device to 3174_____

      Type the ASCII Sequence(s) for each 3270 function.

                  3270              ASCII Sequence from Terminal
                Function            Primary            Alternate

              Ex Sel  . . .         02                 1B62
              Field Mark. .         06                 _____
              Dup . . . .           04                 _____
              Erase EOF . .         05                 _____
              Erase Input .         1B5B337E           1B69
              Insert  . . .         1B5B337E           1B7F
              Delete  . . .         7F                 _____
              Print . . . .         10                 _____
              Ident . . . .         1A                 1B64
              Status ON/OFF         17                 1B3F
              Refresh . . .         1B5B357E           1B72
              Fast Left . .         16                 _____
              Fast Right  .         15                 _____
              Suspend Print         0C                 1B6F
              Resume Print          07                 1B70
              Test  . . . .         14                 1B74
              File Tran En          _____       _____
              File Tran Dis         _____       _____
              ECHO  . . . .         _____       _____
              ECHO  . . . .         _____       _____
              ECHO  . . . .         _____       _____
```

Figure 14-21 (Part 2 of 2). U1 Inbound Sequences - ASCII Device to 3174 for a DEC
VT340

Filling In Worksheet 34—Outbound Sequence Panels

Locate and remove Worksheet 34. Using the information provided below, fill in the appropriate response areas on the worksheet.

ASCII Outbound Sequences

This worksheet shows the 3270 functions that you can define for your ASCII devices to support. The response areas correspond to the command sequences that are sent outbound from the 3174 to the station. The command sequences are entered in hexadecimal. Only one outbound ASCII sequence can be defined for each 3270 function.

Remember, default sequence values appear if a model table is used. Refer to "Defaults" on page 14-73 for more information about default values.

Figure 14-22 shows the Outbound Sequence Panel, including default values for the model table selected in Figure 14-19 (model table V2).

```
                    U1 Outbound Sequences - 3174 to ASCII Device

Type the ASCII sequence for each function.

         Function          ASCII Sequence to the Terminal

       Term Init Seq       1B5B3F313B383B32681B5B3F333B37
                           6C1B3D1B5B30711B5B481B5B4A1B5B
                           3469
                           _____

                           _____

       Term Exit Seq       1B5B481B5B4A

       Erase EOL           1B5B4B
       Clear Screen        1B5B4A
       Cursor Up           1B5B41
       Cursor Down         1B5B42
       Cursor Left         1B5B44
       Cursor Right        1B5B43
       Status On           _____
       Status Off          _____
       Bell                07
       Dim Unprot          1B5B306D
       Highlt Unprot       1B5B303B316D
       Dim Protec          1B5B306D
       Highlt Protec       1B5B303B316D
       Transparency On     _____
       Transparency Off    _____
       Alpha Clear         _____
       Start Printer       1B5B3569
       Stop Printer        1B5B3469
```

Figure 14-22. U1 Outbound Sequences - 3174 to ASCII Device for a DEC VT340

Filling In Worksheet 35—Translate Tables

Planner: *The following procedures explain how to complete a set of worksheets for* **one** *User-Defined Translate table. Worksheets 32-34 pertain to translate tables definition; before filling them out, make a set of copies for each translate table being defined.*

Locate and remove Worksheet 35. Using the descriptions given below, fill in each response area on the worksheet.

The text below describes the responses needed for the first panel of UDX customization. This panel enables you to identify your UDX tables. You can define your own tables or copy, modify, and rename tables that are already defined. Details about how to do this are provided below.

Number   The number of the UDX being defined. The number must be in the range 1—3. This field is required and a maximum of three tables can be defined.

> **Note:** If you build a new table by using another as a model and changing its values, save the changes under a new name unless you want to overwrite the model table. Default tables used as models are not overwritten. If you use a default table as a model, whether you make any changes or not, and then you file it away, the table is filed under the UDX number you selected and the default one is left intact.

Name   A mnemonic name that helps you differentiate between the three tables. It can be up to 14 characters long, using any combination of supported characters. Once a UDX has been defined (and filed), its name is displayed on the customizing panel to the right of the table number that it describes.

This field is optional, but if no name is entered, the customizing procedure assigns a default name. If the table is new or previously defined and no name is given, the model name is defaulted to the model number.

Language   A two-digit language ID. This ID is that of the keyboard language used for default UDX translation. The languages and their IDs are listed below.

- 01 U.S.A. English
- 03 German
- 07 Danish
- 09 Finnish
- 15 Italian
- 19 Spanish
- 21 Spanish speaking
- 22 UK English
- 23 Norwegian

- 24 Swedish
- 28 Portuguese
- 29 Canadian Bilingual
- 30 French
- 41 Swiss French
- 42 Swiss German
- 43 Belgian
- 47 Netherlands.

The response for this field should match that given for question 121. It is not a requirement but is strongly recommended, as unpredictable results may occur otherwise.

A response to this item *is* required if any of default tables 4-9 are selected as models. (See the description of the model field on 14-79.) The default value is 01.

CECP　　A single digit response that indicates yes (Y) or no (N). Placing a "Y" in this response field indicates that the CECP code page for this language is used.

The response for this field should match that given for question 123 of customization. It is not a requirement but is strongly recommended, as undesirable results may occur otherwise.

A response is required for this item if any of default tables 4-9 are selected as models. (See the description of the Model field, below.) The default value is N.

Model　　A defined table, used as a model for the one you are creating. The list below contains names and IDs of translate tables already supported. Tables UDX-1, UDX-2, and UDX-3 are user-defined. Any existing UDX can be used as a model.

If you wish to use a table as a model, enter the ID of that table in the space provided on the worksheet. If no model is specified at customization, underscores appear in place of default values on subsequent panels.

1. UDX-1
2. UDX-2
3. UDX-3
4. Standard US ASCII to EBCDIC
5. DEC MCS 8-bit Character Table
6. DEC NRC 7-bit Character Table
7. ISO 8859/1.2 7/8-bit Character Table
8. 3101 CS1 Character Set Table
9. 31XX CS1/CS2 SI/SO Character Table

Figure 14-23 on page 14-80 shows an example of UDX table selection. In the example, table 1 is being defined and given the name EngASCII. It provides CECP support. Default table 4 is selected as the model. Table 4 contains the character translation sequences for Standard US ASCII to EBCDIC conversion; these sequences appear as defaults.

```
          _____User-Defined Translate (UDX) Table Selection_____

Type the UDX number and name, then type the language,
CECP support and model options for the UDX defaults.


                              --------------Options--------------
UDX Number....1               1-3

Name...EngASCII               14 Characters

Language.....01               2-digit language code

CECP Support..Y               Y or N

Model........4                1. UDX-1
                              2. UDX-2
                              3. UDX-3
                              4. Standard US ASCII to EBCDIC
                              5. DEC MCS 8-bit character table
                              6. DEC NRC 7-bit character table
                              7. ISO 8859/1.2 7/8-bit character table
                              8. 3101 CS1 character set table
                              9. 31XX CS1/CS2 SI/SO character table
```

Figure 14-23. User-Defined Translate Table Selection. This figure shows an example panel identifying a User-Defined Translate table as supporting U.S.A. English, CECP, and using standard US ASCII to EBCDIC translation.

Each language supported for UDX translation has a unique character set. The hexadecimal values in the translate table correspond to characters in the set. The *3174 Character Set Reference*, GA27-3831 shows the character sets for each language.

Filling In Worksheet 36—Outbound Translate Table Definition

Locate and remove Worksheet 36. Using the information provided below, fill in the appropriate response areas of the worksheet.

EBCDIC Outbound Sequences

This worksheet is designed for specifying how data received from the host is translated to ASCII before being sent to the device.

The worksheet contains a matrix of EBCDIC values. The row numbers (on the left) correspond to the first digit of each EBCDIC value; the column numbers (across the top) correspond to the second digit of each value.

To fill in the response areas of the worksheet, locate the EBCDIC values using the matrix and write the equivalent ASCII value in the appropriate response area.

Defaults

When a model table is used, the values for that model type appear in the response areas during customization and can be referred to as default values.

When planning to customize these tables for your establishment, you may choose to use a model, with default values. Modify those responses for your configuration. For each response being changed, write the new one in the corresponding response area of the worksheet.

Write only those responses that are *changed* in the response areas of the worksheets. You may wish to leave blanks for responses not being modified.

At any time during customization of these panels, if the customizer wishes to show default values for a sequence, he presses PF4 (Default key). This key refreshes all screens of the panel and shows the original default responses. If a model table is not used, the customization panels display underscores.

Remember, the ASCII sequences are to be entered in hexadecimal. Blanks between hexadecimal characters in a field are not allowed. To see default values for each of the 6 predefined translate tables, refer to the *IBM 3174 Establishment Controller AEA Description and Reference*.

Figure 14-24 on page 14-82 shows the an example of the Outbound (EBCDIC to ASCII) Translation Panel. The example shows the default values for model table 4.

Figure 14-24. Outbound Translate Table Defaults for US ASCII, CECP Format

Outbound Translate Table Defaults for US ASCII, CECP Format

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
1	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
2	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
3	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
4	20	20	20	20	20	20	20	20	20	20	5B	2E	3C	28	2B	7C
5	26	20	20	20	20	20	20	20	20	20	21	24	2A	29	3B	5E
6	2D	2F	20	20	20	20	20	20	20	20	5D	2C	25	5F	3E	3F
7	20	20	20	20	20	20	20	20	20	60	3A	23	40	27	3D	22
8	20	61	62	63	64	65	66	67	68	69	20	20	20	20	20	20
9	20	6A	6B	6C	6D	6E	6F	70	71	72	20	20	20	20	20	20
A	20	7E	73	74	75	76	77	78	79	7A	20	20	20	20	20	20
B	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
C	7B	41	42	43	44	45	46	47	48	49	20	20	20	20	20	20
D	7D	4A	4B	4C	4D	4E	4F	50	51	52	20	20	20	20	20	20
E	5C	20	53	54	55	56	57	58	59	5A	3B	20	20	20	20	20
F	30	31	32	33	34	35	36	37	38	39	2A	20	20	20	20	20

Note: When 8-bit codes are entered in this table and the port for which the UDT applies is configured as 7-bit, it is assumed that the terminal or printer supports Shift-in and Shift-out.

Filling In Worksheet 37—Inbound Translate Table Definition

Locate and remove Worksheet 37. Using the information provided below, fill in the appropriate response areas of the worksheet.

ASCII Inbound Sequences

This worksheet is designed for specifying how data received from the device is translated to EBCDIC before being sent on to the host.

The worksheet contains a matrix of ASCII values. The row numbers (on the left) correspond to the first digit of each ASCII value; the column numbers (across the top) correspond to the second digit of each value.

To fill in the response areas of the worksheet, locate the ASCII values using the matrix and write the equivalent EBCDIC value in the appropriate response area.

Figure 14-25 on page 14-83 shows an example of the Inbound (ASCII to EBCDIC) Translation Panel. The example shows the default values for model table 4.

Inbound Translate Table Defaults for US ASCII, CECP Format

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	00	40	40	40	40	40	40	40	40	B9	CA	CA	41	B9	40	40
1	40	40	40	40	40	40	40	40	40	E1	9F	40	40	40	40	CA
2	40	5A	7F	7B	5B	6C	50	7D	4D	5D	5C	4E	6B	60	4B	61
3	F0	F1	F2	F3	F4	F5	F6	F7	F8	F9	7A	5E	4C	7E	6E	6F
4	7C	C1	C2	C3	C4	C5	C6	C7	C8	C9	D1	D2	D3	D4	D5	D6
5	D7	D8	D9	E2	E3	E4	E5	E6	E7	E8	E9	BA	E0	BB	B0	6D
6	79	81	82	83	84	85	86	87	88	89	91	92	93	94	95	96
7	97	98	99	A2	A3	A4	A5	A6	A7	A8	A9	C0	4F	D0	A1	40
8	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
9	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
A	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
B	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
C	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
D	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
E	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
F	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00

Figure 14-25. Inbound Translate Table Defaults for US ASCII, CECP Format

Planner: *You have completed the worksheets required for AEA planning.*

Return to the divider page labeled "Microcode Customization Planning." See step 7 to determine if there are additional worksheets that you need to fill out to complete the planning process. You may also refer to the divider page labeled "Worksheet Summary" to determine where to proceed next.

Keep records of your configuration by using one of the methods described under "Customization Records" on page 5-6.

Chapter 15. Planning to Define Devices

An Overview of Device Definition

Before you start planning, you need the following:

- Information from the site planner about which terminals and printers are attached to which ports
- "Worksheet 38—Device Definition" on page A-53
- "Worksheet 39—Printer Authorization Matrix (PAM)" on page A-54
- "Worksheet 40—Logical Terminal Assignment (LTA)" on page A-55
- "Worksheet 41—Extended Vital Product Data (VPD)" on page A-56
- "Worksheet 42—ISDN Adapter Definition" on page A-57
- "Worksheet 43—ISDN Port Definition" on page A-58
- "Worksheet 44—ISDN Channel Definition" on page A-59
- You may need the completed Port Assignment Worksheets.

Device Definition consists of four separate areas:

- Printer Authorization Matrix (PAM)
- Logical Terminal Assignment (LTA)
- Prompts for Extended Vital Product Data (VPD)
- Integrated Services Digital Network (ISDN).

Printer Authorization Matrix defines which printers the display stations in a cluster can use for local copy, host printing, and shared copy operations. During planning, you complete worksheets that identify the display stations in the PAM for the different copy operations.

Note: If you have already planned for the Asynchronous Emulation Adapter (AEA), refer to the AEA Worksheets for information on AEA printer port assignments. If you have not planned the AEA, you may wish to do so before defining the Printer Authorization Matrix. The information you need for planning the AEA is in Chapter 14.

Logical Terminal Assignment identifies which host sessions each display station can access. An LTA is needed only if you are planning to configure for Multi-Host Support.

Notes:

1. If you have not planned for Port Assignment, you may want to do so before planning the LTA. It is during Port Assignment that devices actually get assigned host addresses. Each 3270 host requires a separate port assignment.

2. If you are planning to configure for Multi-Host support, you need to do both Logical Terminal Assignment and Port Assignment.

Extended Vital Product Data is vital product data that can be entered by a terminal user. During customization, you enter labels that will be used to prompt the terminal user for specific information such as the location of the terminal and the phone number of the terminal user. These labels will appear on the display when the terminal user invokes the facility to enter Extended Vital Product Data.

Integrated Services Digital Network (ISDN) enables the customizer to define the type of network attached to each ISDN Adapter.

The Device Definition Worksheet

When planning for device definition, you need to fill out "Worksheet 38—Device Definition" (Figure 15-1). This worksheet contains four configuration questions that the customizer encounters while performing the Define Devices utility. Your responses to these questions determine whether you want to define the PAM, LTA, Extended VPD, ISDN, or all four.

```
_____ Device Definition _____


800 Printer Authorization Matrix (PAM) -   [  |  ]
                                            0  0
801 Logical Terminal Assignment (LTA) -    [  ]
                                            0
802 Prompts for Extended VPD -             [  ]
                                            0
803 ISDN Definition -                      [  ]
                                            0
```

Figure 15-1. An Example of Worksheet 38 — Device Definition

Filling In Worksheet 38 – Device Definition

Locate "Worksheet 38—Device Definition" on page A-53. Using the following information, write your responses to the questions on the worksheet.

800: Printer Authorization Matrix (PAM)

Response:

00 = Do not define the PAM.
10 = Define the PAM. Printers on HG 27 **cannot** be defined on the PAM.
11 = Define the PAM. Printers on HG 27 **can** be defined on the PAM.

The default response is 00.

Notes:

1. If you leave this question set to the default, previously defined PAM data is not included when the controller is IMLed and the local copy function will be unavailable.

2. Values specified for PRINT ID or Printer Assignment will differ depending on the response.

   - If question 800 = 10, the terminal user will specify either a value, 1-55, that represents the HG 26 or AEA printer port number, or a value, 70-85, that represents the printer class number.

   - If question 800 = 11, the terminal user will specify either a value, 1-47, that represents the PAM entry number, or a value, 70-85, that represents the printer class number.

   For more information on PRINT IDs or Printer Assignments, see Chapter 4 in the *3174 Functional Description*, GA23-0218.

Planner:

- *If you need more information to determine your response, see "Printer Authorization Matrix (PAM)" on page 15-6.*

- *If you responded with a 1 for the first digit, fill out "Worksheet 39—Printer Authorization Matrix (PAM)." The information you need to fill out this worksheet starts on page 15-18.*

801: Logical Terminal Assignment (LTA)

Response:

0 = Do not define the LTA. (Previously defined LTA data will not be included when the controller is IMLed.)
1 = Define the LTA for port 26-00; copy to the remaining ports.
    Define the LTA for port 27-00; copy to the remaining ports.
2 = Define the LTA for individual ports.

The default response is 0.

Note: HG 27 ports are not allowed to access CCA host sessions (2x, 3x).

Planner:

- *If you need more information to determine your response, see "Logical Terminal Assignment (LTA)" on page 15-12.*

- *If you responded with a nonzero response, fill out "Worksheet 40—Logical Terminal Assignment (LTA)." The information you need to fill out this worksheet starts on page 15-12.*

802: Prompts for Extended Vital Product Data (VPD)

Response:

0 = Disable Extended VPD
1 = Enable Extended VPD

The default response is 0.

Planner:

- *If you need more information to determine your response, see "Filling In Worksheet 41 — Prompts for Extended VPD" on page 15-18.*

- *If you responded with a 1, fill out "Worksheet 41—Extended Vital Product Data (VPD)." The information you need to fill out this worksheet can be found on page 15-18.*

803: Integrated Services Digital Network (ISDN) Definition

Response:

0 = Do not define the ISDN.
1 = Define the ISDN.

The default response is 0.

Planner:

- *If you need more information to determine your response, see "Filling In Worksheets 42, 43, and 44 — ISDN Definition" on page 15-22.*

- *If you responded with a 1, fill out "Worksheet 42—ISDN Adapter Definition." The information you need to fill out this worksheet starts on page 15-22.*

Printer Authorization Matrix (PAM)

The Printer Authorization Matrix (PAM) defines which printers the display stations in a cluster can use for local copy, host printing, and shared copy operations. A local copy transfers data directly from the display buffer to the printer buffer, and the data is printed. During a host print operation, data is sent from the host to the printer. Shared copy means that both local copy and host printing operations can be performed. Printers that will be used for host printing operations only need not be entered in the matrix.

When defining a printer for local copies, its capabilities should match those of the source display, especially the capabilities for APL/Text handling and support of the Extended Highlighting, Color, and Programmed Symbols functions. If the print buffer is at least as large as the display buffer, a copy request can be handled. However, if the other capabilities do not match, the printout may be degraded, depending on the contents of the display buffer when the copy request is serviced.

The PAM Worksheet

"Worksheet 39—Printer Authorization Matrix (PAM)" (Figure 15-2) helps you define which display stations will use which printers. Use the procedure on page 15-11 to fill in this worksheet.

```
───────────────────────── PAM Definition ─────────────────────────

Entry          Printer         Mode            Class
               Port                        7              8
                                           01234 56789 012345

  1            __ _ __         __         ..... ..... ......
  2            __ _ __         __         ..... ..... ......
  3            __ _ __         __         ..... ..... ......
  4            __ _ __         __         ..... ..... ......
  5            __ _ __         __         ..... ..... ......
  6            __ _ __         __         ..... ..... ......
  7            __ _ __         __         ..... ..... ......
  8            __ _ __         __         ..... ..... ......

               3270 Display Ports                    ASCII Display Ports

Entry
        0           1           2           3   HG 21      HG 22      HG 23
     HG 01234 56789 01234 56789 01234 56789 01  01234567   01234567   01234567

  1  26 ..... ..... ..... ..... ..... ..... ..  ........   ........   ........
     27 ..... ..... ..... ..... ..... ..... ..
  2  26 ..... ..... ..... ..... ..... ..... ..  ........   ........   ........
     27 ..... ..... ..... ..... ..... ..... ..
  3  26 ..... ..... ..... ..... ..... ..... ..  ........   ........   ........
     27 ..... ..... ..... ..... ..... ..... ..
  4  26 ..... ..... ..... ..... ..... ..... ..  ........   ........   ........
     27 ..... ..... ..... ..... ..... ..... ..
  5  26 ..... ..... ..... ..... ..... ..... ..  ........   ........   ........
     27 ..... ..... ..... ..... ..... ..... ..
  6  26 ..... ..... ..... ..... ..... ..... ..  ........   ........   ........
     27 ..... ..... ..... ..... ..... ..... ..
  7  26 ..... ..... ..... ..... ..... ..... ..  ........   ........   ........
     27 ..... ..... ..... ..... ..... ..... ..
  8  26 ..... ..... ..... ..... ..... ..... ..  ........   ........   ........
     27 ..... ..... ..... ..... ..... ..... ..
```

Figure 15-2. Example of a Worksheet 39 — Printer Authorization Matrix

The following describes the areas on this worksheet.

Entry   The PAM Entry is sequential numbering from 1 to 47, with 47 being the maximum number of printer assignments allowed.

The Entry field appears twice on the worksheet. In the top half of the worksheet, next to each printer you have identified, you define the Printer Port, Mode, and Class. In the bottom half of the worksheet, you write in the same PAM Entry numbers and identify the ports of the displays that will use the printer.

Printer Port   In this column, you identify the port number for the printer. Include the two-digit hardware group number prefix: 26, 21, 22, 23, or 27 if question 800 = 11.

Notes:

1. You cannot assign a local copy printer to port 26-00.

2. Ports with Display Host Addressable Printers (HAP) should not be identified as printer ports.

3. If you have planned for individual port assignment, ensure that the assigned addresses on "Worksheet 11—117: Port

Assignment" (Parts A and B) are consistent with the printer assignments defined here. The exception to this requirement is local-copy printers; they do not require a host address.

4. If you have planned for the AEA, ensure that the AEA Configure Worksheets (27 through 37) are consistent with the printer assignments defined here. You need to take into account the following:

   - If you define a printer port with a HG of 21, 22, or 23 then there should be a printer station defined that can be used by that port.
   - If a printer station has a default destination of an ASCII host then the printer ports that can use this station should not be defined in the PAM.

Mode   This column is used to define the mode in which the printer will operate:

0   = Host
1   = Local
2   = Shared.

Host mode means the printer is under 3270 host (system) control. Since host control is the default mode for each printer if no matrix is defined, it is unnecessary to include a printer on the PAM if it will operate in host mode. When in host mode, the printer is protected from local copies, unless it is operating with BSC protocols. (The BSC Copy command does not use the PAM; it is directed to the *to* device and specifies the *from* device as a command parameter.)

Local mode means the printer is used only for local-copy functions regardless of host attachment or communication protocol. The display operator initiates a local copy by using the Print key; if the display is operating in SNA, the host can initiate a local copy from the display buffer. However, the host cannot use the printer for direct-print operations.

Shared mode means the printer performs both 3270 host-directed printing operations and local-copy operations. The efficiency of local-copy operations in shared mode depends on the communication protocol.

In SNA, a printer defined in shared mode may be used for local copy under either of these conditions:

- When the printer is not in session with a primary logical unit (PLU) in the host

- When Between Bracket Printer Sharing (question 213) has been specified in the microcode and the printer is not in bracket state with the PLU in the host.

In non-SNA, shared mode is a less efficient choice for local copy operations. Host application sessions are longer, so there are fewer opportunities for a local copy between host communications.

When operating a printer in shared mode, the user must assume responsibility for the integrity of the printed data by following installation rules and proper programming practices.

Class   In this area, you enter an **X** (capital letter) under the class or classes defined for the printer. Assigning a printer to a class is optional.

You may want to group printers into classes, based, for example, on (1) physical characteristics (type font, character set, type of forms mounted), (2) location, or (3) security. You can assign a class number ranging from 70 through 85. In your installation, class 72 may identify all printers with yellow paper. In any configuration, a single printer may be in one class, several, or none.

If you wanted to group several printers in class 72 and authorize the display on port 26-08 to use any of them, you would enter an **X** under Display Port 26-08 on the line for each printer in class 72. If the display then attempted a local copy with a class 72 printer already in use, the local copy would automatically be sent to another available printer in that same class.

Before performing a local copy, the display operator selects a particular printer by class by first selecting the IDENT function on the keyboard and then keying in the authorized class number (70 through 85) next to the printer symbol on the bottom of the screen.

Display Port   Your response in this field defines which displays may use each printer. You can assign more than one display to use the same printer for local copy or shared copy operations.

Write an **X** under the port for each display authorized to use a particular printer.

Notes:

1. Displays cannot perform local copies on printers that have ASCII hosts designated as their default destination on "Worksheet 31—AEA Default Destination."

2. Local copy printers can be assigned to display stations on HG 27 even if question 800 = 10.

A Sample PAM

A sample Printer Authorization Matrix is defined in Figure 15-3.

```
 _____ PAM Definition _____

   Entry       Printer        Mode            Class
               Port                     7                8
                                        01234 56789  012345

     1         2 6 - 0 2       2         ..... ..... .......
     2         2 6 - 0 4       1         .X... ..... .......
     3         2 1 - 0 2       1         ..... ..... .......
     4         2 6 - 0 6       1         .X... ..... .......
     5         2 1 - 0 3       2         .X... ..... .......
     6         -- - --         __        ..... ..... .......
     7         -- - --         __        ..... ..... .......
     8         -- - --         __        ..... ..... .......

               3270 Display Ports                       ASCII Display Ports

   Entry
             0            1            2            3   HG 21      HG 22      HG 23
        HG  01234 56789  01234 56789  01234 56789  01  01234567   01234567   01234567

     1  26   X..... ..... ...X. XXX.. ..... ..... ..  ........   ........   ........
        27  X.X . ..... ..... ..... ..... ..... ..
     2  26  ..... ..XXX ..... ..... ..... ..... ..  ........   ........   ........
        27  ...X. ..... ..... ..... ..... ..... ..
     3  26  ...X. ..... XXX.. ..... ..... ..... ..  ........   ........   ........
        27  ..... ..... ..... ..... ..... ..... ..
     4  26  ..... ..XXX ..... ..... ..... ..... ..  ........   ........   ........
        27  ..... ..... ..... ..... ..... ..... ..
     5  26  ..... ..XXX ..... ..... ..... ..... ..  ....XX..   ........   ........
        27  ..... ..... ..... ..... ..... ..... ..
     6  26  ..... ..... ..... ..... ..... ..... ..  ........   ........   ........
        27  ..... ..... ..... ..... ..... ..... ..
     7  26  ..... ..... ..... ..... ..... ..... ..  ........   ........   ........
        27  ..... ..... ..... ..... ..... ..... ..
     8  26  ..... ..... ..... ..... ..... ..... ..  ........   ........   ........
        27  ..... ..... ..... ..... ..... ..... ..
```

Figure 15-3. Example of a PAM Definition

Entry 1: This printer is cabled to port 26-02. It operates in shared mode (2). It has no class designation. The displays at ports 26-01, 26-13, 26-15, 26-16, 26-17, 27-00, and 27-02 all use this printer.

Entry 2: This printer operates in local mode (1). It is designated in class 71 because it prints output on continuous forms. The displays at ports 26-07, 26-08, and 26-09 all use this printer. These displays are also authorized to use the printer attached to port 26-06 (as defined in Entry 4), and the printer attached to port 21-03 (as defined in entry 5), which are also in class 71.

Entry 3: This printer operates in local mode (1). It has no class designation. The displays at ports 26-03, 26-10, 26-11, and 26-12 all use this printer.

Entry 4: This printer operates in local mode (1) and is designated in class 71. The displays at ports 26-07, 26-08, and 26-09 are authorized to use this printer, as well as the printer at port 26-04 (as defined in Entry 2), and the printer at port 21-03 (as defined in Entry 5).

Entry 5: This printer operates in shared mode (2) and is designated in class 71 because it prints output on continuous forms. The displays at ports 21-04, 21-05, 26-07, 26-08, and 26-09 are authorized to use this printer.

Notes:

1. A printer assigned on the PAM must have a 3270 host designated as its default destination. See Chapter 14, "Planning for the Asynchronous Emulation Adapter" on page 14-1 for more information.

2. The Sample PAM has restrictions or different specifications depending on your response to question 800.

   - If question 800 = 10,

     − HG 27 cannot be used when designating a printer port.
     − The PRINT ID or Printer Assignment to be used for the local copy printers defined in our sample PAM on the previous page is:
       — 02 on display stations 26-01, 26-13, 26-15, 26-16, 26-17, 27-00, and 27-02 representing port number 26-02 (PAM Entry 1).
       — 71 on display stations 26-07, 26-08, 26-09, 21-04, and 21-05 representing the class number 71 (PAM Entries 2, 4, and 5).
       — 34 on display stations 26-03, 26-10, 26-11, and 26-12 representing port number 21-02 (PAM Entry 3).

   - If question 800 = 11,

     − HG 27 can be used when designating a printer port.
     − The PRINT ID or Printer Assignment to be used for the local copy printers defined in our sample PAM on the previous page is:
       — 01 on display stations 26-01, 26-13, 26-15, 26-16, 26-17, 27-00, and 27-02 representing the actual PAM Entry number.
       — 71 on display stations 26-07, 26-08, 26-09, 21-04, and 21-05 representing class number 71 (PAM Entry 2, 4, and 5).
       — 03 on display stations 26-03, 26-10, 26-11, and 26-12 representing the actual PAM Entry number.

Filling In Worksheet 39—Printer Authorization Matrix (PAM)

Planner: If you have not read the previous information in this chapter, you need to do so before you begin to fill out the worksheet.

Step 1 Locate "Worksheet 39—Printer Authorization Matrix (PAM)" on page A-54. Make copies of this worksheet (one for every five printer assignments).

Step 2 Decide to which ports you are attaching the printers and displays.

Step 3 Enter your responses in these fields:

Entry: Sequentially number the PAM Entries on the top half of the worksheet. Transfer the same numbers to the entries on the bottom half.

Printer Port: Write the four-digit number of the port to which the printer is attached (for example, 26-18 or 21-02). You cannot assign a printer to port 26-00.

Mode: Write the number of the mode in which the printer will operate.

Class: Write an **X** under the number that identifies the class(es) defined for the printer. If no class is defined, leave this blank.

Display Port: Write an **X** under the ports of the displays authorized to use this particular printer.

Step **4** Finish entering the information for those printers that you want to authorize for local copy.

Planner: You have completed "Worksheet 39—Printer Authorization Matrix (PAM)" on page A-54. Return to the divider page labeled "Microcode Customization Planning" and see step 9. You may also refer to the divider page labeled "Worksheet Summary" to determine where to proceed next.

Keep records of your configuration using one of the methods described under "Customization Records" on page 5-6.

Logical Terminal Assignment (LTA)

Logical Terminal Assignment (LTA) is used when Multi-Host Support has been configured for a controller. The LTA allows you to assign up to five host sessions for each terminal and one host session for each printer attached to a 3270 controller port. Terminals can have all of their sessions with one host or each session can be with a different host. Each session for a terminal is seen by the host as communication between it and a physical terminal. By assigning up to five host sessions for each terminal, you are using one terminal as if it were five physical terminals. In other words, one physical terminal becomes five logical terminals.

For each 3270 controller port, there are five logical terminal (LT) fields on the Logical Terminal Assignment Worksheet. In these LT fields, you identify the host sessions that a terminal can access. Host sessions are presented on a terminal in the order that they are defined. Ports for which an LTA is not specified receive default assignments that are determined when a 3270 device is turned on.

When planning for LTA, remember:

- ASCII devices can communicate only with the primary host on the primary link.
- Even with Multi-Host Support, a printer can be assigned only one host session.
- CCA host sessions (2x, 3x) are not allowed on HG 27.

The LTA Worksheet

"Worksheet 40—Logical Terminal Assignment (LTA)" (Figure 15-4 on page 15-13) helps you define the hosts with which display stations can have sessions. Use the procedure on page 15-17 to fill in this worksheet. This example only shows a small portion of the ports on HG 27.

```
 _____Logical Terminal Assignment _____


Port  LT1  LT2  LT3  LT4  LT5        Port  LT1  LT2  LT3  LT4  LT5
26-00 ___  ___  ___  ___  ___        26-01 ___  ___  ___  ___  ___
26-02 ___  ___  ___  ___  ___        26-03 ___  ___  ___  ___  ___
26-04 ___  ___  ___  ___  ___        26-05 ___  ___  ___  ___  ___
26-06 ___  ___  ___  ___  ___        26-07 ___  ___  ___  ___  ___
26-08 ___  ___  ___  ___  ___        26-09 ___  ___  ___  ___  ___
26-10 ___  ___  ___  ___  ___        26 11 ___  ___  ___  ___  ___
26-12 ___  ___  ___  ___  ___        26-13 ___  ___  ___  ___  ___
26-14 ___  ___  ___  ___  ___        26-15 ___  ___  ___  ___  ___
26-16 ___  ___  ___  ___  ___        26-17 ___  ___  ___  ___  ___
26-18 ___  ___  ___  ___  ___        26-19 ___  ___  ___  ___  ___
26-20 ___  ___  ___  ___  ___        26-21 ___  ___  ___  ___  ___
26-22 ___  ___  ___  ___  ___        26-23 ___  ___  ___  ___  ___
26-24 ___  ___  ___  ___  ___        26-25 ___  ___  ___  ___  ___
26-26 ___  ___  ___  ___  ___        26-27 ___  ___  ___  ___  ___
26-28 ___  ___  ___  ___  ___        26-29 ___  ___  ___  ___  ___
26-30 ___  ___  ___  ___  ___        26-31 ___  ___  ___  ___  ___

27-00 ___  ___  ___  ___  ___        27-01 ___  ___  ___  ___  ___
27-02 ___  ___  ___  ___  ___        27-03 ___  ___  ___  ___  ___
27-04 ___  ___  ___  ___  ___        27-05 ___  ___  ___  ___  ___
27-06 ___  ___  ___  ___  ___        27-07 ___  ___  ___  ___  ___
```

Figure 15-4. An Example of Worksheet 40 – Logical Terminal Assignment

15-13

The following describes the areas on the worksheet.

Port   This column lists the physical 3270 port numbers, beginning with port 26-00. The prefix "26" indicates direct or indirect connection to the Terminal Adapter (TA), identified by Hardware Group 26. The prefix "27" indicates direct or indirect connection to the Terminal Adapter identified by Hardware Group 27.

LT1—LT5   In each of these columns, you identify host sessions for the logical terminals (LTs) assigned to the 3270 controller ports. Your response to each field consists of a two-part entry. The first part of your response determines which host the LT is assigned to. For this part of your response, enter the two-character host identifier (this information appears on "Worksheet 2—Multi-Host Definition").

The second part of your response is optional. It determines which host address is to be used for the LT. For this part of your response, you write in the port assignment entry number (1—5 which corresponds to your logical session number) that you wish to be assigned to the LT. (The port assignment entries are assigned when you fill out "Worksheet 11—117: Port Assignment" [Parts A and B] for each host attachment.) If you decide to leave this part of your response blank, it will be assigned sequentially during the Configure utility.

For example, assume you write in the following values for a particular port:

        1A2   2A_   2A3   2A_   1A_

After the customizer types in these responses and presses ENTER, the following values are displayed on his screen.

        1A2   2A1   2A3   2A2   1A1

You cannot skip LTs or enter duplicate entries for a port. The following example is invalid for both of these reasons:

        LT1   LT2   LT3   LT4   LT5

        1A1   1A1   ___   2A1   1B1

Notes:

1. In some cases, the LTA overrides assignments made in the AEA Default Destination. If you have configured for the AEA, see the discussion of Multi-Host Support under "AEA Planning Considerations" on page 14-16.

2. 3174 online tests must be performed from a CUT display. To ensure that all tests can be performed, select a port that has a CUT attached to it and assign at least one LT to each host link. For example, if you had Host IDs 1A, 2A, 3A, 1B, 1C, 1D, 1E, and 1F, the following would fill this requirement.

        LT1   LT2   LT3   LT4   LT5

        1C   2A   3A   ___   ___

   You should make this assignment to port 26-00 because some tests are only performed from this port.

3. Host 2X or 3X cannot be assigned to HG 27.

A Sample LTA

A sample Logical Terminal Assignment is defined in Figure 15-5.

```
_____ Logical Terminal Assignment _____


Port LT1  LT2  LT3  LT4  LT5      Port LT1  LT2  LT3  LT4  LT5
26-00 1A1  2A1  3A1  ___  ___     26-01 1A1  1A2  1A3  1A4  1A5
26-02 1A1  ___  ___  ___  ___     26-03 1A   1A   2A   2A   3A
26-04 1A   1A   2A   2A   3A      26-05 1A   1A   2A   2A   3A
26-06 2A1  2A3  3A3  3A4  3A2     26-07 2A4  2A5  3A1  3A2  3A5
26-08 1A   1B   1C   1D   1E      26-09 1A   1B   1C   1D   1E
26-10 1A   1B   1C   1D   1E      26-11 1A   1B   1C   1D   1E
26-12 1A   1B   1C   1D   1E      26-13 1A   1B   1C   1D   1E
26-14 2A   2A   2A   2A   2A      26-15 2A   2A   2A   2A   2A
26-16 3A   3A   3A   3A   3A      26-17 3A   3A   3A   3A   3A
26-18 ___  ___  ___  ___  ___     26-19 ___  ___  ___  ___  ___
26-20 ___  ___  ___  ___  ___     26-21 ___  ___  ___  ___  ___
26-22 ___  ___  ___  ___  ___     26-23 ___  ___  ___  ___  ___
26-24 ___  ___  ___  ___  ___     26-25 ___  ___  ___  ___  ___
26-26 ___  ___  ___  ___  ___     26-27 ___  ___  ___  ___  ___
26-28 ___  ___  ___  ___  ___     26-29 ___  ___  ___  ___  ___
26-30 ___  ___  ___  ___  ___     26-31 ___  ___  ___  ___  ___
```

Figure 15-5. Example of an LTA Definition

In the overall configuration involving this LTA, we have two secondary links, through Concurrent Communication Adapters, each with one host. We also have a primary link configured for Single Link Multi-Host Support with access to five hosts on the link. This configuration yields the following Host Identifiers: 1A, 2A, 3A, 1B, 1C, 1D, and 1E. The hosts accessed through the primary link are identified by 1A, 1B, 1C, 1D, and 1E. The hosts on the secondary links are identified by 2A and 3A. A separate Port Assignment was previously defined for each of these hosts.

Port 26-00: A CUT is attached to this port and access to each host link was defined to allow 3174 online tests to be run.

Port 26-01: The attached terminal has five LT sessions with the primary host.

Port 26-02: A 3270 printer is connected to this port and assigned to the primary host (1A).

Ports 26-03, -04, -05: Displays attached to these ports each have their first two LT sessions assigned to the primary host on the primary link. The third and fourth LT sessions are assigned to the primary host on the secondary link (identified by 2A), and the fifth LT session is assigned to the primary host on the secondary link 3A.

Ports 26-06, -07: The displays on these ports both have their first two LT sessions with the 2A host and the remaining sessions with the 3A host. However, the port assignment entry numbers vary.

Ports 26-08—26-13: On these ports, LT sessions for attached displays have been defined for all the hosts accessed through the Single Link Multi-Host Support function.

Ports 26-14—26-17: Displays attached to these ports are assigned LT sessions with only one host, 2A or 3A.

Ports 26-18—26-31: Default LTAs will be made to these ports when the devices attached to them are turned on.

Refer to the Multi-Host Support chapter in the 3174 *Functional Description* for additional information about defaulting.

LTA Considerations

For CUTs

In order for a local copy to be performed from a specific LT, the display must be authorized in the PAM to use the selected printer and the host session for the LT must be associated with the same host link as the printer. For example, an LT whose host session is on host 1A may do a local copy to a printer that is assigned to host 1D. The same LT may not do a local copy to a printer that is assigned to host 2A or 3A.

Session 1A2 is used for an attached printer session. If 1A2 is specified on the LTA panel, then the corresponding LT will not be available to the display. If 1A2 does not appear in the LTA and there are less than five LTs filled in, the display will have all sessions specified on the LTA and the printer will use session 1A2. If 1A2 does not appear on the LTA and five LTs are filled in for the port, then the display will only be able to access the first four sessions and the printer will be assigned session 1A2. The LT5 session will not be used because the maximum number of sessions (both display and attached printers) is limited to five.

For DFTs

Local Copy: In order for a local copy to be performed from an LT, the display must be authorized in the PAM to use the selected 3270 printer. A local copy will be allowed only to 3270 printers that are assigned to the primary host link, or to ASCII printers in emulating a 3270 printer. For example, an LT whose host session is on host 2B may do a local copy to a printer that is assigned to hosts 1A—1H. The same LT may not do a local copy to a printer that is assigned to host 2A or 3A.

Multi-Host Support: In order for a DFT to communicate with hosts on a secondary link (Host ID 2A-2D, 3A-3D), the primary link must be configured for SNA (Local SNA, SDLC, X.25, Token-Ring Network, or X.21 Switched) and the secondary links must be configured for SNA (SDLC, X.25 or X.21 Switched). If the primary link is *not* configured for SNA, but the secondary links *are*, then the LTA is ignored and all sessions are assigned to the primary host on the primary link. If the primary link *is* configured for SNA, but the secondary links are *not*, then sessions defined with the secondary hosts cannot be used.

For DFT-Es

You specify the information for the DFT mode sessions in the LTA. The CUT mode sessions are defaulted. The considerations for the DFT mode sessions are the same as those for normal DFT devices. Refer to the Multi-Host Support chapter in the 3174 *Functional Description* for additional information about defaulting.

For Printers

When planning for LTA, remember that, even with multi-host support, a printer can be assigned only one host session.

Filling In Worksheet 40 — Logical Terminal Assignment (LTA)

Planner: If you have not read the previous information in this chapter, you need to do so before you begin to fill out the worksheet.

Step **1** Locate and make a copy of "Worksheet 40—Logical Terminal Assignment (LTA)" on page A-55.

Step **2** Decide which ports will receive LTAs. Ports that are not defined will receive default LTAs when the devices attached to them are turned on.

If you specified that 801 = 1, then you need to define the LTAs only to port 26-00 and port 27-00; the control microcode will make the same assignments for the remaining controller ports.

Step **3** For each port that you wish to make LT assignments to, write in the identifiers of the hosts that you wish to have sessions with under the LT1 — LT5 columns. The order in which you assign these identifiers determines the session sequence of the attached terminal. For example, a host assigned to LT1 will be the terminal's first session and host assigned to LT2 will be the terminal's second session. If you wish to specify which address for a host is to be used for the LT, write in the port assignment entry number 1 — 5 next to the host's identifier. (These optional port assignment entries are assigned automatically during customizing if you do not specify them here.)

When you assign host sessions to a port, do not skip LT entries. For example, while making assignments to LT1, LT2, LT3, and LT4 is valid, making assignments to LT1, LT3, and LT4 is not.

Step **4** Do not exceed the port limitations of your controller:

- For Models 1L, 1R, 2R, and 3R, you can make assignments to ports 26-00 through 26-31 only.

- For Models 11L, 11R, 12L, 12R, 13R, 21L, 21R, 22L, and 23R, you can make assignments to all the ports on the worksheet if you have a second Terminal Adapter (HG 27).

- For Models 51R, 53R, 61R, 62R, and 63R, you can make assignments to ports 26-00 through 26-15 only.

Planner: You have completed "Worksheet 40—Logical Terminal Assignment (LTA)."

Return to the divider page labeled "Microcode Customization Planning" and see step 9. You may also refer to the divider page labeled "Worksheet Summary" to determine where to proceed next.

Keep records of your configuration by using one of the methods described under "Customization Records" on page 5-6.

Extended Vital Product Data

Extended Vital Product Data is supported by the 3471 (Model B) and 3472 display stations. At customization time, you enter labels on the Extended Vital Product Data panel. These labels will be used to prompt the terminal user for specific information such as the location of the terminal. When the display user invokes the facility to enter Extended Vital Product Data, the labels will be displayed. Some terminals allow Extended Vital Product Data to be entered through terminal set-up mode. Others do not have this capability and the Extended Vital Product Data must be entered with the 3174 Online Test 5, Option 6.

Additional information on the Extended Vital Product Data function can be found in the *3174 Functional Description.* See the *3174 Customer Problem Determination* for information on Online Test 5, Option 6.

Filling In Worksheet 41 — Prompts for Extended VPD

Planner: If you have not read the previous information in this chapter, you need to do so before you begin to fill out the worksheet.

Step 1 Locate "Worksheet 41—Extended Vital Product Data (VPD)" on page A-56. Make a copy of this worksheet.

Step 2 Enter up to 8 labels. Each label is limited to 15 alphanumeric characters.

Note: When the Extended Vital Product Data panel is first displayed, underscores appear in the label fields. If you leave any underscores in the label, blanks will be displayed in place of the underscores when the label is used to prompt a terminal user for Extended Vital Product Data.

Planner: You have completed "Worksheet 41—Extended Vital Product Data (VPD)."

Return to the divider page labeled "Microcode Customization Planning" and see step 9. You may also refer to the divider page labeled "Worksheet Summary" to determine where to proceed next.

Keep records of your configuration by using one of the methods described under "Customization Records" on page 5-6.

Integrated Services Digital Network (ISDN) Definition

ISDN definition is used to define the type of network attached to each ISDN Adapter. An ISDN number must be specified for each device in the network, and depending on the type of network, additional information may be needed for each device. Such information may include specifying a semi-permanent connection or a TEI value.

The ISDN Worksheets

"Worksheet 42—ISDN Adapter Definition" (Figure 15-6), and if needed "Worksheet 43—ISDN Port Definition" (Figure 15-7 on page 15-20) and "Worksheet 44—ISDN Channel Definition" (Figure 15-8 on page 15-21) help you define the adapters and device attachments in your ISDN network. Use the procedure on page 15-22 to fill in these worksheets. This example shows four ISDN Adapters which is the maximum you can have.

```
                          ISDN Adapter Definition _____

   Type the Adapter Options for the ISDN Adapter(s).

   Adapter            Network          Inactivity
   Hardware                            Timeout
   Group No.                           (Y,N)  Range
   _____           _____         _____
      36                 _              n     0030
      37                 _              n     0030
      38                 _              n     0030
      39                 _              n     0030
```

Figure 15-6. An Example of Worksheet 42 — ISDN Adapter Definition

The following describes the areas on the worksheet.

Adapter Hardware Group No.

This column lists the hardware group numbers of the adapters. Fill out the appropriate columns for the hardware groups that you want to configure.

Note that the number of ISDN Adapters is controller dependent. Models 61R and 62R support 2 ISDN Adapters. Models 1L, 1R, and 2R support 3 ISDN Adapters. Models 11L, 11R, 12L, 12R, 21L, 21R, and 22L support 4 ISDN Adapters.

Network This column requires a null, space, underscore (default), or a network type. A null, space, or underscore indicates that the adapter is not configured. The possible network selections are:

1. U.S. and Canada AT&T 5ESS/5E4
2. U.S. and Canada AT&T 5ESS/5E5
3. U.S. and Canada Northern Telecom DMS100/BSC29
4. Japan NTT INSNET-64
5. U.K. BTNR-191
6. France VN2
7. Germany 1TR6 SW1
8. Germany 1TR6 SW2

Notes:

1. You must specify a network type for at least the first adapter listed; otherwise, change your response to question 803 to 0.

2. For any network type, you must provide an ISDN number for each data channel on the ISDN Channel Definition panel. This number will most likely be the same for each data channel associated with the same physical ISDN interface, but will be unique between the physical interfaces (ports).

3. If you specify type 3, you must provide a TEI value for each data channel on the ISDN Channel Definition panel.

4. If you specify type 7 or type 8, you must designate, on the ISDN Port Definition panel, which of those ports, if any, will be semi-permanent connections.

Inactivity Timeout

The two entries for this column indicate whether or not an adapter should provide a disconnect on a B-Channel showing no data activity, and if it should provide a disconnect, after what amount of time should that disconnect take place. Valid timeout values are 0005 to 1440 minutes. The defaults are n (no) and 0030 (30 minutes).

The following is an example of the ISDN Port Definition worksheet.

```
                        _____ ISDN Port Definition _____

    Type in (Y,N) for Semi-Permanent Connection.
    Semi-Permanent Connection valid on ports for
    Hardware Group number(s)   *


    Port    Semi-Permanent      Port    Semi-Permanent
            Connection                  Connection
    36-00        n              36-01        n
    36-02        n              36-03        n
    37-00        n              37-01        n
    37-02        n              37-03        n
    38-00        n              38-01        n
    38-02        n              38-03        n
    39-00        n              39-01        n
    39-02        n              39-03        n
```

Figure 15-7. An Example of Worksheet 43 – ISDN Port Definition

The following describes the areas on the worksheet.

*   The asterisk will be replaced by valid HG numbers for which Semi-Permanent Connections for the ports can be specified.

Port   This column lists the HG number and port numbers for the adapters that have been configured on the ISDN Adapter Definition panel.

Semi-Permanent Connection

This column requires you to select whether or not the port can have a semi-permanent connection for those adapters that have been designated as a network type 7 or type 8 on the ISDN Adapter Definition panel. The only fields that are unprotected are those hardware groups defined as network type 7 or 8. A semi-permanent connection between two DTEs is a logical connection whose usage can be deactivated or activated by either DTE. Deactivation of the usage does not cause the call to be disconnected but does prevent data transmission until the usage has been activated by one of the DTEs. The default is n (no).

The following is an example of the ISDN Channel Definition worksheet.

```
_____ ISDN Channel Definition _____

Type in the Channel options for the ISDN Channels.


Port          Channel B1                    Channel B2
         TEI    ISDN Number             TEI    ISDN Number
36-00    ___    _____                 ___    _____
36-01    ___    _____                 ___    _____
36-02    ___    _____                 ___    _____
36-03    ___    _____                 ___    _____
37-00    ___    _____                 ___    _____
37-01    ___    _____                 ___    _____
37-02    ___    _____                 ___    _____
37-03    ___    _____                 ___    _____
38-00    ___    _____                 ___    _____
38-01    ___    _____                 ___    _____
38-02    ___    _____                 ___    _____
38-03    ___    _____                 ___    _____
39-00    ___    _____                 ___    _____
39-01    ___    _____                 ___    _____
39-02    ___    _____                 ___    _____
39-03    ___    _____                 ___    _____
```

Figure 15-8. An Example of Worksheet 44 — ISDN Channel Definition

The following describes the areas on the worksheet.

Port   This column lists the HG number and port number for the adapters that have been configured on the ISDN Adapter Definition panel.

TEI (Terminal End-Point Identifier)

This column requires a value for those ports whose ISDN Adapter has been identified on the ISDN Adapter Definition panel as having network type 3. The TEI values range from 00 − 63 and represent an ID for each terminal endpoint in the ISDN network. These values are supplied to you when the network is set up. They must be unique for each ISDN interface.

ISDN Number

This column requires a value for all ports. Valid values are 0 − 9 and the ISDN number must be 4 − 7 digits. The ISDN numbers are supplied to you when the network is set up.

Filling In Worksheets 42, 43, and 44 — ISDN Definition

Planner: If you have not read the previous information in this chapter, you need to do so before you begin to fill out the worksheet.

Step *1* Locate "Worksheet 42—ISDN Adapter Definition" on page A-57, "Worksheet 43—ISDN Port Definition" on page A-58, and "Worksheet 44—ISDN Channel Definition" on page A-59. Make a copy of these worksheets.

Step *2* Complete "Worksheet 42—ISDN Adapter Definition" on page A-57 by entering the number of the network type for each adapter installed in the controller.

Step *3* Complete Worksheet 43—ISDN Port Definition by entering a Y or N (Yes or No) indicating a semi-permanent connection.

Step *4* Complete Worksheet 44—ISDN Channel Definition by entering the ISDN number for each port and the TEI value, as required, for your specific network type.

Planner: You have completed the ISDN Definition Worksheets.

Return to the divider page labeled "Microcode Customization Planning" and see step 9. You may also refer to the divider page labeled "Worksheet Summary" to determine where to proceed next.

Keep records of your configuration by using one of the methods described under "Customization Records" on page 5-6.

Chapter 16. Planning for Gateways (Token-Ring and ISDN)

An Overview of Gateway Planning

Before you start planning, you need the following:

- "Worksheet 45—Common Network" on page A-60
- "Worksheet 46—Ring Address Assignment" on page A-61
- "Worksheet 47—Ring Transmission Definition" on page A-62
- "Worksheet 48—ISDN PUID Assignment" on page A-63.

This chapter describes additional questions you answer to customize your 3174 controller for gateway support. This chapter also presents an overall strategy to plan for your 3174 Token-Ring Gateway. Appendix C contains planning examples for Token-Ring Gateways. Refer to these examples while planning for the microcode customization of your 3174 Token-Ring gateway controller.

Overall Planning for Token-Ring Gateway Support

The following information is intended as general planning steps for implementing Token-Ring Network gateway support as provided by the 3174 Establishment Controller. Depending on the devices and host access method, you need to consult other documentation to obtain further details. See the list of related publications in the preface of this book.

Step 1 Order the appropriate 3174 documentation.

Step 2 Identify a profile of the user equipment attaching to the gateway:

- Identify host application requirements.
- Identify personal computer (PC) product requirements for attaching to the Token-Ring Network.
- Identify physical Token-Ring configuration changes.
- Identify items such as additional cables, 8228 Multistation Access Units, Token-Ring Adapters for PCs, and copper/optical fiber repeaters as required for your Token-Ring Network.
- Plan for universally administered or locally administered addresses for the PCs and other attaching devices.
- If the PCs will use the IBM PC 3270 Emulation Program Version 3, decide if the users will be standalone or network station users supported by PC gateway. Also decide if you require the program's Extended Support offering.
- Define a starting (test) Token-Ring configuration.
- Define a production Token-Ring configuration.
- Plan for any future increases in the number of attaching Token-Ring devices.
- Plan for a backup of the gateway controller.
- Consider installing the IBM LAN Network Manager program for ring diagnostics and the IBM Token-Ring Network Trace and Performance Program. If you decide on installing either or both of these programs, you must order, install, and test them.

Step   **3**   Document the relationship between VTAM, the 3174 gateway, and the attaching devices.

For Gateway connections to channel-attached hosts:

- Choose a consecutive channel address range that supports the 3174 gateway and attached devices.

- Choose an address range that allows for future growth of your Token-Ring Network and keep a record of the range.

- Choose the VTAM Physical Unit (PU) and Logical Unit (LU) naming convention and keep a record of the names.

- Plan for universally and locally administered addresses for the devices attaching to the gateway.

- Define the service access point (SAP) addresses used by the Token-Ring devices and keep a record of these addresses.

For 3174 Gateway connections to telecommunication attached hosts:

- Choose the SDLC address range that supports the 3174 gateway and attached devices.

- Since the 3174 is in a multidrop configuration on the communication link, ensure that the consecutive SDLC address range allows room for future growth of your Token-Ring Network. Keep a record of this address range.

- Choose the VTAM Physical Unit (PU) and Logical Unit (LU) naming convention and keep a record of the names.

- Plan for universally and locally administered addresses for the devices attaching to the gateway.

- Define the service access point (SAP) addresses used by the Token-Ring devices and keep a record of these addresses.

Step   **4**   Order the required 3174 and features that meet your needs.

Step   **5**   Prepare the host operating system for the 3174 gateway.

For Gateway connections to channel-attached hosts:

- For the 3174 host address range:

  - If the host is an I/O control program (IOCP) processor, define the 3174 as a single controller with multiple addresses (one CNTLUIT statement normally, with shared set to YB).

  - If the host is not an IOCP processor, schedule a service representative to set the unit control words (UCWs) to shared.

- For VM systems:

  - Define each device (channel addresses) as a separate 3725 or 3705 RDEVICE macro.

  - Define controllers as single unit with Feature = 144-DEVICE.

For Gateway connections to telecommunication attached hosts:

Order and install the following as required for your network:

- Communication lines
- Modems
- 37xx or Integrated Communication Adapter hardware
- VTAM APARS for 9370 (VM - #VM26635, VSE - #DY35217)
- Because you have a half-duplex multidrop configuration, create VTAM/NCP definitions for a multidrop configuration.

Step 6 Prepare VTAM for the 3174 gateway.

- If you are migrating to a new release of VTAM, perform the migration before you install the gateway.

- Decide if you want the ring error monitor (REM) function of the 3174. If so, you need ACF/VTAM Version 3.1.1 or higher for NetView support.

- If your current version of ACF/VTAM is no longer supported, migrate to a supported version.

- Verify that the VTAM buffers meet the 3174 requirement of greater than or equal to 78 bytes and the number of bytes is even.

- RU sizes must be less than or equal to 8KB inbound and 8KB outbound for 3174 Models 12L and 22L. Question 241 must be 1 if 8KB outbound is selected; question 241 must be 0 if 4KB outbound is selected.

- RU sizes must be less than or equal to 4KB inbound and 4KB outbound for 3174 Models 1L, 11L, and 21L.

- Order and apply any necessary program temporary fixes (PTFs).

Step 7 Define the Token-Ring devices to VTAM and/or NCP.

- Ensure Logmode entries for the LUs exist within the Logmode tables.

- RU sizes must be less than or equal to 2KB inbound and 4KB outbound for 3174 Models 3R, 13R, 21R, 23R, 53R, and 63R.

  If the gateway is a Model 12L or 22L, the RU sizes must be less than or equal to 2KB inbound and 8KB outbound. However, desirable RU sizes are greater than or equal to 1KB inbound and greater than 1KB outbound.

- For non-3174 Token-Ring devices, the maximum RU sizes are 4KB inbound and 4KB outbound.

  If the gateway is a Model 12L or 22L, the RU sizes must be less than or equal to 8KB inbound and 8KB outbound for non-3174 Token-Ring devices.

- Verify printers on PCs have the correct LU1 or LU3 Logmode entries.

For 3174 Gateway Models 1L, 11L, 12L, 21L, and 22L:

Define the 3174 and its non-Token-Ring devices within VTAM Local SNA major node.

- Verify the MAXBFRU is sufficient for the 3174. Ability to handle 1KB is recommended.

- Verify the defined addresses are within the 3174 gateway address range.

For 3174 Gateway Models 1R, 2R, 11R, 12R, 21R, 51R, 61R, and 62R:

Define a major node and NCP definition of a pseudo-multidrop line. Refer to "NCP Definition" on page 4-9 for more information.

Step 8 Install and customize the 3174 gateway.

Step 9 Customize the devices attaching to the Token-Ring Network.

Step 10 Activate the 3174 gateway and Token-Ring-attached devices to the host.

The Common Network Worksheet

If your response to either digit of question 150 was 1, or if your response to question 510 = 1 and question 100 = 2 or 5, you must fill out "Worksheet 45—Common Network" (Figure 16-1). On the worksheet, you respond to configuration questions using the information in this chapter. For controllers that are providing the gateway for:

- Token-Ring 3270 Gateway only, respond to questions 900, 905, 908, 911, and 912.
- ISDN only, respond to questions 912 (if SDLC) and 920.
- Token-Ring and ISDN, respond to all questions.
- APPN only, respond to questions 900, 905, 908, and 911.

Figure 16-1. An Example of Worksheet 45 — Common Network

Filling In Worksheet 45 — Common Network

Locate "Worksheet 45—Common Network" on page A-60. Using the following information, write your responses to the questions on the worksheet.

Planner: *As you step through Token-Ring Gateway planning, if Multi-Host Gateway is configured, remember that the responses to questions 900, 905, 908, and 911* **must be the same for all hosts** *with the exception of the SAP.*

The SAP field is defined in question 900 and must be unique for each host.

Similarly, as you step through ISDN Gateway planning and Multi-Host Gateway is configured, the response to question 920 **must be the same for all hosts**.

900: Token-Ring Network Address and SAP

Response: Twelve-character hexadecimal address and two-character SAP.

This address and SAP must be a locally administered address in the following format:

4000 XYYY YYYY 04

where X and Y are the user-assigned portion of the locally administered address. Note that X should not be greater than hex 7.

The default value for the SAP is 04; this must be replaced with your own value.

Note: The response for this question cannot be all zeros.

If 650 = Y (3174-Peer Support) and 651 = Y (Bridge Support), then the 3174-Peer Port Address Range defined under question 660 will be 4000 XXXX XX00 to 4000 XXXX XX3F (where X is the user assigned portion of the address). In such a case, question 900 cannot be set equal to any of the values in this range or 4000 XXXX XX FF.

Ask your network planner for this address.

905: Token-Ring Error Alerts

Response:

0 = Critical Token-Ring Alerts
1 = Critical and Non-Critical Token-Ring Alerts
2 = Neither Critical nor Non-Critical Token-Ring Alerts reported.

The default response is 1.

For the ring that this controller is on, the ring error monitor (REM) performs integration and analysis of the nonrandom or error conditions on a real-time basis. REM then derives information indicating the fault domain (the two consecutive adapters and the media between them) most likely to be causing the failure, and conditionally provides this information to the host communication and systems management when error thresholds have been exceeded.

Responding with a 0 would report the following errors:

- Beaconing lasting more than one minute
- Beaconing during adapter open
- Auto-removal of adapter.

Responding with a 1 would report the following errors:

- Temporary beaconing
- REM-detected 3174 status codes
- Beaconing lasting less than one minute.

Responding with a 2 would not report any errors. This may be useful to prevent duplicate alerts from being generated if more than one 3174 is connected to the same host and the same Token-Ring.

908: Token-Ring Link Subsystem Name

Response: Up to eight alphanumeric characters.

The default response is "IBMLAN", which appears on the panel.

The Token-Ring link subsystem name identifies which controller an alert is from when an alert is sent to the host.

911: Ring Speed of the Network

Response:

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

The default response is 0.

For controllers with a 4Mbps Token-Ring Adapter installed, respond with 0. For controllers with a 16/4Mbps Token-Ring Adapter installed, you may select any response. A response of 2 is recommended for large networks.

When you have 8KB RU support (question 241 = 1), the response to this question cannot be 0.

Note: If you want to have devices on your ring running both early and normal token release, you must respond to this question with 2. If you select 0 or 1, your ring can only operate with normal token release.

912: Group Poll Address

Planner: Group polling is used only for SDLC attachments. Do not answer this question if your host attachment is Local SNA.

Response: Two-character hexadecimal group poll address that is not in the range specified for questions 104 and 105, but not equal to X'FF'.

The default response is 00 (no group polling).

The address specified (if any) must be coordinated with the host system programmer.

Group polling results in faster response times for end users by decreasing the number of SDLC polls on the network.

Restrictions:

- One of the following must be installed at the host:
  - NCP Version 4 Release 3.1
  - NCP Version 5 Release 2.1
  - SSP Version 3 Release 4.1

  Each of the above requires Small Programming Enhancements (SPEs). Contact your IBM representative for the SPEs required.

- SDLC-attached 3174s without the Gateway feature cannot use group polling.

Planner: If you are not customizing for ISDN Gateway, you have completed "Worksheet 45—Common Network." Continue with filling in "Worksheet 46—Ring Address Assignment."

920: ISDN Link Subsystem Name

Response: Up to eight alphanumeric characters.

The default response is "IBMISDN", which appears on the panel.

Planner: You have completed "Worksheet 45—Common Network." If you customized for Token-Ring, fill out "Worksheet 46—Ring Address Assignment" and "Worksheet 47—Ring Transmission Definition." If you customized for ISDN Gateway only, continue with filling out "Worksheet 48—ISDN PUID Assignment."

The Ring Address Assignment Worksheet

"Worksheet 46—Ring Address Assignment" (Figure 16-2 on page 16-10) helps you set up the one-to-one correspondence between the host addresses and the Token-Ring Network address of attaching products. Use the procedure on page 16-12 to fill out this worksheet.

Figure 16-2. An Example of Worksheet 46 — Ring Address Assignment

940: **Ring Address Assignment**

The following information defines the columns on the Ring Address Assignment worksheet.

S   Contains the addresses of Token-Ring DSPUs within the range of addresses defined in questions 104 and 105. This information is supplied automatically when the Ring Address Assignment panel is presented during the Configure utility.

Ring   This column defines the Token-Ring Network addresses of the DSPUs (downstream physical units).

Response: Twelve-character hexadecimal address.

The address can be either a locally administered address or a universal address. A locally administered address is in the following format:

4000 XYYY YYYY

where X and Y are the user-assigned portion of the locally administered address. Note that X should not be greater than hex 7.

A universal address is in the following format:

WWWW WWZZ ZZZZ

where:

W =   The ID of the adapter manufacturer (for example, IBM's ID is 1000 5A)

Z =   The unique address portion of this adapter's universal address.

Note: The combination of the Ring and SAP must be unique. See the publications for ring-attached products for addressing specifications.

If 650 = Y (3174-Peer Support) and 651 = Y (Bridge Support), a ring address of 4000 XXXX XXFF (where X is the user portion of the address specified in question 660) cannot be specified.

Important: When the product permits you to enter either type of address, the suggested choice is locally administered. If the universal address is used and the Token-Ring Adapter is replaced, that product, as well as the gateway, will have to be recustomized with the new address.

SAP   This column defines the service access point (SAP) ID. Some attaching products, including a 3174 that is configured for Single Link Multi-Host Support, may appear as multiple SNA physical units and therefore have multiple SAP addresses and a single-ring address. See the publications for ring-attached products for more information.

Response: Two hexadecimal characters.

This must be a multiple of 4 in the range of hex 04 to hex EC.

The default is 04.

T   This is the type of the device.

Response:

0 = workstation
1 = 3174 Establishment Controller
2 = 8KB RU devices

The default is 0.

Response 2 is valid only if question 241 is 1 (8KB RU). The selection will determine the default values for I-frame size and maximum out (transmit window size) on the Ring Transmission Definition panel.

Consult your network planner for this information.

Filling In Worksheet 46 — Ring Address Assignment

Refer to the descriptions of the columns under "940: Ring Address Assignment" on page 16-10 if you need information to fill in a field on this worksheet.

Step **1** Locate "Worksheet 46—Ring Address Assignment" on page A-61. Depending on the number of DSPUs, you may need to make from one to eight copies of this worksheet.

Step **2** Skip the first Ring entry. The response to question 900 (Gateway address) will automatically fill this entry during customization.

In the remaining Ring columns, enter from left to right (to be consistent with the cursor movement on the customizer's screen) the 12-character hexadecimal address of each attaching device.

Step **3** Fill in the SAP columns or circle the default for each attaching device.

Response: Two hexadecimal characters.

This must be a multiple of 4 in the range of hex 04 to hex EC.

The default is 04.

Step **4** Fill in the T columns or circle the default for each device.

Response:

0 = workstation
1 = 3174 Establishment Controller
2 = 8KB RU devices

The default is 0.

Planner: *You have completed "Worksheet 46—Ring Address Assignment." Continue with "Worksheet 47—Ring Transmission Definition" on page A-62.*

The Ring Transmission Definition Worksheet

"Worksheet 47—Ring Transmission Definition" (Figure 16-3) helps you define the transmit I-frame size and maximum-out for each DSPU. Use the procedure on page 16-15 to fill out this worksheet.

Figure 16-3. An Example of Worksheet 47 — Ring Transmission Definition

The F and W columns are the only unique fields between the 940 and 941 panels. The defaults for F and W depend on the value assigned to T (type) on the Ring Address Assignment Worksheet. These defaults are listed by type selection in Table 16-1.

Table 16-1. Defaults for F and W by Type selection

Type	I-Frame	Maximum-Out
0 (workstation)	0 (265 bytes)	2
1 (controller)	3 (2042 bytes)	2
2 (8KB RU device)	5 (8201 bytes)	2

941: Ring Transmission Definition

The following information defines the F and W fields.

F   Transmit I-frame size.

Response:

        0 = 265 bytes
        1 = 521 bytes
        2 = 1033 bytes
        3 = 2042 bytes
        4 = 4105 bytes
        5 = 8201 bytes

The value specified for the T (type) field on the Ring Address Assignment Worksheet determines the default. These defaults are listed in Table 16-1 on page 16-13.

Notes:

1. Response 4 is valid only for controllers that have a 16/4Mbps Token-Ring Gateway Adapter installed.

2. Response 5 is valid for either a controller with a 16/4Mbps Token-Ring Gateway Adapter installed or a controller that is running with ESCON Channel attachment.

3. In responding to this question, you need to consider the route by which data will flow. If at link activation time there does not exist a route to the gateway that supports the specified I-frame size, then the I-frame size is downgraded to the maximum supported on the available route. When a downgrade takes place, a unique status code appears on the operator panel and an error is written in the 3174 event log.

4. The values for the maximum I-frame size include the additional bytes for the SNA header.

W   Maximum-Out (transmit window size) — the number of transmits before waiting to receive an acknowledgment.

Response: One numeric character.

A valid response ranges from 1 to a maximum of 7.

The value specified for the T (type) field on the Ring Address Assignment Worksheet determines the default. These defaults are listed in Table 16-1 on page 16-13.

Consult your network planner for this information.

Filling In Worksheet 47 — Ring Transmission Definition

Refer to the descriptions of the columns under "941: Ring Transmission Definition" on page 16-14 if you need information to fill in a field on this worksheet.

Step 1 Locate "Worksheet 47—Ring Transmission Definition" on page A-62. Depending on the number of DSPUs, you may need to make from one to eight copies of this worksheet.

Step 2 Duplicate the Ring entries from the Ring Address Assignment Worksheet.

Step 3 Duplicate the SAP responses from the Ring Address Assignment Worksheet.

Step 4 Fill in the F columns for each attaching device.

Response:

0 = 265 bytes
1 = 521 bytes
2 = 1033 bytes
3 = 2042 bytes
4 = 4105 bytes (Applies to Models 12L or 22L Gateway)
5 = 8201 bytes (Applies to Models 12L or 22L Gateway)

Note: The Token-Ring must be running with a 16/4Mbps Token-Ring Adapter or the 8192-byte RU size will not be supported.

Step 5 In the W columns for each attaching device, enter the number of transmits before waiting to receive an acknowledgment.

Response: One numeric character. A valid response ranges from 1 to a maximum of 7.

Consult your network planner for this information.

Planner: You have completed "Worksheet 47—Ring Transmission Definition." Return to the divider page labeled "Microcode Customization Planning." See step 4 to determine if you need to fill out additional worksheets before you continue. You may also refer to the divider page labeled "Worksheet Summary" to determine where to proceed next.

Keep records of your configuration by using one of the methods described under "Customization Records" on page 5-6.

The ISDN PUID Assignment Worksheet

"Worksheet 48—ISDN PUID Assignment" (Figure 16-4 on page 16-16) allows you to assign PUIDs for the devices in your ISDN network. Use the procedure on page 16-17 to fill out this worksheet.

```
                          _____ ISDN PUID Assignment _____
                                                                  CU@/ATTACH
    Type in the ISDN PUID.  Each PUID must be unique and
    can not equal question 215.  Question 215 = *****

      S   ISDN PUID     S   ISDN PUID     S   ISDN PUID     S   ISDN PUID

         _____             _____             _____             _____
         _____             _____             _____             _____
         _____             _____             _____             _____
         _____             _____             _____             _____
         _____             _____             _____             _____
         _____             _____             _____             _____
         _____             _____             _____             _____
         _____             _____             _____             _____
```

Figure 16-4. An Example of Worksheet 48 — ISDN PUID Assignment

The following describes the areas on the worksheet.

Question 215 = ***

The five asterisks (*) represent the PUID in your response to question 215.

S

This two-digit field contains the addresses of ISDN DSPUs within the range of addresses defined in questions 104 and 105. This information is supplied automatically when the ISDN PUID Assignment panel is presented.

ISDN PUID

This column defines the PUIDs of the ISDN DSPUs.

Response: Five-character hexadecimal value in the range of 00001 - FFFFF.

During connection establishment with an ISDN DSPU, the controller matches the ISDN DSPU's PUID with those defined on this panel to determine the host address assigned to the ISDN DSPU.

No two PUIDs can be the same, including the controller PUID in your response to question 215. With Multi-Host Gateway, this restriction applies to all PUIDs for all hosts attached to the controller.

Note: Not customizing an ISDN PUID for a host address prevents the gateway from using that host address. Consult your network planner for this information.

Filling In Worksheet 48 — ISDN PUID Assignment

Step **1** Locate "Worksheet 48—ISDN PUID Assignment" on page A-63.

Step **2** Fill in the ISDN PUID fields for each address listed.

Planner: *You have completed "Worksheet 48—ISDN PUID Assignment." Return to the divider page labeled "Microcode Customization Planning." See step 4 to determine if you need to fill out additional worksheets before you continue. You may also refer to the divider page labeled "Worksheet Summary" to determine where to proceed next.*

Keep records of your configuration by using one of the methods described under "Customization Records" on page 5-6.

Chapter 17. Planning to Modify Keyboards

An Overview of Modifying Keyboards

Before you start planning, you need the following:

- The Keyboard Layout Worksheets in Appendix A
- The *3174 Character Set Reference*, GA27-3831, for visual identification of keyboard layouts and for code page graphics.

The purpose of the Modify Keyboards procedure is to create unique keyboard layouts that meet specific user applications. These modified layouts can be used on IBM display stations with modifiable keyboards.

Keyboards can be modified for both 3270 sessions and ASCII Emulation. This chapter presents keyboard modification procedures based on use in 3270 sessions. Procedures for ASCII Emulation are similar; an explanation is provided. See "Modifying Keyboards for ASCII Emulation" in this chapter.

During microcode customization planning, you can select which standard keyboard layout (question 136) and which of the four possible modified keyboard layouts (question 137) are to be included in the 3174. The maximum number of standard and modified keyboards that can be configured is four.

Most characters, symbols, and functions can be relocated, duplicated, or deleted from almost any key position. However, there are restrictions, as explained under "Restrictions" on page 17-4. For two-language keyboards, modifying the secondary language nomenclature on the two-language keyboard will, in some cases, also affect the primary nomenclature. These occurrences are described in detail under "Two-Language Modification" on page 17-9.

The 3174 supports a PA3 function for the Converged (also referred to as *122-key keyboard*) and Enhanced Typewriter keyboards. The PA3 key, which is sometimes unlabeled, allows a third program attention key to be supported by an application. You should check with your system programmer to determine if any application already has a function associated with the PA3 key. If the system programmer determines that pressing the (unlabeled) PA3 key initiates an undesirable action, you should instruct the customizer to use the Modify Keyboard procedure to remove the PA3 key from the keyboard.

Note: To modify the keyboard on a 3290 Information Panel or 3179 Color Display Station, see *3290 Information Panel Description and Reference*, GA23-0021, and *3179 G Color Display Station Description*, GA18-2261.

Modify Keyboard Requirements

To use modified keyboards, it is necessary to answer question "137: Modified Keyboard Layouts" on page 6-28 (see page 6-28) on the applicable Host Attachment Worksheet.

Although as many as four modified keyboard layouts can be defined, the total number of standard and modified keyboard layouts (question numbers 136 and 137) cannot exceed 4. For example, if three standard keyboards are selected, then only one of the four modified keyboards can be selected.

Restrictions

The restrictions are grouped into four categories:

- General
- Local Functions
- APL
- Nomenclature Presentation.

General

- If you modify a keyboard for the language used on the primary host link, the display station will not get the modified keyboard when operating in a logical terminal session if the following are true: (1) the logical terminal session is on a secondary host *and* (2) the secondary host is not configured for the same language as the primary host on the primary link. If the secondary and primary hosts on the same link are configured for the same language, the display station will get the modified keyboard.

- If you have a keyboard with the Numeric Lock feature and you are planning to modify any of these functions:

Change Screen	Reset
Attention	Cursor Blink
System Request	Alternate Cursor
Test Request	Clicker
Device Cancel	Extended Select.
Insert	

  then consult the Numeric Lock feature section of *3174 Functional Description,*, GA23-0218. This is particularly important if you plan to move the function to a key that will not be used in ALT shift or one that will not provide these functions in both lower and upper shift modes.

- A maximum of four keyboard layouts are identified by this procedure.

- The following are mandatory key functions and **must** be included on the modified keyboard layouts:

Alternate shift	Test
Enter	System request
Reset	Upshift or downshift.
Device cancel	

Exceptions:

For the Katakana **Converged keyboards:** The Japanese English upper and lower shift key functions are mandatory key functions and **must** be included on the modified keyboard layout.

For the Greek, Cyrillic, and Thai modifiable keyboards: The Latin shift key function is a mandatory key function and **must** be included on the modified keyboard layout.

- A make/break key cannot be copied to a non-make/break key, nor can a non-make/break key be copied to a make/break key.

  The make/break keys are:

Shift Lock	ENTER (on main keyboard only)
Upshift (two keys)	Downshift (Data Entry keyboard only)
RESET/DEV CNCL	CONTROL (3471/72 only).
ALT (two keys)	

- **Do not** place any of the following functions anywhere on key 69 while modifying Converged keyboards for Models 3179, 3180, 3191, and 3192. (See the keyboard worksheets in Appendix A for the position of key 69.)

Shift Lock	ALT
Upshift	Downshift
RESET/DEV CNCL	CONTROL.

- **Do not** place any of the following functions anywhere on key 64 while modifying a Converged keyboard for a Model 3180. (See the keyboard worksheets in Appendix A for the position of key 64.)

Shift Lock	ALT
Upshift	Downshift.
RESET/DEV CNCL	

- For CECP countries, when the Acute, Grave, Circumflex, Diaeresis, Cedilla, and Degree/Overcircle accents are added to a Typewriter or APL keyboard, they become "nonescaping keys." A nonescaping key is a key that allows a character to be typed without the imprint position being changed. These keys are intended to be combined with other characters in a two-keystroke sequence to create accented characters. If the accent is to be used by itself, the two-keystroke sequence **must** be the accent and space.

- For languages that have Extended Graphics support (all CECP languages except Icelandic), the Caps Lock and Shift Lock functions cannot be modified in full-key mode. The Caps Lock and Shift Lock functions can be moved around within the original key in single-shift mode. They cannot be deleted, copied, or exchanged with another key. All shifts of the modified key must contain the Caps Lock or Shift Lock function, in any arrangement.

  Note: Modifying keyboards does not affect the Extended Select or Extended Graphics keyboard functions.

  For languages without Extended Graphics support, Caps Lock and Shift Lock functions can be moved to another key in full-shift mode and moved around within a key in single-shift mode. However, all shifts of the modified key must contain the Caps Lock or Shift Lock function, in any arrangement.

- Reset and Device Cancel functions can be moved to another key in full-shift mode and moved around within a key in single-shift mode. However, all shifts of the modified key must contain the Reset or Device Cancel function, in any arrangement.

- "Fwd" and "Back" (the scroll forward and backward functions) can be moved, but they are not operative for all modifiable keyboards.

- For languages that have Extended Graphics support (all CECP languages except Icelandic), the Up-shift, Down-shift, and Alt-shift keys cannot be modified.

- For languages that do not have Extended Graphics support, the Up-shift, Down-shift, and Alt-shift keys cannot be modified in a single shift change.

- On Typewriter and APL keyboards with the keyboard numeric lock feature, the keyboard is automatically downshifted when the cursor enters a numeric field; on Data Entry keyboards, the keyboard is automatically upshifted. You must keep this in mind when modifying a keyboard with this feature, because the automatic shifting remains in effect regardless of keyboard layout modification. For example, when a Typewriter keyboard layout has been modified, if any numbers are moved from downshift to upshift key locations, the operator must override the automatic downshift in a numeric lock field (by pressing the Shift key) before keying in the upshift numbers.

- Only characters resident in the I/O interface code page for the language that was selected can be added to the keyboard. For example, only the characters from the Cyrillic I/O interface code page can be used to add a character to the keyboard while you are modifying Cyrillic keyboards.

- When modifying a Converged keyboard for a 3471 or 3472, change it so that **only** the following functions are listed on key 69 (see the keyboard worksheets in Appendix A for the position of key 69). Or, delete all functions from that key:

Shift Lock/Caps	ALT
Lock	Downshift (Data entry keyboard)
Upshift	CONTROL
RESET/DEV CNCL	ENTER.

Local Functions

- Keyboard local functions are not displayed and are not modifiable.

- Extended Select key functions (including Entry Assist, X.21, and X.25) cannot be modified.

- Local keys (for example, SETUP, RECORD, and PLAY keys) on modifiable keyboards do not send signals to the 3174. (See your terminal user's guide to find out if your terminal's keyboard has local keys.) Any key functions that are moved to these "local" key locations will not be recognized by the 3174. This restriction does not apply to modifiable keyboards that do not implement these local keys.

- The procedure will not prevent moving functions to or from the keys associated with the local key functions. When a modifiable keyboard is performing a local function, however, all key functions revert to the positions of the standard keyboard. For example, assume that the ALT key function was exchanged with the ENTER key. During setup mode, then, the original ALT key (now labeled ENTER) must be pressed when the "Alternate" function is required.

APL

- Not all display stations with modifiable keyboards support the APL keyboard.

- The display station connected to port 26-00 must have an APL read-only storage (ROS) to modify APL characters.

- A display station must have an APL2 ROS in order to display APL2 characters correctly.

- APL key functions cannot be exchanged with Typewriter key functions.

- Characters resident in an I/O interface code page cannot be added to the APL layer on the Converged APL keyboard.

Nomenclature Presentation

- When a key nomenclature of n characters (where $n > 3$) is moved to a key of less-than-n characters, the nomenclature is truncated. For example, exchanging the Print key with the letter Q key causes Pri to be displayed on the new "print" key.

- The display station connected to port 26-00 must have a primary language read-only storage (ROS) to display the corresponding primary language characters. However, these characters are modifiable whether the primary language ROS is present or not. (This note applies to Katakana, Greek, Turkish, Icelandic, ROECE, Yugoslavic, Cyrillic, and Thai.)

- For CECP characters to be supported, the controller must be customized for CECP, and displays that support CECP must be used. See Chapter 8, "Planning for Country Extended Code Page," for the devices that support CECP.

- For any CECP language, characters that are unique to the CECP ROS may not be displayed correctly unless the display being used has a CECP ROS.

For additional information on keyboard restrictions, refer to the *3174 Utilities Guide*, GA27-3863.

Setting Up the Terminal Keyboards

After customizing has been performed, the user of a display station with a modifiable keyboard can select which keyboard layout to use. For a modified keyboard layout, the user must change the keyboard to match the layout sheet by changing the keytops or by affixing stick-on labels. Depending on the type of display station, the user identifies the keyboard layout to the 3174 either by switches mounted on the bottom of the keyboard or by a local-mode procedure.

The users of display stations with modifiable keyboards need to know which keyboard layouts have been customized for their controller. Copies of the modified keyboard layouts should be given to these users so that they can set up their keyboards.

Instructions on how to set up a modified keyboard layout are in the operator's guide for each display station with a modifiable keyboard.

The customer is responsible for all changes he makes to the keyboard. That is, before submitting a keyboard for exchange or repair, the customer should remove all special keytops he has installed on his keyboard, because he will receive a keyboard with the standard key layout in return for any keyboard submitted for exchange or maintenance.

Modifying Keyboards for ASCII Emulation

Converged and Enhanced keyboards are used in ASCII Emulation. Each keyboard type can be modified (and its layout changed) for both 3270 *and* ASCII Emulation sessions at once. The Keyboard Definition Utility allows you to make changes for 3270 sessions, then the system matches equivalent ASCII functions to 3270 ones. Modified keyboards can only be used in ASCII Emulation if question 702 = 1.

So, to modify a function used in ASCII Emulation mode, use keyboard maps to find the 3270 function that matches the ASCII function you want to change (the one already on that key). Then, using KDU, change the 3270 function to the one that matches the ASCII function you want supported. See the *3174 Terminal User's Reference for Expanded Function* for the keyboard maps that match ASCII-3270 equivalent functions.

For example, suppose you have a Converged keyboard which emulates a 3101. On the keyboard map, you see that the 3270 function matching ASCII ERASE EOS is Cursor Sel. So you use KDU to move the Cursor Sel function to the key you want ERASE EOS to be supported on. Then, when you power on that workstation, identify it as using a modified keyboard layout. From that point on, when the workstation is used in 3270 session, Cursor Sel is in the new location; when the workstation is used in ASCII Emulation session, the ERASE EOS function is in the new location also.

Two-Language Modification

Code Page Considerations: In some two-language code pages, there may be a character that is duplicated between the primary and secondary languages. While modifying the secondary language keyboard, you may use only the secondary language's characters. While modifying the primary language keyboard, you may use only the primary language's characters. For example, a Latin (secondary language) capital A and a Greek (primary language) capital alpha look similar, but the Latin A is hex C1, and the Greek alpha is hex 41.

Hidden Keyboard Considerations: When the primary language code is specified on the master panel of this procedure, the keyboard layouts of two languages—for instance, the Katakana keyboard layout and the Japanese English keyboard layout—can be displayed.

There are occasions when a modification made to the primary language (Katakana, Greek, Cyrillic, and Thai) keyboard layout will also be made to the secondary language keyboard layout. For example, if the Katakana keyboard layout is displayed and PF7 is deleted, the PF7 on the hidden (Japanese English) keyboard layout may also be deleted. The reverse is also true. When a modification is made to both languages, an indication is displayed on the display screen. (This indication and how to move between the keyboard layouts are explained in the *3174 Utilities Guide*, GA27-3863.)

A two-language modification will occur (unless you are modifying a keyboard where the keyboard group selection is equal to a 1, meaning APL only) in the following circumstances:

- When you are modifying function keys on the keyboard; for example, program function keys, control keys, and shift keys. With some exceptions, most of these keys appear gray on the keyboard.

    If you are modifying a graphic key, a two-language modification will **not** occur. Graphic keys produce alphanumeric and national characters on the screen. With some exceptions, these are the white keys on the keyboard.

- If you are copying a character from an I/O interface code table, two-language modification will **not** occur.

- If the modification involves the full key (both upper and lower shift positions), and the upper and lower shift positions on the displayed keyboard layout and on the hidden keyboard layout are the same. See "Examples of Two-Language Modification" on page 17-10 for illustrations of this condition.

- When the modification involves a single-shift (either the upper shift, lower shift, or alt shift position) key, and the corresponding keys on both the displayed keyboard and the hidden keyboard are the same. See "Examples of Two-Language Modification" for illustrations of this condition.

Examples of Two-Language Modification

The examples in Figures 17-1 and 17-2 illustrate cases when a two-language modification will and will not occur. They use the Japanese English keyboard layout as the displayed keyboard and the Katakana keyboard layout as the hidden keyboard. However, the same result would occur regardless of which keyboard is hidden or displayed. The keyboard layouts used in the examples represent the control keys on the left side of the Typewriter keyboard. The characters displayed on the boxes, however, do not represent any real function; they are used here for illustration only.

The same applies to Latin-Greek, Latin-Cyrillic, and Latin-Thai language keyboard layouts.

Deleting Key Functions

The first and second sets of boxes on the left in Figure 17-1 represent the layout of function keys on the left side of the Japanese English Typewriter keyboard that is displayed on the screen. They show the keyboard **before** and **after** the Modify Keyboard procedure was used to delete a key function. The third and fourth sets of boxes, on the right, represent the corresponding keys on the hidden (Katakana) Typewriter keyboard layout. They show what can happen to the hidden keyboard when keys are deleted on the displayed keyboard.

	Japanese English Typewriter (displayed)			Katakana Typewriter (hidden)	
	before deletion	after deletion		before deletion	after deletion
Row 1	F1			F1	
Row 2	F2 F3			F2 F3	
Row 3	F3 F4			F5 F6	F5 F6
Row 4	F5 F7	F7		F5 F6	F6
Row 5	F8 F9	F9		F4 F9	F4 F9
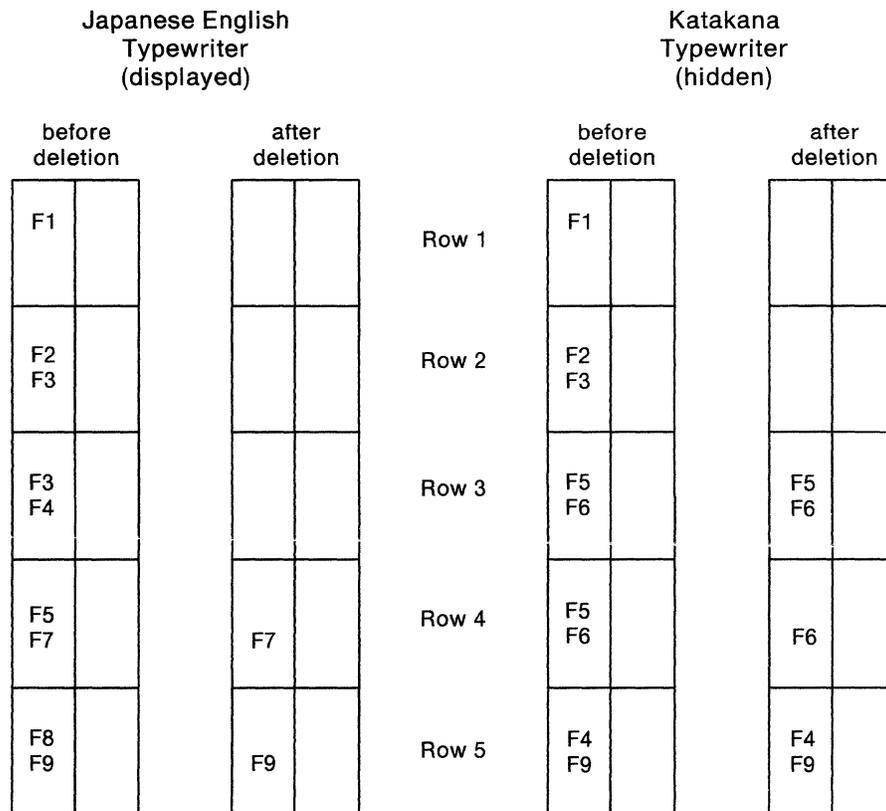
Row 1: Full-key deletion; both the displayed and hidden keyboards are modified because they are functionally the same.

Row 2: Full-key deletion; both the displayed and hidden keyboards are modified because they are functionally the same.

Row 3: Full-key deletion; the key on the displayed keyboard and the corresponding key on the hidden keyboard are functionally different. The hidden key is not modified.

Row 4: Single-shift deletion of the upper shift function occurs on both keyboards because the upper shift functions of both keys are the same.

Row 5: Single-shift deletion; the upper shift function of the key on the displayed keyboard is functionally different from the corresponding key on the hidden keyboard. The hidden keyboard is not modified.

Figure 17-1. Deleting Key Functions

Copying from One Key to Another Key

The following examples also apply when you are exchanging the functions of two keys.

The first and second sets of boxes on the left in Figure 17-2 represent function keys on the Japanese English Typewriter keyboard layout that is displayed on the screen. They show the **before** and **after** states of copying a key function to the neighboring key. The third and fourth sets of boxes represent the corresponding keys on the hidden (Katakana) Typewriter keyboard layout. They show what will happen to the hidden keyboard when keys are copied on the displayed keyboard.

Japanese English Typewriter (displayed)			Katakana Typewriter (hidden)	
before copy	after copy		before copy	after copy
F1	F1 | F1	Row 1	F1	F1 | F1
F2 F3 F9	F2 F3 F9 | F2 F3 F9	Row 2	F2 F3 (F9)	F2 F3 (F9) | F2 F3 (F9)
F4 F5	F4 F5 | F4 F5	Row 3	F4 F6	F4 F6
F8 F9 | F11 F12	F8 F9 | F8 F9	Row 4	F8 F9 | F6 F7	F8 F9 | F6 F7
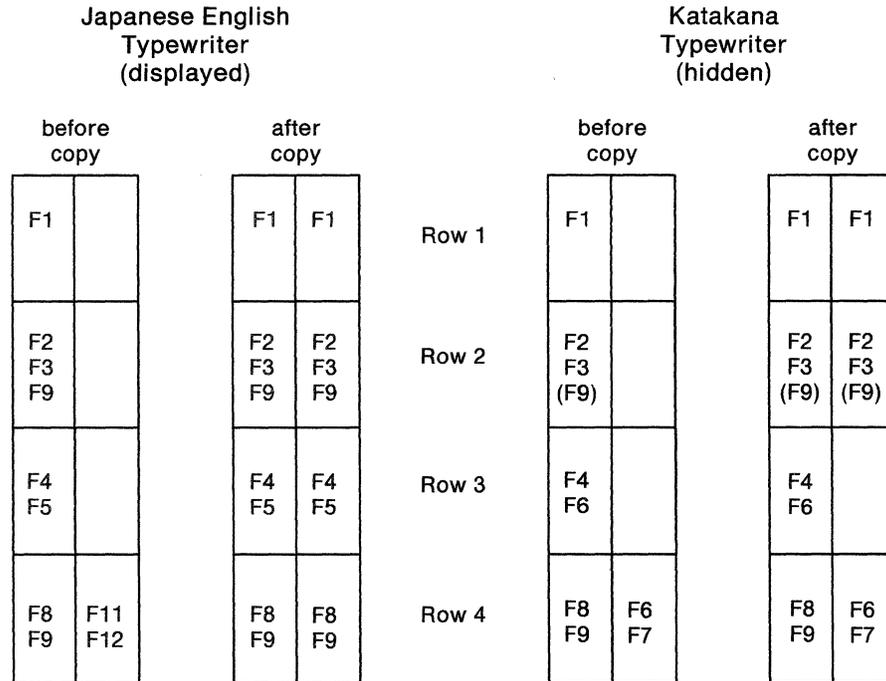
Row 1: Full-key copy; both the displayed and hidden keyboards are modified because they are functionally the same. The function in the alternate location is copied to the Katakana keyboard, but is not displayed.

Row 2: Full-key copy; both the displayed and hidden keyboards are modified because they are functionally the same in the upper and lower positions. The function in the alternate location is copied to the Katakana keyboard, but is not displayed.

Row 3: Full-key copy; the key on the hidden keyboard is not modified, because the corresponding keys are not functionally the same in both upper and lower shift positions.

Row 4: Full-key copy; the corresponding keys on the hidden keyboard are not modified, because the target key (the key being copied to) is functionally different from the target key on the displayed keyboard.

Figure 17-2 (Part 1 of 2). Copying from One Key to Another Key

Japanese English Typewriter (displayed)   Katakana Typewriter (hidden)

Japanese English — before copy		Japanese English — after copy			Katakana — before copy		Katakana — after copy	
F10 F11		F10 F11	F10	Row 5	F10 F13		F10 F13	F10
F10 F11		F10 F11	F10	Row 6	F9 F11		F9 F11	
F12 F13	F14 F18	F12 F13	F12 F18	Row 7	F12 F17	F14 F20	F12 F17	F12 F20
F12 F13	F14 F15	F12 F13	F12 F15	Row 8	F12 F17	F18 F19	F12 F17	F18 F19
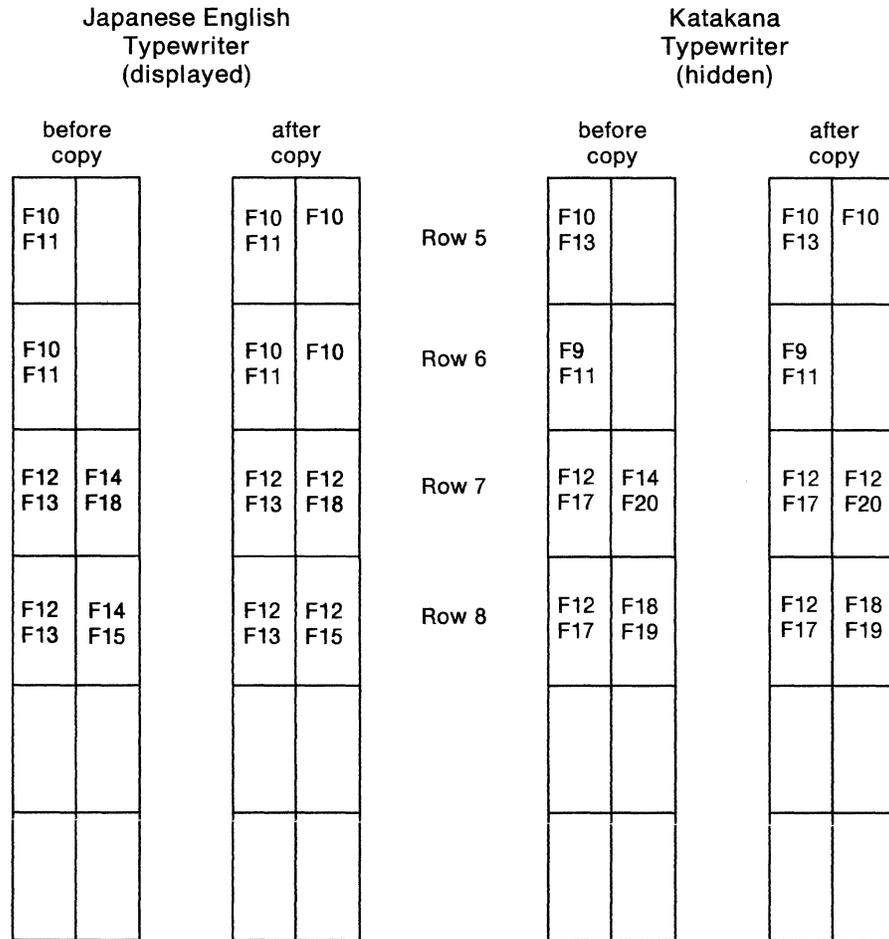
Row 5: Single-shift copy of the upper shift function; the corresponding keys on the hidden keyboard are modified because the upper positions of both keys are functionally the same.

Row 6: Single-shift copy of the upper shift function; the corresponding keys on the hidden keyboard are not modified, because the upper position of the corresponding key on the hidden keyboard is functionally different from the corresponding key on the displayed keyboard.

Row 7: Single-shift copy of the upper shift function; the corresponding keys on the hidden keyboard are modified because the upper position of the target key (the key being copied to) is functionally the same as the corresponding key on the displayed keyboard.

Row 8: Single-shift copy of the upper shift function; the keys on the hidden keyboard are not modified, because the upper position of the target key (the key being copied to) is functionally different from the corresponding key on the displayed keyboard.

Figure 17-2 (Part 2 of 2). Copying from One Key to Another Key

Languages Supported on Modifiable Keyboards

Table 17-1. Languages Supported on Modifiable Keyboards					
	Converged Keyboards			Enhanced Keyboard	
Keyboard Language	Typewriter	Data Entry	APL	Typewriter	Response
English (U.S.A.)	√	√	√	√	01
English (U.S.A.) ASCII-7	√				02[1]
Austrian/German	√	√	√	√	03
Belgian	√		√		04
Danish	√	√	√	√	07
Finnish	√	√	√	√	09
Italian	√	√	√	√	15
Japanese Katakana	√	√	√	√	17
Spanish	√		√	√	19
Spanish-Speaking	√	√	√	√	21
English (UK)	√	√	√	√	22
Norwegian	√	√	√	√	23
Swedish	√	√	√	√	24
Portuguese	√	√	√	√	28
Canadian Bilingual	√	√	√	√	29
French	√	√	√	√	30
English (U.S.A.) ASCII-International	√		√		33[2]
English (U.S.A.) ASCII-8	√				34[3]
Cyrillic	√			√	35
Greek	√			√	36
Icelandic	√			√	37
ROECE[4] Latin	√			√	38
Turkish	√			√	39
Yugoslavic	√			√	40
Swiss French (New)	√		√	√	41
Swiss German (New)	√		√	√	42
Belgian (New)	√		√	√	43
Thai				√	46
Netherlands	√	√	√	√	47
New Greek	√			√	48

[1]Available on remote models only.
Does not support Extended Data Stream.
[2]Available on BSC, Local SNA, and Local Non-SNA only.
[3]Available on SDLC and X.25 only.
[4]Regional Office for Eastern and Central Europe.

Note: The *3174 Character Set Reference*, GA27-3831, contains the code pages for the supported languages.

Each of the languages supported by the Modify Keyboard procedure uses the key function nomenclature of one of the following languages:

- English
  - Belgian
  - Cyrillic
  - Danish
  - Finnish
  - Greek
  - Icelandic
  - Netherlands
  - New Belgium
  - Norwegian
  - Portuguese
  - ROECE
  - Swedish
  - Thai
  - Turkish
  - Yugoslavic
  - UK English
  - US English

- French
  - Canadian (Bilingual)
  - French (AZERTY 105)
  - New Swiss/French
- German
  - Austrian/German
  - New Swiss/German
- Italian
  - Italian
- Spanish
  - Spanish
  - Spanish-speaking
- Japanese
  - Katakana.

For example, when a keyboard panel for a Finnish keyboard is displayed, the key function is displayed in English. Table 17-2 on page 17-16 lists the key functions and the corresponding displays.

Table 17-2. Key Function Nomenclature

Key Function	Key Function Display				
	English	**French**	**German**	**Italian**	**Spanish**
Attention	Attn	Attn	Abruf	Attn	Atenc
Clear	Clear	EfEcr	Losch	Annul	Borra
System Request	SysRq	Syst	S-Abf	Sist	PtSis
Cursor Select	CrSel	SelCr	AwPos	SelCr	SelCr
Erase Input	ErInp	EfEnt	E-Lo	ImCan	BorEn
Erase to End of Field	ErEOF	EfFZn	LoFld	FCCan	BrFDC
Extend Select	ExSel	2eSel	ErAus	EsSel	ExSel
Print	Print	Impr	Druck	Stamp	Impr
Ident	Ident	Ident	Ident	Ident	Ident
Test	Test	Test	Test	Prova	Prba
Shift Lock	ShLck	VrMaj	UmVer	FMaiu	BlMay
Up Shift	UpSh	Maj	UmObn	Maius	Mayus
Reset	Reset	Rest	Grdst	Ripr	Rest
Device Cancel	DvCnl	AnnOp	Eh-Lo	AnTrs	CancD
Alternate Shift	Alt	FnSel	Alt	Altrn	Altva
Space	Space	Esp	Leer	Spaz	Espac
Enter	Enter	Entr	DatFr	Invio	Intro
Home	CrHom	Posl	GrPos	Posiz	IncCr
Cursor Down	CrDwn	CrBas	UnPos	CrGiu	BajCr
Cursor Up	CrUp	CrHt	ObPos	CrSu	SubCr
Insert	Ins	Inser	Eifug	Inser	Inser
Delete	Del	Suppr	Z-Lo	Canc	Supr
Delete Word	WdDel	SpMot	W-Lo	PCanc	SupP1
Duplicate	Dup	Repro	Dup	Dup	Dup
Field Mark	FldMk	FinZn	FeldM	MC	MCamp
PA1—PA3	PA1—PA3	AP1—AP3	PA1—PA3	AP1—AP3	AP1—AP3
Cursor Blink	CrBnk	ClgCr	BlPos	IntCr	ParCr
Alternate Cursor	CrAlt	TypCr	UPos	CAlt	CrALt
Clicker (On/Off)	Click	Clic	Klick	Segn	Clic
PF1—PF24	P1—P24	P1—P24	P1—P24	F1—F24	F1—F24
Down Shift	DwnSh	Min	UmUnt	Minus	Minus
Window Forward	Fwd	Avant	Vorw	Avant	Avnce
Change Screen	ChgSc	ChgSc	ChgSc	ChgSc	Chgsc
Window Back	Back	Arr	Ruck	Indtr	Retro
Backspace	<- -	<- -	<- -	<- -	<- -
Carrier Return	<-|	<-|	<-|	<-|	<-|
Tab Right	->|	->|	->|	->|	->|
Tab Left	|<-	|<-	|<-	|<-	|<-
Fast Cursor Left	< <- -	< <- -	< <- -	< <- -	< <- -
Fast Cursor Right	- -> >	- -> >	- -> >	- -> >	- -> >
Cursor Left	<-	<-	<-	<-	<-
Cursor Right	->	->	->	->	->
Capslock	CapLk	CapLk	CapLk	CapLk	CapLk

The Keyboard Changes Chart

An example of a Keyboard Changes Chart can be seen in Figure 17-3. This chart appears on keyboard worksheets 1 through 5. Use the procedure on page 17-19 to fill out the keyboard worksheets.

Keyboard			Shift		Function				From Key		I/O Interface		To Key	
0	1	2	3	4	5	6	7	8	Shift	Character	Code	Character	Shift	Character

Figure 17-3. Example of a Keyboard Changes Chart

The columns are defined below.

0, 1, 2, 3, 4, 5, 6, 7, 8	Numbers indicating the keyboard, shift, and function groups (see Figure 17-4 on page 17-18.)
From Key Shift	Designates which shift positions of the key should be moved, deleted, or copied.
From Key Character	Designates the character or function on the From key that will be deleted, moved, copied, or exchanged.
I/O Interface Code	A hexadecimal code that represents a character not normally on the keyboard. These codes can be found in the I/O Interface Code Character tables of the *3174 Character Set Reference*, GA27-3831.
I/O Interface Code Character	A character that is not normally on the keyboard, but that can be added through the use of hexadecimal codes entered in the Modify Keyboards files of the controller.
To Key Shift	Designates which shift positions on the To key will receive the From key character or the I/O interface code character.
To Key Character	Designates the character or function on the To key that will be exchanged with the From key character, that will be replaced by the From key character or I/O interface code character, or that indicates the To key position on the keyboard.

Keyboard, Shift, and Function Groups

0, 1, 2 — Keyboard Group

0 = The desired change is on a Converged Typewriter, Converged Data
Entry, Enhanced Typewriter, or the typewriter functions on a
Converged APL keyboard.
1 = The desired change applies only to the APL key functions on a
Converged APL keyboard.
2 = The desired change applies to both the typewriter and APL functions
a Converged APL keyboard.

3, 4 — Shift Group

3 = Full-key change (includes alternate, upper, and lower shifts).
4 = Single-shift change.

5, 6, 7, 8 — Function Group

5 = Copy from I/O interface code table.
6 = Exchange two functions.
7 = Copy a function to another key.
8 = Delete a key function.

Figure 17-4. Keyboard, Shift, and Function Groups — Keyboard Changes Chart

A Sample Keyboard Changes Chart

Use the following example as a reference when filling in the Keyboard Changes Chart.

Example: In this example, the planner has already specified on the top portion of the worksheet that the keyboard is Non-Katakana, Typewriter, PF, and a new layout.

In the following Keyboard Changes Chart, the planner has indicated on the first row that he wishes:

• To change a Converged Typewriter, Converged Data Entry, or Enhanced Typewriter keyboard
• To make a single-shift change
• To exchange two functions
• To perform an exchange of the X key (uppershift position) with the A key (uppershift position).

In the second row the planner has indicated that he wishes:

• To change a Converged Typewriter, Converged Data Entry, or Enhanced Typewriter keyboard
• To make a single-shift change
• To copy a character from the I/O interface code table
• To copy the plus (+) key from the I/O Interface character table (hex 4E) to replace the Z key (alternate position).

Keyboard			Shift		Function				From Key		I/O Interface		To Key	
0	1	2	3	4	5	6	7	8	Shift	Character	Code	Character	Shift	Character
√				√		√			Upper	X			Upper	A
√				√	√						4E	+	Alternate	Z

Figure 17-5. Example of a Completed Keyboard Changes Chart

Filling Out the Keyboard Worksheets

Use the following steps to plan your modified keyboards. Be sure to review "Restrictions" on page 17-4. The restrictions listed may apply to the changes you wish to make.

Step **1** Locate the worksheets you plan to use. There are five Keyboard Layout Worksheets:

- Converged Non-Katakana
- Converged Katakana
- Enhanced (US)
- Enhanced (World Trade)
- Enhanced (Katakana).

Remove the worksheets you plan to use from Appendix A. The keyboard users will need copies of the completed worksheets to set up their keyboards. Duplicate the worksheets as needed, but be sure to keep one blank copy of each worksheet for future planning.

Step **2** At the top of the worksheet, circle the keyboard ID. The keyboard IDs represent the modified or unmodified keyboards for which the controller has been configured. To determine which IDs are to be supported, check the response to configuration question 137 on your host related worksheet.

Step **3** Specify whether this is a New Layout or Update. If you are planning changes to a keyboard that already exists in the Modify Keyboard tables (within the microcode files), check the box indicating "Update." If you are planning to enter a new keyboard into the Modify Keyboard tables, check the box indicating "New Layout."

Step **4** *Planner: This step does not apply to Enhanced keyboards. If you are modifying an Enhanced keyboard, proceed to step 5.*

Put a check in the "Keyboard Type" box that applies to the keyboard you are modifying: Typewriter, Data Entry, or APL.

Step **5** Put a check in the "Keypad Type" box that applies to the keyboard you are modifying: National Language Numeric, Data Entry, or Program Function (PF).

Step **6** Put in the appropriate language number (found in Table 17-1 on page 17-14) on the line beside "Keyboard Language," which is located just above the Keyboard Changes Chart on the worksheet.

Warning: If you specify a keyboard language that has characters **unique** to APL2 and CECP, you need to ensure that a device capable of supporting those characters will be used. If you use a device that does not support those characters, they may be misrepresented or displayed as blanks.

Step **7** Using the information in Figure 17-4 on page 17-18 and the description of the Keyboard Changes Chart columns on page 17-17, fill in the Keyboard Changes Chart (located at the bottom of the worksheet) with the modifications you plan to make.

a. Place a √ in the Keyboard, Shift, and Function group columns. Using Figure 17-4 on page 17-18 as a reference, determine which number applies for **each** group. Place a √ in the column under the appropriate numbers. **You must choose one number from each group.**

b. Designate Upper Shift, Lower Shift, Alternate, or All in the ***From*** Key Shift Column. The *From* key is the key you will be moving, copying, or deleting.

   Note: In the case where you will be copying a character from the I/O Interface Code Characters chart, see step 7d.

   After you have determined which shift of the character should be changed, indicate the shift or "All" (in the case where you wish to change the entire key) in the shift column for the *From* key.

c. Write in the character or function for the ***From*** key. Write in the appropriate character (for example, "A") or function (for example, the "Forward" function), in the Character column for the *From* key.

d. ***Planner:*** *This step applies only if you are copying an I/O Interface Code from the I/O Interface Code tables. If you are not copying an I/O Interface Code, skip this step.*

   Write in the I/O Interface Code and character. The I/O Interface Code Characters are characters that are not standard on the keyboard. To allow the character to be used on the keyboard you are modifying, you must copy the character from the I/O Interface Code Character tables. These tables are located within the Modify Keyboard files, but must be indicated to the Modify Keyboards program by a hexadecimal code. (The hexadecimal codes can be found in the *3174 Character Set Reference*, GA27-3831.)

   After determining which I/O interface code character you wish to copy from the I/O Interface Code Tables, write the hexadecimal code given for that character, **and** the actual character you want copied, in the applicable columns of the Keyboard Changes Chart.

e. Designate Upper Shift, Lower Shift, Alternate, or All in the ***To*** Key Shift Column. The *To* key is the key to which you are copying or moving the character or function.

   The shift indicates which shift position on the *To* key will receive the *From* key character or the I/O interface code character.

   Note: Be sure to review "Restrictions" on page 17-4.

f. Write in the Character or Function for the *To* key. In the event that you wish to have characters, functions, or an entire key exchanged or replaced, you will want to indicate which character, function, or entire key you wish to exchange with the *From* key. Write in the appropriate character (for example, "A") or function (for example, the "Forward" function), in the Character column for the *To* key.

Note: In the event that the *To* key does not have a character or function on the shift position to which you plan to move the *From* key character, use one of the characters or functions on the *To* key, to identify the *To* key's location.

Step **8** On the keyboard worksheet, indicate with an X which keys will be affected by the Modify Keyboards changes; this will help the person performing the actual procedure to locate the affected keys quickly.

Step **9** Give a copy of the completed worksheets to the customizer.

When you have completed filling in all the worksheets, give a copy of each worksheet to the person who will perform the Modify Keyboard procedure. Information on how to perform the actual procedure can be found in the *3174 Utilities Guide*, GA27-3863.

Planner: You have completed planning for Modified Keyboards.

Return to the divider page labeled "Microcode Customization Planning." See step 7 to determine if there are additional worksheets you need to fill out to compete the planning process. You may also refer to the divider page labeled "Worksheet Summary" to determine where to proceed next.

Keep records of your modifications using one of the methods described under "Customization Records" on page 5-6.

Worksheet Summary

If you are familiar with the microcode customization process, you can use this summary to plan your configuration. The worksheets that must be filled out to plan the specific areas of your configuration are listed below. The worksheets, which are located in Appendix A, tell you where to find the planning information you need.

All configurations require that you fill out **Worksheet 1**.

Type of Host Attachment

Attachment Type	Worksheets
BSC	3
SDLC and/or X.21 Nonswitched	4, 14
with Token-Ring Gateway	4, 14, 45, 46, 47
with ISDN Gateway	4, 14, 45, 48
X.25	5, 13, 14
Non-SNA (Channel)	6
SNA (Channel)	7, 14
with Token-Ring Gateway	7, 14, 45, 46, 47
with ISDN Gateway	7, 14, 45, 48
X.21 Switched	8, 14
Token-Ring Network	9, 14
Multiple Hosts	2
(Primary host on primary link requires worksheets for one of the above.)	

Additional Host Attachment

Attachment Type	Worksheets
BSC	3S
SDLC and/or X.21 Nonswitched	4S
with Token-Ring Gateway	4S, 45, 46, 47
X.25	5S, 13 or 13S
SNA (Channel)	7S
with Token-Ring Gateway	7S, 45, 46, 47
with ISDN Gateway	7S, 45, 48
X.21 Switched	8S
Token-Ring Network	9S

Additional Areas

Area	Worksheets
Multiple Logical Terminals	10
Port Assignment	11A & 11B
Response Time Monitor	12
APPN	15 through 21
Peer Communication	22 through 24
Asynchronous Emulation Adapter	25 through 37
Device Definition (PAM, LTA, Extended VPD, and ISDN)	38
PAM	39
LTA	40
EVPD	41
ISDN	42, 43, 44
Controller Storage	49
Modified Keyboards	Keyboard 1—5

Customizing Procedures

You may need to have the customizer:

- Merge RPQs
- Merge DSL
- Copy Files
- Perform Microcode Upgrade
- Perform Media Management
- Identify Customizing Keyboard.

See the *3174 Utilities Guide*, GA27-3863, for these additional procedures.

3174 Configuration Questions Reference

Configuration Questions—Worksheet 1	
Question:	**Response:**
098: Online Test Password (Page 6-3)	Up to 8 alphanumeric characters
099: Product Assistance Data (Page 6-4)	Up to 68 alphanumeric characters
100: 3174 Model Designation (Page 6-4)	3174 Model Number
101: Host Attachment (Page 6-5)	1 = BSC 2 = SDLC 3 = X.25 4 = Non-SNA (Channel) 5 = SNA (Channel) 6 = SDLC (X.21 Switched) 7 = Token-Ring Network M = Multi-Host Support

Configuration Questions—Worksheets 3 through 9S	
Question:	**Response:**
104: Controller Address (Page 6-9)	Two-character hexadecimal address
105: Upper Limit Address (Page 6-11)	Two-character hexadecimal address
106: Token-Ring Network Address and SAP - 3174 (Page 6-12)	A hexadecimal address and service access point
107: Token-Ring Network Address and SAP - Gateway (Page 6-13)	A hexadecimal address and service access point
108: Unique Machine Identifier (Page 6-14)	Seven alphanumeric characters
110: MLT Storage Support (Page 6-14)	Level 0 – 8 or exact MLT storage amount
116: Individual Port Assignment (Page 6-18)	One, two, or four alphanumeric characters
Note: 0, 1, SX, and SXAY provide automatic assignment.	
117: Port Assignment	Panel (See page 6-20)
118: Port Address	Panel (See page 6-20)
121: Keyboard Language (Page 6-20)	Two-digit language code
123: Country Extended Code Page Support (Page 6-21)	0 = No CECP 1 = CECP
125: Miscellaneous Feature Options (A) (Page 6-22)	Eight digits (0 or 1)
126: Miscellaneous Feature Options (B) (Page 6-24)	Eight digits (0 or 1)
127: RTM Definition (Page 6-25)	Two digits
128: Boundaries and Interface Specification	Panel (See page 6-26)
132: Alternate Base Keyboard Selection (Page 6-26)	Four digits (0, 1, or 2)

Configuration Questions—Worksheets 3 through 9S	
Question:	**Response:**
136: Standard Keyboard Layouts (Page 6-27)	Four digits (0 or 1)
137: Modified Keyboard Layouts (Page 6-28)	Four digits (0 or 1)
138: Standard Keypad Layouts (Page 6-28)	0 = National Language Numeric 1 = Data Entry 2 = Program Function
139: Concurrent Communication Keyboard Language (Page 6-29)	00 = Same language as primary host on that link 01 = English (U.S.A.) 02 = English (U.S.A.) ASCII-7.
141: Magnetic Character Set (Page 6-29)	A = None B = Numeric C = Alphanumeric (auto entry; secure data) D = Alphanumeric (auto entry; all data)
150: Gateway (Token-Ring and ISDN) (Page 6-30)	Digit 1 0 = Controller does not act as a T/R Gateway 1 = Controller does act as a T/R Gateway Digit 2 0 = Controller does not act as an ISDN Gateway 1 = Controller does act as an ISDN Gateway
165: Compressed Program Symbols (Page 6-30)	0 = Compressed PS data not sent 1 = Compressed PS data sent
166: Attribute Select Keypad (Page 6-30)	A = Attribute Select Keypad not in use B = Attribute Select Keypad in use without numeric lock C = Attribute Select Keypad in use with numeric lock
168: Additional Extension-Mode Key Definition (Page 6-31)	0 = None 1 = Home key 2 = Print ID key
173: DFT Options (Page 6-32)	Eight digits (0-No or 1-Yes)
175: DFT Password (Page 6-33)	Six numeric digits
176: BSC Enhanced Communication (Page 6-34)	0 = No 1 = Yes
179: Local Format Storage (Page 6-34)	Three digits (0, 1, 2, or 3)
190: Number of ISDN DSPUs (Page 6-35)	Two-character hexadecimal value
213: Between Bracket Printer Sharing (Page 6-35)	0 = No 1 = Yes
215: PU Identification (Controller) (Page 6-36)	Five alphanumeric characters

Question:	Response:
220: Alert/CMIP Event Report Function (Page 6-36) For responses 1, 2, or 3, the CMIP Event Report Function is active.	0 = None 1 = No operator-generated alert message capability 2 = Operator-generated alert message capability from port 26-00 and 27-00 3 = Operator-generated alert message capability; all ports
221: 3174 Alert/CMIP Control Point (Page 6-37)	0 = This host is not the alert/CMIP control point for the 3174. 1 = This host is the alert/CMIP control point for the 3174.
222: Support of Command Retry (Page 6-38)	0 = No 1 = Yes
223: Attention Delay Value (Page 6-39)	Two digits (whole milliseconds)
224: Mode of Data Transfer (Page 6-39)	0 = Interlocked mode; normal data transfer 1 = Data streaming mode; 1.25Mbps 2 = Interlocked mode; high-speed data transfer 3 = Data streaming mode; 2.5Mbps
225: Channel Burst Size (Page 6-40)	0 = 002 bytes per burst 1 = 004 bytes per burst 2 = 008 bytes per burst 3 = 016 bytes per burst 4 = 032 bytes per burst 5 = 064 bytes per burst 6 = 256 bytes per burst 7 = 512 bytes per burst
240: Controller Logical Address (Page 6-41)	One alphanumeric digit (from 0-9, A-F)
241: RU Maximum Size (Page 6-41)	0 = 4KB RU 1 = 8KB RU
242: Link Type (Page 6-41)	0 = 2.0 traffic 1 = Both 2.0 and 2.1 traffic.
310: CDSTL Operation (Page 6-42)	0 = Operation: Nonswitched, or switched line (US or Canada), or in DTR/DSR mode (not Canada). 1 = Connection on a switched line via the CCITT 108.1 interface operating in the CDSTL mode.
313: NRZ or NRZI Encoding (Page 6-42)	0 = Nonreturn to zero encoding 1 = Nonreturn to zero inverted encoding
317: Telecommunication Facilities (Page 6-42)	0 = Nonswitched facilities 1 = Half-duplex SNBU operation 2 = Switched networks
318: Full- or Half-Speed Transmission (Page 6-43)	0 = Full-speed Transmission 1 = Half-speed Transmission
332: X.25 Options (Page 6-44)	Panel (See Chapter 10)
340: RTS Control Response (Page 6-44)	0 = Controlled RTS 1 = Permanent RTS 2 = BSC special controlled RTS

Question:	Response:
360: X.21 Switched Retry (Page 6-45)	00 = Switched feature or Retry not in use 01-99 = Number of times to retry an incoming or outgoing call
361: X.21 Switched Retry Timing (Page 6-45)	00 = Switched feature not in use, or Retry not in use 01-20 = Number of seconds between retries
362: X.21 Switched Options (Page 6-45)	Eight digits (0-No and 1-Yes)
365: X.21 Data Transfer Delay (Page 6-47)	0 = N/A 1 = No delay 2 = Data Transfer Delay
367: X.21 Switched Short-Hold Mode (Page 6-48)	0 = No 1 = Yes
368: X.21 Switched Short-Hold Mode Dial Number (Page 6-48)	Up to 14 numeric characters (dial number of the 3174)
370: Maximum Inbound I-Frame Size (Page 6-48)	0 = 265-byte Maximum I-Frame 1 = 521-byte Maximum I-Frame
371: X.21 Switched Dial Digits (Page 6-48)	Thirty-one numeric digits (0-9)
372: Autocall/Autodisconnect (Page 6-49)	Two numeric digits (0, 1, or 2)
382: Transmit I-Frame Size (Page 6-49)	Four numeric characters • From 265 to 2042 bytes for 4Mbps Token-Ring Adapters • From 265 to 2057 bytes for 16/4Mbps Token-Ring Adapters
383: Token-Ring Network Maximum Out (Page 6-50)	One numeric character (from 1 to 7)
384: Ring Speed of the Token-Ring Network (Page 6-50)	0 = 4Mbps - Normal token release 1 = 16Mbps - Normal token release 2 = 16Mbps - Early token release
385: Link Subsystem Name (Page 6-50)	Eight-character maximum
386: Receive I-Frame Size (Page 6-51)	0 = Up to 4K frames 1 = Up to 8K frames.

X.25 Options—Worksheet 13	
Question:	Response:
400: Network Type (Page 10-6)	Four numeric digits (0 or 1)
401: Circuit Type (Page 10-10)	1 = Permanent virtual circuit (PVC) 2 = Incoming call (from host) only (SVC) 3 = Outgoing call (to host) only (SVC) 4 = Two-way call (SVC).

X.25 Options—Worksheet 13	
Question:	Response:
402: Logical Channel Identifier (Page 10-10)	0000 – 4095. Channel identifier for PVC circuit specified in question 401.
409: X.25 Keyboard Support Options (Page 10-10)	Eight digits (0-No or 1-Yes)
420: Incoming Call Options (Page 10-13)	Eight digits (0-No or 1-Yes)
421: Outgoing Call Options (Page 10-14)	Eight digits (0-No or 1-Yes)
423: Host DTE Address (Page 10-15)	Up to 15 numeric digits.
424: 3174 DTE Address (Page 10-6)	Up to 15 numeric digits.
430: Negotiated Packet Size (Page 10-15)	0 = 64-byte packet 1 = 128-byte packet 2 = 256-byte packet 3 = 512-byte packet
431: Packet Sequence Numbering (Page 10-7)	0 = Modulo 8 1 = Modulo 128.
432: Negotiated Window Size (Page 10-15)	01-07 = Modulo 8 range (if 431 = 0) 01-11 = Modulo 128 range (if 431 = 1).
433: K-Maximum Out (Page 10-7)	1 – 7. Maximum number of link level I-frames.
434: Nonstandard Default Packet Size (Page 10-7)	0 = 64-byte packet 1 = 128-byte packet 2 = 256-byte packet 3 = 512-byte packet
435: Nonstandard Default Window Size (Page 10-8)	01-07 = Modulo 8 range (if 431 = 0) 01-11 = Modulo 128 range (if 431 = 1).
440: Throughput Class Negotiation (Page 10-16)	One digit (3-9 or A-D)
441: Closed User Group (Page 10-16)	00-99. Include CUG facility in outgoing Call Request packet.
442: Recognized Private Operating Agency (Page 10-16)	0000-9999 = RPOA
450: Link Level Transmit Timeout (Page 10-8)	0001-2540. Specified in 0.1-second intervals.
451: Number of Retries (Page 10-8)	01-99. Number of retries required by the network.
452: Connection Identifier (Page 10-17)	Eight-character maximum (0-9, A-Z or blanks).
453: Connection Options (Page 10-17)	Eight digits (0 or 1)
461: Lowest Incoming Channel (Page 10-9)	0000-4095
462: Highest Incoming Channel (Page 10-9)	0000-4095
463: Lowest Two-Way Channel (Page 10-9)	0000-4095

X.25 Options—Worksheet 13	
Question:	Response:
464: Highest Two-Way Channel (Page 10-9)	0000-4095
465: Lowest Outgoing Channel (Page 10-10)	0000-4095
466: Highest Outgoing Channel (Page 10-10)	0000-4095

Common SNA Questions—Worksheet 14	
Question:	Response:
500: CSCM Unique (Page 11-5)	0 = No CSCM 1 = CSCM in use as a Network Site Controller. 2 = CSCM in use as a Central Site Controller.
501: Network ID (Page 11-5)	Up to eight alphanumeric characters (first character must be uppercase alphabetic; no spaces/blanks).
502: Logical Unit Name (Page 11-6)	Up to eight alphanumeric characters (first character must be uppercase alphabetic; no spaces/blanks).
510: APPN Network Controller (Page 11-6)	0 = APPN is not active 1 = APPN is active.
511: APPN Control Point Name (Page 11-7)	Eight-character maximum (first character must be uppercase alphabetic; no spaces/blanks).
512: APPN Virtual Node Name (Page 11-7)	Eight-character maximum (first character must be uppercase alphabetic; no spaces/blanks).

APPN Node Definition Questions—Worksheet 15	
Question:	Response:
610: APPN Sessions (Page 12-42)	1 = Up to 225 sessions 2 = Up to 500 sessions 3 = Up to 750 sessions 4 = Up to 1000 sessions.
611: APPN Nodes/Links (Page 12-42)	1 = Up to 20 nodes/links 2 = Up to 75 nodes/links 3 = Up to 150 nodes/links 4 = Up to 225 nodes/links.
612: APPN Wildcard Option (Page 12-43)	0 = No wildcard option 1 = Wildcard option.

Peer Communication Configure Questions—Worksheets 22 through 24	
Question:	Response:
650: 3174-Peer Support (Page 13-11)	N = No Y = Yes
651: Bridge Support (Page 13-11)	N = No Y = Yes
652: LAN Manager Support (Page 13-11)	N = No Y = Yes
653: 3174-Peer Online Test Updates (Page 13-12)	N = No Y = Yes

AEA Station Set Questions—Worksheet 30

Question:		Response:
743:	Prompt for Universal/Specific Keyboard Map (Page 14-53)	0 = Do not display prompt 1 = Display prompt
744:	Number of Bits per Character (Page 14-53)	0 = 7 bits per character 1 = 8 bits per character
745:	ASCII Display Character Set (Page 14-53)	0 = US ASCII 1 = IBM 3101 CS1 2 = IBM 316x CS1 and CS2 3 = ISO 8859/1.2 4 = DEC MCS 5 = DEC NRC
746:	Translate Option (Page 14-54)	0 = Default table 1 = UDX-1 2 = UDX-2 3 = UDX-3
751:	Data Stream Supported by the ASCII Host (Page 14-54)	1 = VT100 data stream 2 = 3101 data stream 3 = Data General D210 data stream 4 = VT220 data stream 7-bit control 5 = VT220 data stream 8-bit control
752:	ASCII Host Phone Number (Page 14-54)	Up to 48 alphanumeric characters. Phone number of the ASCII host.
761:	Auto XON/XOFF (DEC VT100/VT220) (Page 14-57)	0 = Disabled 1 = Enabled
762:	Wraparound Option (DEC VT100/VT220) (Page 14-57)	0 = Disabled 1 = Enabled
763:	New Line Option (DEC VT100/VT220) (Page 14-57)	0 = Disabled 1 = Enabled
764:	Margin Bell (DEC VT100/VT220) (Page 14-58)	0 = Disabled 1 = Enabled
765:	DEC Host ASCII Character Set (DEC VT100/VT220) (Page 14-58)	0 = DEC NRC 1 = DEC MCS
771:	Automatic Line Feed for Cursor Control (IBM 3101) (Page 14-58)	0 = Disabled 1 = Enabled
772:	Carriage Return/Carriage Return-Line Feed Selection (IBM 3101) (Page 14-58)	0 = Carriage Return 1 = Carriage Return and Line Feed
773:	Automatic New Line for Cursor Control (IBM 3101) (Page 14-59)	0 = Disabled 1 = Enabled
774:	Scrolling (IBM 3101) (Page 14-59)	0 = Disabled 1 = Enabled
775:	Line Turnaround Character (IBM 3101) (Page 14-59)	0 = EOT 1 = CR 2 = XOFF 3 = ETX
776:	IBM ASCII Host Character Set (Page 14-59)	0 = ISO - 8859/1.2 1 = IBM 3101 CS1 2 = IBM 316x CS1 and CS2

AEA Station Set Questions—Worksheet 30

Question:		Response:
781:	Attached Printer Prompt (Page 14-59)	0 = No 1 = Yes 2 = Assumed (no prompt)
782:	Use of Form Feed (Page 14-60)	0 = Printer does not support form feed 1 = Printer supports form feed
783:	Page Length (Page 14-60)	Value from 1 to 255 (use leading zeros).
784:	Printer Character Set (Page 14-60)	1 = US ASCII 2 = ISO - 8859/1.2 3 = DEC MCS 4 = PC code page 850 5 = UDX-1 6 = UDX-2 7 = UDX-3
785:	ASCII Printer Options (Page 14-61)	Eight digits (0-No or 1-Yes)
786:	Page Width (Page 14-63)	Value from 001 to 255
787:	LU 1 SCS Transparency Translation (Page 14-63)	0 = LU 1 transparent data is not translated 1 = LU 1 transparent data is translated

Device Definition Questions—Worksheet 38

Question:		Response:
800:	Printer Authorization Matrix (Page 15-5)	00 = Do not define the PAM 10 = Define the PAM. Printers on HG 27 cannot be defined on the PAM 11 = Define the PAM. Printers on HG 27 can be defined on the PAM
801:	Logical Terminal Assignment (Page 15-5)	0 = Do not define the LTA 1 = Define the LTA for port 26-00 and 27-00 2 = Define the LTA for individual ports.
802:	Prompts for Extended Vital Product Data (VPD) (Page 15-6)	0 = Do not define Extended VPD 1 = Define Extended VPD
803:	ISDN Definition (Page 15-6)	0 = Do not define ISDN 1 = Define ISDN

Common Network Questions—Worksheet 45

Question:		Response:
900:	Token-Ring Network Address and SAP (Page 16-7)	12-character hexadecimal address and 2-character SAP. (Should be locally administered)
905:	Token-Ring Error Alerts (Page 16-7)	0 = Critical Token-Ring Alerts 1 = Critical and non-critical Token-Ring Alerts 2 = Neither critical nor non-critical Token-Ring Alerts reported.
908:	Token-Ring Link Subsystem Name (Page 16-8)	Up to eight alphanumeric characters

Common Network Questions—Worksheet 45	
Question:	Response:
911: Ring Speed of the Token-Ring Network (Page 16-8)	0 = 4Mbps - Normal token release 1 = 16Mbps - Normal token release 2 = 16Mbps - Early token release
912: Group Poll Address (Page 16-8)	Two-character hexadecimal address
920: ISDN Link Subsystem Name (Page 16-9)	Up to eight alphanumeric characters

Token-Ring 3270 Gateway Questions—Worksheets 46 and 47	
Question:	Response:
940: Ring Address Assignment (Page 16-10)	Panel
941: Ring Transmission Definition (Page 16-14)	Panel

Appendixes

Appendix A. Configuration Worksheets

Appendix B. AEA Planning Examples

Appendix C. Token-Ring Planning Examples

Appendix D. Examples of 3174 VTAM/NCP Definitions

Appendix E. Examples of Using Service Access Points for Single Link Multi-Host Support

Appendix F. IBM Default COS Tables

Appendix A. Configuration Worksheets

A-1

Permission to Copy

You are authorized to copy the worksheets in this appendix. Make as many copies of these worksheets as you need to plan for customizing. Save the blank originals for later planning.

Worksheet 1—Host Attachment

Date: _____   Model: _____
Serial: _____   Location: _____
Customized by: _____   Telephone: _____

Chapter 6 of the *3174 Planning Guide* contains the planning information you need.

_____ MODEL/ATTACH _____

098 - ☐☐☐☐☐☐☐

099 - ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

100 - ☐☐☐
    X X X

101 - ☐
   X

098: Online Test Password
099: Product Assistance Data
100: 3174 Model Designation
101: Host Attachment

Note: The 3174 Model 21H is used *only* on the ES/9000 and should be customized as a 21L. It is functionally the same as a Model 21L.

Worksheet 2—Multi-Host Definition

Chapter 6 of the *3174 Planning Guide* contains the planning information you need.

_____ Multi-Host Definition _____

Host ID	Adapter Type	Host Attach	Hardware Group	Include In IML	Host Descriptor
1A		—			_____
2A	—	—	—	—	_____
3A	—	—	—	—	_____
—				—	_____
—				—	_____
—				—	_____
—				—	_____
—				—	_____
—				—	_____
—				—	_____
—				—	_____
—				—	_____
—				—	_____
—				—	_____
—				—	_____
—				—	_____

Worksheet 3—BSC

Chapter 6 of the *3174 Planning Guide* contains the planning information you need.

Host ID: _____

_____ BSC _____

104 - ☐☐
   X X

108 - ☐☐☐☐☐☐☐
  0 0 0 0 0 0 0

110 - ☐ ☐☐☐☐
  0   0 0 0 0

116 - ☐☐
  0 _

121 - ☐☐
  0 1

123 - ☐
  0

125 - ☐☐☐☐☐☐☐☐
  0 0 0 0 0 0 0 0

126 - ☐☐☐☐☐☐☐☐
  0 0 0 0 0 0 0 0

127 - ☐ ☐
  0 0

132 - ☐ ☐ ☐ ☐
  0 0 0 0

136 - ☐ ☐ ☐ ☐
  0 0 0 0

137 - ☐ ☐ ☐ ☐
  0 0 0 0

138 - ☐
  0

141 - ☐
  A

165 - ☐
  1

166 - ☐
  A

168 - ☐
  0

173 - ☐☐☐☐☐☐☐☐
  0 0 0 0 0 0 0 0

175 - ☐☐☐☐☐☐
  0 0 0 0 0 0

176 - ☐
  0

317 - ☐
  0

318 - ☐
  0

340 - ☐
  0

104:	Controller Address	
108:	Unique Machine Identifier	
110:	MLT Configuration Level	
116:	Individual Port Assignment	
121:	Keyboard Language	
123:	CECP Support	
125:	Miscellaneous Feature Options (A)	
126:	Miscellaneous Feature Options (B)	
127:	RTM Definition	
132:	Alternate Keyboard Selection	
136:	Standard Keyboard Layouts	
137:	Modified Keyboard Layouts	
138:	Standard Keypad Layouts	
141:	Magnetic Character Set	
165:	Compressed Program Symbols	
166:	Attribute Select Keypad	
168:	Additional Extension-Mode Key Definition	
173:	DFT Options	
175:	DFT Password	
176:	BSC Enhanced Communication: DFTs	
317:	Telecommunication Facilities	
318:	Full- or Half-Speed Transmission	
340:	RTS Control Options	

Worksheet 3S—Secondary BSC

Chapter 6 of the *3174 Planning Guide* contains the planning information you need.

Host ID: _____

———————————— BSC ————————————

104 - ☐☐
    X X

110 -☐ ☐☐☐☐   116 -☐☐
  0   0 0 0 0   0 _

125 -☐☐ *|*|*|*|*   127 -☐ ☐
  0 0   0   0 0

139 -☐☐
  0 0

165 -☐
  1

176 -☐
  0

317 - ☐   318 -☐   340 -☐
  0   0   0

104: Controller Address	165: Compressed Program Symbols
110: MLT Configuration Level	176: BSC Enhanced Communication: DFTs
116: Individual Port Assignment	317: Telecommunication Facilities
125: Miscellaneous Feature Options (A)	318: Full- or Half-Speed Transmission
127: RTM Definition	340: RTS Control Options
139: CCA Keyboard Language	

*Responses cannot be entered. Responses provided on the worksheet for the primary host on the primary link fill these fields automatically during the customizing procedures.

Worksheet 4—SDLC

Chapter 6 of the *3174 Planning Guide* contains the planning information you need.

Host ID: _____

——————— SDLC ———————

104 - ☐☐
X X

105 - ☐☐
0 0

108 - ☐☐☐☐☐☐☐
0 0 0 0 0 0 0

110 - ☐ ☐☐☐☐
0   0 0 0 0

116 - ☐☐ ☐☐
0 —   — —

121 - ☐☐
0 1

123 - ☐
0

125 - ☐☐☐☐☐☐☐☐
0 0 0 0 0 0 0 0

126 - ☐☐☐☐☐☐☐☐
0 0 0 0 0 0 0 0

127 - ☐ ☐
0   0

132 - ☐ ☐ ☐ ☐
0   0   0   0

136 - ☐ ☐ ☐ ☐
0   0   0   0

137 - ☐ ☐ ☐ ☐
0   0   0   0

138 - ☐
0

141 - ☐
A

150 - ☐☐
0 0

165 - ☐
0

166 - ☐
A

168 - ☐
0

173 - ☐☐☐☐☐☐☐☐
0 0 0 0 0 0 0 0

175 - ☐☐☐☐☐☐
0 0 0 0 0 0

179 - ☐ ☐ ☐
0   0   0

190 - ☐☐
0 0

213 - ☐
1

215 - ☐☐☐☐☐
0 0 0 0 0

220 - ☐
0

310 - ☐
0

313 - ☐
0

317 - ☐
0

318 - ☐
0

340 - ☐
0

365 - ☐
0

370 - ☐
0

104:	Controller Address	
105:	Upper Limit Address	
108:	Unique Machine Identifier	
110:	MLT Configuration Level	
116:	Individual Port Assignment	
121:	Keyboard Language	
123:	CECP Support	
125:	Miscellaneous Feature Options (A)	
126:	Miscellaneous Feature Options (B)	
127:	RTM Definition	
132:	Alternate Keyboard Selection	
136:	Standard Keyboard Layouts	
137:	Modified Keyboard Layouts	
138:	Standard Keypad Layouts	
141:	Magnetic Character Set	
150:	Token-Ring/ISDN Network Gateway Controller	
165:	Compressed Program Symbols	
166:	Attribute Select Keypad	
168:	Additional Extension-Mode Key Definition	
173:	DFT Options	
175:	DFT Password	
179:	Local Format Storage	
190:	Number of ISDN DSPUs	
213:	Between Bracket Printer Sharing	
215:	Physical Unit Identification	
220:	Alert/CMIP Event Report Function	
310:	Connect-Data-Set-to-Line Operation	
313:	NRZ or NRZI Encoding	
317:	Telecommunication Facilities	
318:	Full- or Half Speed Transmission	
340:	RTS Control Options	
365:	X.21 Switched Host DTE Connection	
370:	Maximum Inbound I-Frame Size	

Worksheet 4S—Secondary SDLC

Chapter 6 of the *3174 Planning Guide* contains the planning information you need.

Host ID: _____

———————————— SDLC ————————————

104 - ☐☐
    X X

105 - ☐☐
    0 0

110 - ☐ ☐☐☐☐
    0   0 0 0 0

116 - ☐☐
    0 —

125 - ☐☐*|*|*|*|*☐
    0 0   0

127 - ☐ ☐
    0 0

139 - ☐☐
    0 0

150 - ☐
    0

165 - ☐
    1

179 - ☐ ☐ ☐
    0   0   0

213 - ☐
    1

215 - ☐☐☐☐☐
    0 0 0 0 0

220 - ☐
    0

310 - ☐
    0

313 - ☐
    0

317 - ☐
    0

318 - ☐
    0

340 - ☐
    0

365 - ☐
    0

370 - ☐
    0

104:	Controller address	213:	Between Bracket Printer Sharing
105:	Upper Limit Address	215:	Physical Unit Identification
	Controller Address	220:	Alert/CMIP Event Report Function
110:	MLT Configuration Level	310:	Connect-Data-Set-to-Line Operation
116:	Individual Port Assignment	313:	NRZ or NRZI Encoding
125:	Miscellaneous Feature Options (A)	317:	Telecommunication Facilities
127:	RTM Definition	318:	Full- or Half-Speed Transmission
139:	CCA Keyboard Language	340:	RTS Control Options
150:	Token-Ring Gateway Controller	365:	X.21 Data Transfer Delay
165:	Compressed Program Symbols	370:	Maximum Inbound I-Frame Size
179:	Local Format Storage		

*Responses cannot be entered. Responses provided on the worksheet for the primary host attachment on the primary link fill these fields automatically during the customizing procedures.

Worksheet 5—X.25

Chapter 6 of the *3174 Planning Guide* contains the planning information you need.

Host ID: _____

————————— X.25 —————————

104 -					108 -									110 -									116 -							

104 - ☐☐ X X

108 - ☐☐☐☐☐☐☐ 0 0 0 0 0 0 0 110 - ☐ 0 ☐☐☐☐ 0 0 0 0

116 - ☐☐ ☐☐ 0 — — —

121 - ☐☐ 0 1

123 - ☐ 0

125 - ☐☐☐☐☐☐☐☐ 0 0 0 0 0 0 0 0

126 - ☐☐☐☐☐☐☐☐ 0 0 0 0 0 0 0 0 127 - ☐ ☐ 0 0

132 - ☐ ☐ ☐ ☐ 0 0 0 0

136 - ☐ ☐ ☐ ☐ 0 0 0 0

137 - ☐ ☐ ☐ ☐ 0 0 0 0

138 - ☐ 0

141 - ☐ A

165 - ☐ 1

166 - ☐ A

168 - ☐ 0

173 - ☐☐☐☐☐☐☐☐ 0 0 0 0 0 0 0 0

175 - ☐☐☐☐☐☐ 0 0 0 0 0 0

179 - ☐ ☐ ☐ 0 0 0

213 - ☐ 1

215 - ☐☐☐☐☐ 0 0 0 0 0

220 - ☐ 0

365 - ☐ 0

370 - ☐ 0

372- ☐ ☐ 0 0
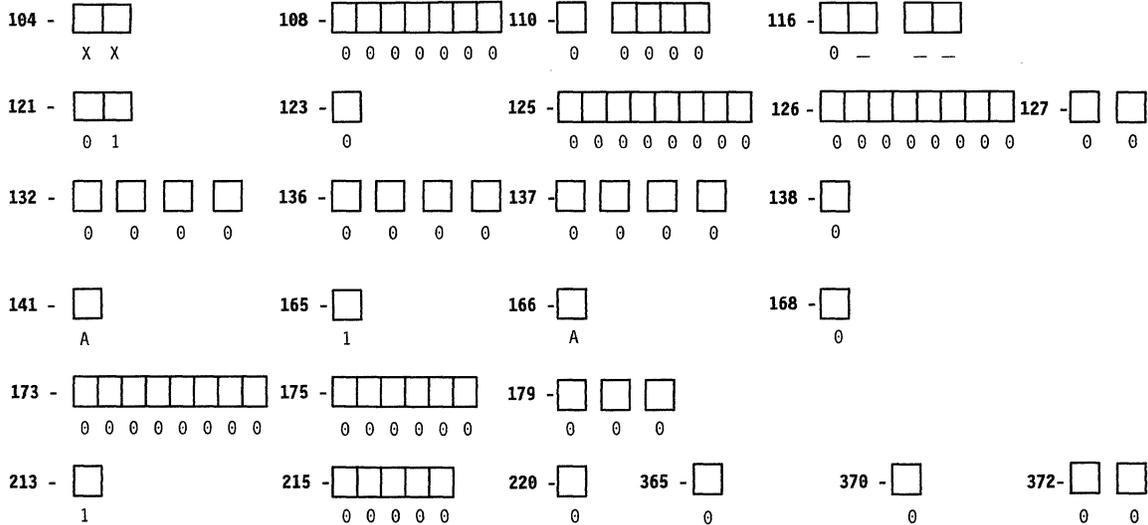
104:	Controller Address	141:	Magnetic Character Set
108:	Unique Machine Identifier	165:	Compressed Program Symbols
110:	MLT Configuration Level	166:	Attribute Select Keypad
116:	Individual Port Assignment	168:	Additional Extension-Mode Key Definition
121:	Keyboard Language	173:	DFT Options
123:	CECP Support	175:	DFT Password
125:	Miscellaneous Feature Options (A)	179:	Local Format Storage
126:	Miscellaneous Feature Options (B)	213:	Between Bracket Printer Sharing
127:	RTM Definition	215:	Physical Unit Identification
132:	Alternate Keyboard Selection	220:	Alert/CMIP Event Report Function
136:	Standard Keyboard Layouts	365:	X.21 Data Transfer Delay
137:	Modified Keyboard Layouts	370:	Maximum Inbound I-Frame Size
138:	Standard Keypad Layouts	372:	Autocall/Autodisconnect

Worksheet 5S—Secondary X.25

Chapter 6 of the *3174 Planning Guide* contains the planning information you need.

Host ID: _____

——————————— X.25 ———————————

104 - ☐☐
    X X

110 -☐ ☐☐☐☐   116 -☐☐
   0   0 0 0 0   0 _

125 -☐☐ * * * * * ☐
   0 0   0

127 -☐ ☐
   0 0

139 -☐☐
   0 0

165 -☐
   1

179 -☐ ☐ ☐
   0 0 0

213 - ☐
   1

215 -☐☐☐☐☐
   0 0 0 0 0

220 -☐
   0

221 -☐
   0

365 -☐
   0

370 -☐
   0

372 -☐ ☐
   0 0

104: Controller Address
110: MLT Configuration Level
116: Individual Port Assignment
125: Miscellaneous Feature Options (A)
127: RTM Definition
139: CCA Keyboard Language
165: Compressed Program Symbols
179: Local Format Storage

213: Between Bracket Printer Sharing
215: Physical Unit Identification
220: Alert/CMIP Event Report Function
221: 3174 Alert/CMIP Control Point
365: X.21 Data Transfer Delay
370: Maximum Inbound I-Frame Size
372: Autocall/Autodisconnect

*Responses cannot be entered. Responses provided on the worksheet for the primary host on the primary link fill these fields automatically during the customizing procedures. If you are configuring for secondary hosts or links, some of the questions shown on this worksheet may not apply to your configuration.

Worksheet 6—Non-SNA (Channel)

Chapter 6 of the *3174 Planning Guide* contains the planning information you need.

Host ID: _____

—————— Local (Non-SNA) ——————

104 - ☐☐
    X X

105 -☐☐
   X X

108 -☐☐☐☐☐☐☐
  0 0 0 0 0 0 0

110 -☐ ☐☐☐☐
  0   0 0 0 0

116 -☐☐
  0 _

121 - ☐☐
    0 1

123 -☐
  0

125 -☐☐☐☐☐☐☐☐
  0 0 0 0 0 0 0 0

126 -☐☐☐☐☐☐☐☐
  0 0 0 0 0 0 0 0

127 -☐ ☐
  0 0

132 - ☐ ☐ ☐ ☐
   0   0   0   0

136 -☐ ☐ ☐ ☐
  0   0   0   0

137 -☐ ☐ ☐ ☐
  0   0   0   0

138 -☐
  0

141 - ☐
   A

165 -☐
  0

166 -☐
  A

168 -☐
  0

173 - ☐☐☐☐☐☐☐☐
  0 0 0 0 0 0 0 0

175 -☐☐☐☐☐☐
  0 0 0 0 0 0

222 - ☐
   0

224 -☐
  2

225 -☐
  4

104:	Controller Address	137:	Modified Keyboard Layouts
105:	Upper Limit Address	138:	Standard Keypad Layouts
108:	Unique Machine Identifier	141:	Magnetic Character Set
110:	MLT Configuration Level	165:	Compressed Program Symbols
116:	Individual Port Assignment	166:	Attribute Select Keypad
121:	Keyboard Language	168:	Additional Extension-Mode Key Definition
123:	CECP Support	173:	DFT Options
125:	Miscellaneous Feature Options (A)	175:	DFT Password
126:	Miscellaneous Feature Options (B)	222:	Support of Command Retry
127:	RTM Definition	224:	Mode of Data Transfer
132:	Alternate Keyboard Selection	225:	Channel Burst Size
136:	Standard Keyboard Layouts		

Worksheet 7—SNA (Channel)

Chapter 6 of the *3174 Planning Guide* contains the planning information you need.

Host ID: _____

——————— Local (S N A) ———————

104 - ▢▢
X X

105 - ▢▢
0 0

108 - ▢▢▢▢▢▢▢
0 0 0 0 0 0 0

110 - ▢ ▢▢▢▢
0 0 0 0 0

116 - ▢▢ ▢▢
0 _ _ _

121 - ▢▢
0 1

123 - ▢
0

125 - ▢▢▢▢▢▢▢▢
0 0 0 0 0 0 0 0

126 - ▢▢▢▢▢▢▢▢
0 0 0 0 0 0 0 0

127 - ▢ ▢
0 0

132 - ▢ ▢ ▢ ▢
0 0 0 0

136 - ▢ ▢ ▢ ▢
0 0 0 0

137 - ▢ ▢ ▢ ▢
0 0 0 0

138 - ▢
0

141 - ▢
A

150 - ▢▢
0 0

165 - ▢
0

166 - ▢
A

168 - ▢
0

173 - ▢▢▢▢▢▢▢▢
0 0 0 0 0 0 0 0

175 - ▢▢▢▢▢▢
0 0 0 0 0 0

179 - ▢ ▢ ▢
0 0 0

190 - ▢▢
0 0

213 - ▢
1

215 - ▢▢▢▢▢
0 0 0 0 0

220 - ▢
0

222 - ▢
0

223 - ▢▢
1 0

224 - ▢
2

225 - ▢
4

240 - ▢
0

241 - ▢
0

242 - ▢
0

104: Controller Address	165: Compressed Program Symbols
105: Upper Limit Address	166: Attribute Select Keypad
108: Unique Machine Identifier	168: Additional Extension-Mode Key Definition
110: MLT Configuration Level	173: Distributed Function Terminal Options
116: Individual Port Assignment	175: Distributed Function Terminal Password
121: Keyboard Language	179: Local Format Storage
123: CECP Support	190: Number of ISDN DSPUs
125: Miscellaneous Feature Options (A)	213: Between Bracket Printer Sharing
126: Miscellaneous Feature Options (B)	215: Physical Unit Identification
127: RTM Definition	220: Alert/CMIP Event Report Function
132: Alternate Keyboard Selection	222: Support of Command Retry
136: Standard Keyboard Layouts	223: Attention Delay Value
137: Modified Keyboard Layouts	224: Mode of Data Transfer
138: Standard Keypad Layouts	225: Channel Burst Size
141: Magnetic Character Set	240: Controller Logical Address
150: Token-Ring/ISDN Network Gateway Controller	241: RU Maximum Size
	242: Link Type

Worksheet 7S—Secondary SNA (Channel)

Chapter 6 of the *3174 Planning Guide* contains the planning information you need.

Host ID: _____

─────── Local (S N A) ───────

104 - ☐☐   105 - ☐☐   116 - ☐☐
    X X   0 0   0 —

125 - ☐☐☐☐☐☐☐☐   127 - ☐ ☐
    0 0 * * * * * 0   0   0

150 - ☐ ☐   165 - ☐
    0   0   0

179 - ☐ ☐ ☐   190 - ☐☐
    0 0 0   0 0

215 - ☐☐☐☐☐   220 - ☐   221 - ☐
    0 0 0 0 0   0   0

240 - ☐
    0

104:	Controller Address	
105:	Upper Limit Address	
116:	Individual Port Assignment	
125:	Miscellaneous Feature Options (A)	
127:	RTM Definition	
150:	Token-Ring/ISDN Gateway Controller	
165:	Compressed Program Symbols	
179:	Local Format Storage	
190:	Number of ISDN DSPUs	
215:	Physical Unit Identification	
220:	Alert/CMIP Event Report Function	
221:	Alert/CMIP Control Point	
240:	Controller Logical Address	

Worksheet 8—X.21 Switched

Chapter 6 of the *3174 Planning Guide* contains the planning information you need.

Host ID: _____

──────── X.21 Switched ────────

```
104 - [ | ]            108 - [ | | | | | | ] 110 -[ ] [ | | | ]    116 -[ | ]   [ | ]
       X X                   0 0 0 0 0 0 0        0   0 0 0 0           0   -   - -

121 - [ | ]            123 -[ ]            125 -[ | | | | | | ] 126 -[ | | | | | | | ] 127 -[ ] [ ]
       0 1                   0                   0 0 0 0 0 0 0 0      0 0 0 0 0 0 0 0      0   0

132 - [ ] [ ] [ ] [ ]  136 -[ ] [ ] [ ] [ ] 137 -[ ] [ ] [ ] [ ]  138 -[ ]
       0   0   0   0          0   0   0   0       0   0   0   0           0

141 - [ ]             165 -[ ]            166 -[ ]              168 -[ ]
       A                    1                   A                     0

173 - [ | | | | | | ] 175 -[ | | | | | ] 179 -[ ] [ ] [ ]
       0 0 0 0 0 0 0 0      0 0 0 0 0 0       0   0   0

213 - [ ]             215 -[ | | | | ]    220 -[ ]
       1                    0 0 0 0 0            0

360 - [ | ]           361 -[ | ]          362 -[ | | | | | | ]
       0   0                0   0               0 0 0 0 0 0 0 0

367 - [ ]             368 -[ | | | | | | | | | | ]  370 -[ ]
       0                                                   0

371 - [ | | | | | | | | | | | | | | | | | | | | | | | | | ]   372 -[ ] [ ]
                                                                     0   0
```
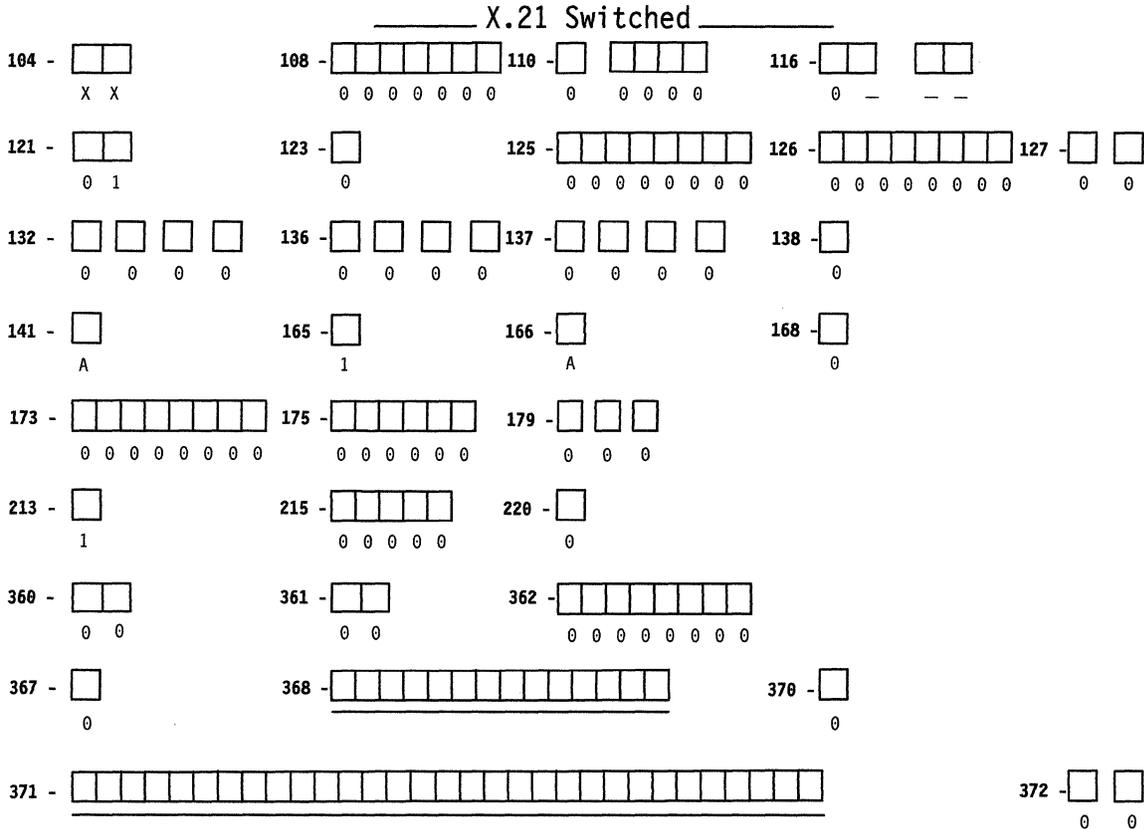
104:	Controller Address	168:	Additional Extension-Mode Key Definition
108:	Unique Machine Identifier	173:	DFT Options
110:	MLT Configuration Level	175:	DFT Password
116:	Individual Port Assignment	179:	Local Format Storage
121:	Keyboard Language	213:	Between Bracket Printer Sharing
123:	CECP Support	215:	Physical Unit Identification
125:	Miscellaneous Feature Options (A)	220:	Alert/CMIP Event Report Function
126:	Miscellaneous Feature Options (B)	360:	X.21 Switched Retry
127:	RTM Definition	361:	X.21 Switched Retry Timing
132:	Alternate Keyboard Selection	362:	X.21 Switched Options
136:	Standard Keyboard Layouts	367:	X.21 Switched Short-Hold Mode
137:	Modified Keyboard Layouts	368:	X.21 Switched Short-Hold Mode Dial Number
138:	Standard Keypad Layouts	370:	Maximum Inbound I-Frame Size
141:	Magnetic Character Set	371:	X.21 Switched Dial Digits
165:	Compressed Program Symbols	372:	Autocall/Autodisconnect
166:	Attribute Select Keypad		

Worksheet 8S—Secondary X.21 Switched

Chapter 6 of the *3174 Planning Guide* contains the planning information you need.

Host ID: _____

——————— X.21 Switched ———————

```
104 - [  ]        110 -[] [    ]    116 -[   ]
      X X              0   0 0 0 0       0 _

                  125 -[ |*|*|*|*|*]    127 -[] []
                       0 0        0          0   0

       165 -[]                          139 -[  ]
            1                                0 0

                  179 - [] [] []
                         0   0   0

213 - []     215 -[    ]    220 -[]
     1           0 0 0 0 0        0

360 - [  ]   361 -[  ]      362 -[        ]
      0 0         0 0            0 0 0 0 0 0 0 0

367 - []     368 -[             ]    370 -[]
      0                                    0

371 - [                              ]

372 - [] []
      0  0
```

104: Controller Address	220: Alert/CMIP Event Report Function
110: MLT Configuration Level	360: X.21 Switched Retry
116: Individual Port Assignment	361: X.21 Switched Retry Timing
125: Miscellaneous Feature Options (A)	362: X.21 Switched Options
127: RTM Definition	367: X.21 Switched Short-Hold Mode
139: CCA Keyboard Language	368: X.21 Switched Short-Hold Mode Dial Number
165: Compressed Program Symbols	370: Maximum Inbound I-Frame Size
179: Local Format Storage	371: X.21 Switched Dial Digits
213: Between Bracket Printer Sharing	372: Autocall/Autodisconnect
215: Physical Unit Identification	

*Responses cannot be entered. Responses provided on the worksheet for the primary host attachment for the primary link fill these fields automatically during the customizing procedures.

Worksheet 9—Token-Ring Network

Chapter 6 of the *3174 Planning Guide* contains the planning information you need.

Host ID: _____

_____ Token-Ring Network _____

```
106 -[ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]107 -[ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]108 -[ ][ ][ ][ ][ ][ ][ ]
     X X X X  X X X X  X X X X 0 4          X X X X  X X X X  X X X X 0 4          0 0 0 0 0 0 0

110 -[ ] [ ][ ][ ][ ]                  116 -[ ][ ] [ ][ ]
     0     0 0 0 0                           0  _   _ _

121 -[ ][ ]        123 -[ ]            125 -[ ][ ][ ][ ][ ][ ][ ]      126 -[ ][ ][ ][ ][ ][ ][ ][ ]127 -[ ][ ]
     0  1               0                   0 0 0 0 0 0 0                   0 0 0 0 0 0 0 0        0  0

132 -[ ][ ][ ][ ]                      136 -[ ][ ][ ][ ]                137 -[ ][ ][ ][ ]         138 -[ ]
     0  0  0  0                             0  0  0  0                      0  0  0  0                0

141 -[ ]                               165 -[ ]                         166 -[ ]                  168 -[ ]
     A                                      0                                A                         0

173 -[ ][ ][ ][ ][ ][ ][ ][ ]          175 -[ ][ ][ ][ ][ ][ ]          179 -[ ][ ][ ]
     0 0 0 0 0 0 0 0                         0 0 0 0 0 0                      0  0  0

213 -[ ]                               215 -[ ][ ][ ][ ][ ]             220 -[ ]
     1                                      0 0 0 0 0                        0

382 -[ ][ ][ ][ ]                      383 -[ ]                         384 -[ ]
     0 5 2 1                                2                                0

385 -[ ][ ][ ][ ][ ][ ][ ]             386 -[ ]
     I B M L A N                            1
```

106: Token-Ring Network—3174 Address/SAP	165:	Compressed Program Symbols
107: Token-Ring Network—Gateway Address/SAP	166:	Attribute Select Keypad
108: Unique Machine Identifier	168:	Additional Extension-Mode Key Definition
110: MLT Configuration level	173:	DFT Options
116: Individual Port Assignment	175:	DFT Password
121: Keyboard Language	179:	Local Format Storage
123: CECP Support	213:	Between Bracket Printer Sharing
125: Miscellaneous Feature Options (A)	215:	Physical Unit Identification
126: Miscellaneous Feature Options (B)	220:	Alert/CMIP Event Report Function
127: RTM Definition	382:	Maximum Ring I-Frame Size
132: Alternate Keyboard Selection	383:	Token-Ring Network Maximum Out
136: Standard Keyboard Layouts	384:	Ring Speed of the Token-Ring Network
137: Modified Keyboard Layouts	385:	Link Subsystem Name
138: Standard Keypad Layouts	386:	Receive I-Frame Size
141: Magnetic Character Set		

Worksheet 9S—Secondary Token-Ring Network

Chapter 6 of the *3174 Planning Guide* contains the planning information you need.

Host ID: _____

_____ Token-Ring Network _____

```
106 -[*|*|*|*][*|*|*|*][*|*|*|*][  ]  107 -[ | | | ][ | | | ][ | | | ][  ]
      X X X X  X X X X  X X X X  0 4        X X X X  X X X X  X X X X  0 4

                                      116 -[  ]
                                            0 _

                                      125 -[ | |*|*|*|*|*|  ]         127 -[ ][ ]
                                            0 0         0               0  0


                                      165 -[ ]
                                            0
                                                          179 -[ ][ ][ ]
                                                                0  0  0

                                      215 -[ | | | | ]   220 -[ ]      221 -[ ]
                                            0 0 0 0 0          0             0

382 -[ | | | ]                        383 -[ ]
      0 5 2 1                                2
```

106:	Token-Ring Network—Address/SAP	179: Local Format Storage
107:	Token-Ring Network—Gateway Address/SAP	215: Physical Unit Identification
116:	Individual Port Assignment	220: Alert/CMIP Event Report Function
125:	Miscellaneous Feature Options (A)	221: 3174 Alert/CMIP Control Point
127:	RTM Definition	382: Maximum Ring I-Frame Size
165:	Compressed Program Symbols	383: Token-Ring Network Maximum Out

*Responses cannot be entered. Responses provided on the worksheet for the primary host attachment for the primary link fill these fields automatically during the customizing procedures.

Worksheet 10A—Multiple Logical Terminals

Chapter 6 of the *3174 Planning Guide* contains the planning information you need.

Controller Port Number	Device Type/Screen Size	EAB? Y/N	Number of Sessions	MLT Storage Required
26-00				
26-01				
26-02				
26-03				
26-04				
26-05				
26-06				
26-07				
26-08				
26-09				
26-10				
26-11				
26-12				
26-13				
26-14				
26-15				
26-16				
26-17				
26-18				
26-19				
26-20				
26-21				
26-22				
26-23				
26-24				
26-25				
26-26				
26-27				
26-28				
26-29				
26-30				
26-31				
Subtotal (if HG 27 and ASCII) MLT Storage required:				
Total (if HG 26 only) MLT Storage required:				

Worksheet 10B—Multiple Logical Terminals

Chapter 6 of the *3174 Planning Guide* contains the planning information you need.

Controller Port Number	Device Type/Screen Size	EAB? Y/N	Number of Sessions	MLT Storage Required
27-00				
27-01				
27-02				
27-03				
27-04				
27-05				
27-06				
27-07				
27-08				
27-09				
27-10				
27-11				
27-12				
27-13				
27-14				
27-15				
27-16				
27-17				
27-18				
27-19				
27-20				
27-21				
27-22				
27-23				
27-24				
27-25				
27-26				
27-27				
27-28				
27-29				
27-30				
27-31				
Subtotal (if 3270 and ASCII) MLT Storage required: Total (if 3270 only) MLT Storage required:				

Worksheet 10C—Multiple Logical Terminals for AEA

Chapter 6 of the *3174 Planning Guide* contains the planning information you need.

AEA Port Number	Device Type/Screen Size	Number of Sessions	MLT Storage Required
21-00			
21-01			
21-02			
21-03			
21-04			
21-05			
21-06			
21-07			
22-00			
22-01			
22-02			
22-03			
22-04			
22-05			
22-06			
22-07			
23-00			
23-01			
23-02			
23-03			
23-04			
23-05			
23-06			
23-07			
Subtotal (amount for ASCII devices only) required: Total MLT Storage required for 3270 and AEA ports:			

Worksheet 11A—117: Port Assignment

Chapter 7 of the *3174 Planning Guide* contains the planning information you need.

Host ID: _____

——————117: Port Assignment ——————

	Host Addresses								Host Addresses				
Port	IS	1	2	3	4	5	Port	IS	1	2	3	4	5
26-00	__	__	__	__	__	__	26-01	__	__	__	__	__	__
26-02	__	__	__	__	__	__	26-03	__	__	__	__	__	__
26-04	__	__	__	__	__	__	26-05	__	__	__	__	__	__
26-06	__	__	__	__	__	__	26-07	__	__	__	__	__	__
26-08	__	__	__	__	__	__	26-09	__	__	__	__	__	__
26-10	__	__	__	__	__	__	26 11	__	__	__	__	__	__
26-12	__	__	__	__	__	__	26-13	__	__	__	__	__	__
26-14	__	__	__	__	__	__	26-15	__	__	__	__	__	__
26-16	__	__	__	__	__	__	26-17	__	__	__	__	__	__
26-18	__	__	__	__	__	__	26-19	__	__	__	__	__	__
26-20	__	__	__	__	__	__	26-21	__	__	__	__	__	__
26-22	__	__	__	__	__	__	26-23	__	__	__	__	__	__
26-24	__	__	__	__	__	__	26-25	__	__	__	__	__	__
26-26	__	__	__	__	__	__	26-27	__	__	__	__	__	__
26-28	__	__	__	__	__	__	26-29	__	__	__	__	__	__
26-30	__	__	__	__	__	__	26-31	__	__	__	__	__	__
27-00	__	__	__	__	__	__	27-01	__	__	__	__	__	__
27-02	__	__	__	__	__	__	27-03	__	__	__	__	__	__
27-04	__	__	__	__	__	__	27-05	__	__	__	__	__	__
27-06	__	__	__	__	__	__	27-07	__	__	__	__	__	__
27-08	__	__	__	__	__	__	27-09	__	__	__	__	__	__
27-10	__	__	__	__	__	__	27-11	__	__	__	__	__	__
27-12	__	__	__	__	__	__	27-13	__	__	__	__	__	__
27-14	__	__	__	__	__	__	27-15	__	__	__	__	__	__
27-16	__	__	__	__	__	__	27-17	__	__	__	__	__	__
27-18	__	__	__	__	__	__	27-19	__	__	__	__	__	__
27-20	__	__	__	__	__	__	27-21	__	__	__	__	__	__
27-22	__	__	__	__	__	__	27-23	__	__	__	__	__	__
27-24	__	__	__	__	__	__	27-25	__	__	__	__	__	__
27-26	__	__	__	__	__	__	27-27	__	__	__	__	__	__
27-28	__	__	__	__	__	__	27-29	__	__	__	__	__	__
27-30	__	__	__	__	__	__	27-31	__	__	__	__	__	__

Note: Remember that the first column (1) represents the host's primary address.

Worksheet 11B—117: Port Assignment for AEA

Chapter 7 of the *3174 Planning Guide* contains the planning information you need.

Host ID: _____

——————117: Port Assignment ——————

Port	IS	Host Addresses 1	2	3	4	5		Port	IS	Host Addresses 1	2	3	4	5
21-00	___	___	___	___	___	___		21-01	___	___	___	___	___	___
21-02	___	___	___	___	___	___		21-03	___	___	___	___	___	___
21-04	___	___	___	___	___	___		21-05	___	___	___	___	___	___
21-06	___	___	___	___	___	___		21-07	___	___	___	___	___	___
22-00	___	___	___	___	___	___		22-01	___	___	___	___	___	___
22-02	___	___	___	___	___	___		22-03	___	___	___	___	___	___
22-04	___	___	___	___	___	___		22-05	___	___	___	___	___	___
22-06	___	___	___	___	___	___		22-07	___	___	___	___	___	___
23-00	___	___	___	___	___	___		23-01	___	___	___	___	___	___
23-02	___	___	___	___	___	___		23-03	___	___	___	___	___	___
23-04	___	___	___	___	___	___		23-05	___	___	___	___	___	___
23-06	___	___	___	___	___	___		23-07	___	___	___	___	___	___

Worksheet 12—128: RTM

Planner: Chapter 9 of the 3174 Planning Guide *contains the planning information you need.*

Host ID: _____

Circle the name that indicates the response you want to specify. If you circle Version A or Version B, write your responses on the corresponding panel.

Default Values

Version A

```
                128: RTM Definition


            B1  □    □    □
                00   01   0
            B2  □    □    □
                00   02   0
            B3  □    □    □
                00   05   0
            B4  □    □    □
                00   10   0
```

Version B

```
                128: RTM Definition

          F1 -□□□□□□□□
              0 0 0 0 0 0 0 0
            B1  □    □    □
                00   01   0
            B2  □    □    □
                00   02   0
            B3  □    □    □
                00   05   0
            B4  □    □    □
                00   10   0
```

Worksheet 13—X.25 Options

Chapter 10 of the *3174 Planning Guide* contains the planning information you need.

Host ID: _____

```
────── 332: X.25 Options ──────
```

400 - ☐☐ ☐☐   401 - ☐   402 - ☐☐☐☐
     0 0   0 0   4

409 - ☐☐☐☐☐☐☐☐   420 - ☐☐☐☐☐☐☐☐   421 - ☐☐☐☐☐☐☐☐
     1 0 1 0 0 1 0 0   0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0

423 - ☐☐☐☐☐☐☐☐☐☐☐☐☐☐   424 - ☐☐☐☐☐☐☐☐☐☐☐☐☐☐

430 - ☐   431 - ☐   432 - ☐☐   433 - ☐
     1   1   0 2   2

434 - ☐   435 - ☐☐
     1   0 2

440 - ☐   441 - ☐☐   442 - ☐☐☐
     9

450 - ☐☐☐☐   451 - ☐☐   452 - ☐☐☐☐☐☐☐☐   453 - ☐☐☐☐☐☐☐☐
     X X X X   X X   0 0 0 0 0 0 0 0

461 - ☐☐☐☐ 462 - ☐☐☐☐ 463 - ☐☐☐☐ 464 - ☐☐☐☐ 465 - ☐☐☐☐ 466 - ☐☐☐☐

400: Network Type
401: Circuit Type
402: Logical Channel Identifier
409: X.25 Keyboard Support Options
420: Incoming Call Options
421: Outgoing Call Options
423: Host DTE Address
424: 3174 DTE Address
430: Negotiated Packet Size
431: Packet Sequence Numbering
432: Negotiated Window Size
433: K-Maximum Out
434: Nonstandard Default Packet Size
435: Nonstandard Default Window Size

440: Throughput Class Negotiation
441: Closed User Group
442: Recognized Private Operating Agency
450: Link Level Transmit Timeout
451: Number of Retries
452: Connection Identifier Password
453: Connection Options
461: Lowest Incoming Channel
462: Highest Incoming Channel
463: Lowest Two-Way Channel
464: Highest Two-Way Channel
465: Lowest Outgoing Channel
466: Highest Outgoing Channel

Worksheet 13S—Secondary X.25 Options

Chapter 10 of the *3174 Planning Guide* contains the planning information you need.

Host ID: _____

——— 332: X.25 Options ———

401 - ☐
4

402 - ☐☐☐☐
X X X X

409 - ☐☐☐☐☐☐☐☐
1 0 1 0 0 1 0 0

420 - ☐☐☐☐☐☐☐☐
0 0 0 0 0 0 0 0

421 - ☐☐☐☐☐☐☐☐
0 0 0 0 0 0 0 0

423 - ☐☐☐☐☐☐☐☐☐☐☐☐☐

430 - ☐
1

432 - ☐☐
0 2

440 - ☐
9

441 - ☐☐

442 - ☐☐☐☐

452 - ☐☐☐☐☐☐☐

453 - ☐☐☐☐☐☐☐☐
0 0 0 0 0 0 0 0

401: Circuit Type	432: Negotiated Window Size
402: Logical Channel Identifier	440: Throughput Class Negotiation
409: X.25 Keyboard Support Options	441: Closed User Group
420: Incoming Call Options	442: Recognized Private Operating Agency
421: Outgoing Call Options	452: Connection Identifier Password
423: Host DTE Address	453: Connection Options
430: Negotiated Packet Size	

Worksheet 14—Common SNA

Chapter 11 of the *3174 Planning Guide* contains the planning information you need.

Common SNA _____

500 - ☐
0

501 - ☐☐☐☐☐☐☐☐

502 - ☐☐☐☐☐☐☐☐

510 - ☐
0

511 - ☐☐☐☐☐☐☐☐

512 - ☐☐☐☐☐☐☐☐

500: CSCM Unique
501: Network ID (NETID)
502: Logical Unit Name (LUNAME)

510: APPN Network Controller
511: APPN Control Point Name (CPNAME)
512: APPN Virtual Node Name (VNODE)

Worksheet 15—APPN Node Definition

Chapter 12 of the *3174 Planning Guide* contains the planning information you need.

```
_____ APPN Node Definition _____


  610 - ☐              611 - ☐              612 - ☐
        1                    1                    0
```

610: APPN Sessions
611: APPN Nodes/Links
612: APPN Wildcard Option

Worksheet 16—Network Resources

Chapter 12 of the *3174 Planning Guide* contains the planning information you need.

_____ Network Resources _____

CPNAME	NODE TYPE (1-3)	LUs (X)	DLC TYPE (1)	ADDRESS
_____	___	___	___	___ ___ ___ ___
_____	___	___	___	___ ___ ___ ___
_____	___	___	___	___ ___ ___ ___
_____	___	___	___	___ ___ ___ ___
_____	___	___	___	___ ___ ___ ___
_____	___	___	___	___ ___ ___ ___
_____	___	___	___	___ ___ ___ ___
_____	___	___	___	___ ___ ___ ___
_____	___	___	___	___ ___ ___ ___
_____	___	___	___	___ ___ ___ ___
_____	___	___	___	___ ___ ___ ___
_____	___	___	___	___ ___ ___ ___

Worksheet 17—Associated LUs

Chapter 12 of the *3174 Planning Guide* contains the planning information you need.

_____ Associated LUs _____

CPNAME	LUNAME	LUNAME	LUNAME	LUNAME	SERVING NN
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

Worksheet 18—COS Definition

Chapter 12 of the *3174 Planning Guide* contains the planning information you need.

```
_____ COS Definition _____


COS Definition Number - ___        Model Definition Number - ___
(1-14)                             (0-14)


_____ Definition Numbers _____

         0.  Clear Definition

         1.  #BATCH              8.  _____

         2.  #BATCHSC            9.  _____

         3.  #INTER             10.  _____

         4.  #INTERSC           11.  _____

         5.  #CONNECT           12.  _____

         6.  _____          13.  _____

         7.  _____          14.  _____


When using models 1-5, IBM-supplied defaults will always be invoked.
```

Worksheet 19—COS Node Definition

Chapter 12 of the *3174 Planning Guide* contains the planning information you need.

_____ COS Node Definition _____

COS Name = _____

Transmission Priority (1,2,3) = __

		1	2	3	4	5	6	7	8
Node Weight		____	____	____	____	____	____	____	____
(0-255)		____	____	____	____	____	____	____	____
Route Addition	Min	____	____	____	____	____	____	____	____
Resistance	Max	____	____	____	____	____	____	____	____
(0-255)									
Congestion	Min	____	____	____	____	____	____	____	____
(0,1)	Max	____	____	____	____	____	____	____	____

Worksheet 20A—COS Transmission Group Definition

Chapter 12 of the *3174 Planning Guide* contains the planning information you need.

_____ COS Transmission Group Definition _____

COS Name = _____		1	2	3	4	5	6	7	8
TG Weight (0-255)		____	____	____	____	____	____	____	____
Cost/Connect	Min	____	____	____	____	____	____	____	____
(0-255)	Max	____	____	____	____	____	____	____	____
Cost/Byte	Min	____	____	____	____	____	____	____	____
(0-255)	Max	____	____	____	____	____	____	____	____
User-Defined 1	Min	____	____	____	____	____	____	____	____
(0-255)	Max	____	____	____	____	____	____	____	____
User-Defined 2	Min	____	____	____	____	____	____	____	____
(0-255)	Max	____	____	____	____	____	____	____	____
User-Defined 3	Min	____	____	____	____	____	____	____	____
(0-255)	Max	____	____	____	____	____	____	____	____

Worksheet 20B—COS Transmission Group Definition

Chapter 12 of the *3174 Planning Guide* contains the planning information you need.

_____ COS Transmission Group Definition Continued _____

COS Name = _____		1	2	3	4	5	6	7	8
Link Speed	Min	____	____	____	____	____	____	____	____
	Max	____	____	____	____	____	____	____	____

(0=MIN 1=1.2K 2=2.4K 3=4.8K 4=7.2K 5=9.6K 6=14.4K 7=19.2K 8=48K

 9=56K 10=64K 11=4M 12=16M 13=MAX)

Security	Min	____	____	____	____	____	____	____	____
	Max	____	____	____	____	____	____	____	____

(0=NONSECURE 1=PUBSWTNET 2=UNDRGRDCB 3=SECURECND 4=GUARDCND 5=ENCRYPTED

 6=MAX)

Propagation	Min	____	____	____	____	____	____	____	____
Delay	Max	____	____	____	____	____	____	____	____

(0=MIN 1=LAN 2=TELEPHONE 3=PKTSWTNET 4=SATELLITE 5=MAX)

Worksheet 21—Mode/COS Correlation

Chapter 12 of the *3174 Planning Guide* contains the planning information you need.

_____ Mode/COS Correlation _____

Mode Name	#	COS Name	Mode Name	#	COS Name
#BATCH_____	___	#BATCH_____	_____	__	_____
#BATCHSC	___	#BATCHSC	_____	__	_____
#INTER_____	___	#INTER_____	_____	__	_____
#INTERSC	___	#INTERSC	_____	__	_____
blank	___	#CONNECT	_____	__	_____
_____	__	_____	_____	__	_____
_____	__	_____	_____	__	_____

Define Mode/COS pairs. To specify IBM-supplied COS names, place 1-5 in
the #-column. 1=#BATCH 2=#BATCHSC 3=#INTER 4=#INTERSC 5=#CONNECT

Worksheet 22 – 3174-Peer Definition

Chapter 13, "Planning for 3174 Peer Communication" of the *3174 Planning Guide* contains the planning information you need.

_____ 3174-Peer Definition _____

3174-Peer Support

    650 – __   3174-Peer Support

3174-Peer Options

    651 – __   Bridge Support

    652 – __   LAN Manager Support

    653 – __   3174-Peer Online Test Updates

3174-Peer Station Parameters

    660 – 4000 __ __ __ __ __ __ PN 3174-Peer Port Address Range

    661 – __ __   Percentage of Discard Threshold

650: 3174-Peer Support   653: 3174-Peer Online Test Updates
651: Bridge Support   660: 3174-Peer Port Address Range
652: LAN Manager Support   661: Percentage of Discard Threshold

Worksheet 23 — 3174-Peer Bridge Profile

Chapter 13, "Planning for 3174 Peer Communication" on page 13-1 of the *3174 Planning Guide* contains the planning information you need.

_____ 3174-Peer Bridge Profile _____

670 — __   Bridge Number

671 — __ __ __   Token-Ring Segment Number

672 — __ __ __   3174-Peer Segment Number

673 — __   Token-Ring Hop Count

674 — __   Frame Forwarding Active

675 — __ __ __ __   Bridge Performance Threshold
                      (Frames Discarded Per 10,000)

676 — __ __ __ __   Logging Interval

677 — __ __ __   Alert Threshold

670: Bridge Number
671: Token-Ring Segment Number
672: 3174-Peer Segment Number
673: Token-Ring Hop Count

674: Frame Forwarding Active
675: Bridge Performance Threshold
676: Logging Interval
677: Alert Threshold

Worksheet 24 — LAN Manager Profile

Chapter 13, "Planning for 3174 Peer Communication" on page 13-1 of the *3174 Planning Guide* contains the planning information you need.

_____ LAN Manager Profile _____

690 — _____ Reporting Link 0 Password

691 — _____ Reporting Link 1 Password

692 — _____ Reporting Link 2 Password

693 — _____ Reporting Link 3 Password

690: Reporting Link 0 Password   692: Reporting Link 2 Password
691: Reporting Link 1 Password   693: Reporting Link 3 Password

Worksheet 25A—3270 Attachment Diagram

Chapter 14 of the *3174 Planning Guide* contains the planning information you need.

	Station Set Name	Station Set Number
IBM Host =		= 1
ASCII Host =		=
ASCII Host =		=
ASCII Host =		=
ASCII Host =		=
ASCII Host =		=
ASCII Host =		=
ASCII Host =		=
ASCII Host =		=

Note:
For 3270 Stations
Port Type = Coax = 1

3270
Display = 3D
Printer = 3P

Terminal Adapter HG-26	Port Set Name	Station Set Name	Default Destinations					Station Type
			LT1	LT2	LT3	LT4	LT5	
26-00								
26-01								
26-02								
26-03								
26-04								
26-05								
26-06								
26-07								
26-08								
26-09								
26-10								
26-11								
26-12								
26-13								
26-14								
26-15								
26-16								
26-17								
26-18								
26-19								
26-20								
26-21								
26-22								
26-23								
26-24								
26-25								
26-26								
26-27								
26-28								
26-29								
26-30								
26-31								

Worksheet 25B—3270 Attachment Diagram

Chapter 14 of the *3174 Planning Guide* contains the planning information you need.

	Station Set Name	Station Set Number
IBM Host =		= 1
ASCII Host =		=
ASCII Host =		=
ASCII Host =		=
ASCII Host =		=
ASCII Host =		=
ASCII Host =		=
ASCII Host =		=
ASCII Host =		=

Note:
For 3270 Stations
Port Type = Coax = 1

3270
Display = 3D
Printer = 3P

Terminal Adapter HG-27	Port Set Name	Station Set Name	Default Destinations					Station Type
			LT1	LT2	LT3	LT4	LT5	
27-00								
27-01	_____	_____	__	__	__	__	__	_____
27-02	_____	_____	__	__	__	__	__	_____
27-03	_____	_____	__	__	__	__	__	_____
27-04	_____	_____	__	__	__	__	__	_____
27-05	_____	_____	__	__	__	__	__	_____
27-06	_____	_____	__	__	__	__	__	_____
27-07	_____	_____	__	__	__	__	__	_____
27-08	_____	_____	__	__	__	__	__	_____
27-09	_____	_____	__	__	__	__	__	_____
27-10	_____	_____	__	__	__	__	__	_____
27-11	_____	_____	__	__	__	__	__	_____
27-12	_____	_____	__	__	__	__	__	_____
27-13	_____	_____	__	__	__	__	__	_____
27-14	_____	_____	__	__	__	__	__	_____
27-15	_____	_____	__	__	__	__	__	_____
27-16	_____	_____	__	__	__	__	__	_____
27-17	_____	_____	__	__	__	__	__	_____
27-18	_____	_____	__	__	__	__	__	_____
27-19	_____	_____	__	__	__	__	__	_____
27-20	_____	_____	__	__	__	__	__	_____
27-21	_____	_____	__	__	__	__	__	_____
27-22	_____	_____	__	__	__	__	__	_____
27-23	_____	_____	__	__	__	__	__	_____
27-24	_____	_____	__	__	__	__	__	_____
27-25	_____	_____	__	__	__	__	__	_____
27-26	_____	_____	__	__	__	__	__	_____
27-27	_____	_____	__	__	__	__	__	_____
27-28	_____	_____	__	__	__	__	__	_____
27-29	_____	_____	__	__	__	__	__	_____
27-30	_____	_____	__	__	__	__	__	_____
27-31	_____	_____	__	__	__	__	__	_____

Worksheet 26—ASCII Attachment Diagram

Chapter 14 of the *3174 Planning Guide* contains the planning information you need.

			Station Set Name	Station Set Number	
		IBM Host =		= 1	
		ASCII Host =		=	
		ASCII Host =		=	
		ASCII Host =		=	
		ASCII Host =		=	
		ASCII Host =		=	
		ASCII Host =		=	
		ASCII Host =		=	
		ASCII Host =		=	

Switched = 2 Direct = 3 Non-switched = 4	Hayes * = 1 Micom = 2 IBM = 3 Other = 4				See Station Type Table below
Port Type	Modem Type	Port Set Name	Station Set Name	Default Destination	Station Type

AEA HG-21

21-00	___	___	___	___	___	___
21-01	___	___	___	___	___	___
21-02	___	___	___	___	___	___
21-03	___	___	___	___	___	___
21-04	___	___	___	___	___	___
21-05	___	___	___	___	___	___
21-06	___	___	___	___	___	___
21-07	___	___	___	___	___	___

AEA HG-22

22-00	___	___	___	___	___	___
22-01	___	___	___	___	___	___
22-02	___	___	___	___	___	___
22-03	___	___	___	___	___	___
22-04	___	___	___	___	___	___
22-05	___	___	___	___	___	___
22-06	___	___	___	___	___	___
22-07	___	___	___	___	___	___

AEA HG-23

23-00	___	___	___	___	___	___
23-01	___	___	___	___	___	___
23-02	___	___	___	___	___	___
23-03	___	___	___	___	___	___
23-04	___	___	___	___	___	___
23-05	___	___	___	___	___	___
23-06	___	___	___	___	___	___
23-07	___	___	___	___	___	___

Station Type Table *

ASCII Host	= AH	FTTERM (Monochrome) = FM	Lear Siegler 1178 = L7	Televideo 912 = T1
ASCII Plotter	= AL	Hewlett Packard 2621 B = H2	IBM 3162 Model 870 = R0	Televideo 970 = T7
ASCII Printer	= AP	IBM 3101 = I1	ROLM Cypress,Cedar,Juniper = R1	DEC VT100 = V1
ADDS Viewpoint A-1,A-2	= A2	IBM 3151, 3161, 3162, 3163 = I2	ANSI 3.64 Terminal = S1	DEC VT241 = V2
ADDS Viewpoint 78	= A7	IBM 3151,3161,3162,3163 = I3	UDT5 = U5	DEC VT52 = V5
Esprit Hazeltine 1500	= E1	IBM 3164 = I4	UDT6 = U6	DEC VT220 = V6
Esprit Executive 78	= E7	Lear Siegler ADM 11/12 = L1		Tektronix 4205 = X4
FTTERM (Color)	= FC	Lear Siegler ADM 3A/5 = L3		WYSE 50/60 = W1
UDT1	= U1	UDT3 = U3		Minitel 1B = M1
UDT2	= U2	UDT4 = U4		

*Trademark acknowledgments can be found in "Special Notices" on page v.

Worksheet 27—AEA Configure

Chapter 14 of the *3174 Planning Guide* contains the planning information you need.

_____ AEA Configure _____

700 - ☐
     0

702 - ☐
     1

703 - ☐
     0

710 - ☐☐☐☐☐☐☐☐   711 - ☐☐☐☐☐☐☐☐   712 - ☐☐☐☐☐☐☐☐   713 - ☐☐☐☐☐☐☐☐
     0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0

700: Configure the AEA Feature
702: Control Key Assignment
703: Request MLT for AEA
710: Miscellaneous ASCII Feature Options (A)

711: Miscellaneous ASCII Feature Options (B)
712: Miscellaneous ASCII Feature Options (C)
713: Miscellaneous ASCII Feature Options (D)

Worksheet 28—AEA Port Set

Chapter 14 of the *3174 Planning Guide* contains the planning information you need.

_____ AEA Port Set _____

	Name	Session Limit	Port Type	Modem Type	Password
1	_____	____	____	____	_____
2	_____	____	____	____	_____
3	_____	____	____	____	_____
4	_____	____	____	____	_____
5	_____	____	____	____	_____
6	_____	____	____	____	_____
7	_____	____	____	____	_____
8	_____	____	____	____	_____
9	_____	____	____	____	_____
10	_____	____	____	____	_____
11	_____	____	____	____	_____
12	_____	____	____	____	_____
13	_____	____	____	____	_____
14	_____	____	____	____	_____
15	_____	____	____	____	_____
16	_____	____	____	____	_____

Worksheet 29—AEA Port to Port Set Map

Chapter 14 of the *3174 Planning Guide* contains the planning information you need.

_____ AEA Port to Port Set Map _____

3270 Ports	0	1	2	3	4	5	6	7
26-00 to 26-07	—	—	—	—	—	—	—	—
26-08 to 26-15	—	—	—	—	—	—	—	—
26-16 to 26-23	—	—	—	—	—	—	—	—
26-24 to 26-31	—	—	—	—	—	—	—	—
27-00 to 27-07	—	—	—	—	—	—	—	—
27-08 to 27-15	—	—	—	—	—	—	—	—
27-16 to 27-23	—	—	—	—	—	—	—	—
27-24 to 27-31	—	—	—	—	—	—	—	—

AEA Ports	0	1	2	3	4	5	6	7
21-00 to 21-07	—	—	—	—	—	—	—	—
22-00 to 22-07	—	—	—	—	—	—	—	—
23-00 to 23-07	—	—	—	—	—	—	—	—

Worksheet 30—AEA Station Set

Chapter 14 of the *3174 Planning Guide* contains the planning information you need.

```
                        _____ AEA Station Set _____

  721 - _____      722 - [ | ]   723 - [ | | | | | | ]   725 - [ ]
                                                          ‾‾‾         ‾‾‾‾‾‾‾‾‾‾‾‾‾            1


  731 - [ ]      732 - [ ]      733 - [ ]   734 - [ ]   735 - [ ]   736 - [ ]  737 - [ ]
         1              1              0      ‾          0          1        ‾

  741 - [ | | ]   742 - [ | | ]   743 - [ ]   744 - [ ]   745 - [ ]   746 - [ ] [ ]
         0 0 0            0 1 5           1           0           0          0   0

  751 - [ ]       752 - _____
         ‾

  761 - [ ]      762 - [ ]      763 - [ ]   764 - [ ]   765 - [ ]
         1              1              1      1          0

  771 - [ ]      772 - [ ]      773 - [ ]   774 - [ ]   775 - [ ]   776 - [ ]
         1              1              1      1          1          1

  781 - [ ]      782 - [ ]      783 - [ | | ]  784 - [ ] 785 - [ | | | | | | | ]  786 - [ ] 787 - [ ]
         0              0             0 6 6        1        1 1 1 1 1 0 0 0          1 3 2      0
```

721: Station Set Name	761: Auto XON/XOFF
722: Station Type	762: Wraparound Option
723: Port Set Name	763: New Line Option
725: Host Connection Menu Option	764: Margin Bell
731: Flow Control Type	765: DEC Host ASCII Character Set
732: XON/XOFF Transmission Resumption Trigger	771: Automatic Line Feed for Cursor Control
733: Line Speed	772: Carriage Return/Carriage Return - Line Feed
734: Line Speed (Host Upper Limit)	Selection
735: Parity	773: Automatic New Line for Cursor Control
736: Stop Bits	774: Scrolling
737: Maximum Modem Line Speed	775: Line Turnaround Character
741: Switched Disconnect Timeout	776: IBM ASCII Host Character Set
742: Inactivity Timeout	781: Attached Printer Prompt
743: Prompt for Universal/Specific Keyboard Map	782: Use of Form Feed
744: Number of Bits Per Character	783: Page Length
745: ASCII Display Character Set	784: Printer Character Set
746: Translate Option	785: AEA Printer Options
751: Terminal Type Supported by the ASCII Host	786: Page Width
752: ASCII Host Phone Number	787: LU1 SCS Transparency Translation

Worksheet 31—AEA Default Destination

Chapter 14 of the *3174 Planning Guide* contains the planning information you need.

_____ AEA Default Destination _____

Station Set	Station Set Name	Session Limit	Session				
			LT1	LT2	LT3	LT4	LT5
1	_____	_____	___	___	___	___	___
2	_____	_____	___	___	___	___	___
3	_____	_____	___	___	___	___	___
4	_____	_____	___	___	___	___	___
5	_____	_____	___	___	___	___	___
6	_____	_____	___	___	___	___	___
7	_____	_____	___	___	___	___	___
8	_____	_____	___	___	___	___	___
9	_____	_____	___	___	___	___	___
10	_____	_____	___	___	___	___	___
11	_____	_____	___	___	___	___	___
12	_____	_____	___	___	___	___	___
13	_____	_____	___	___	___	___	___
14	_____	_____	___	___	___	___	___
15	_____	_____	___	___	___	___	___
16	_____	_____	___	___	___	___	___
17	_____	_____	___	___	___	___	___
18	_____	_____	___	___	___	___	___
19	_____	_____	___	___	___	___	___
20	_____	_____	___	___	___	___	___
21	_____	_____	___	___	___	___	___
22	_____	_____	___	___	___	___	___
23	_____	_____	___	___	___	___	___
24	_____	_____	___	___	___	___	___
25	_____	_____	___	___	___	___	___
26	_____	_____	___	___	___	___	___
27	_____	_____	___	___	___	___	___
28	_____	_____	___	___	___	___	___
29	_____	_____	___	___	___	___	___
30	_____	_____	___	___	___	___	___

Worksheet 32—Terminal Tables Definition

Chapter 14 of the *3174 Planning Guide* contains the planning information you need.

UDT Number: _____

Section One: Identifying Each Table

_____ AEA User-Defined Terminal Table Definition _____

UDT Number   _____

Name   _____

Model   _____

Section Two: Selecting Attributes for Tables

Attributes of Station Type:

Last line reserved for Status	_____
Status line Character Set	_____
Status line Clear Option	_____
Use Cursor Seq on Status Line	_____
Scrolling on	_____
Cursor wraps at end of line	_____
Color supported	_____
Cursor class	_____
Cursor sequence	_____
Alternate Screen size	_____
Graphics Query Reply	_____
Graphics Input wait time	_____
Graphics Input ending seq	_____
Graphics Input length	_____

Worksheet 33A—Inbound Sequence Panels

Chapter 14 of the *3174 Planning Guide* contains the planning information you need.

_____ Inbound Sequence Panels _____

UDT Number: _____

3270 Function	ASCII Sequence from Terminal	
	Primary	Alternate
PF1	_____	_____
PF2	_____	_____
PF3	_____	_____
PF4	_____	_____
PF5	_____	_____
PF6	_____	_____
PF7	_____	_____
PF8	_____	_____
PF9	_____	_____
PF10	_____	_____
PF11	_____	_____
PF12	_____	_____
PF13	_____	_____
PF14	_____	_____
PF15	_____	_____
PF16	_____	_____
PF17	_____	_____
PF18	_____	_____
PF19	_____	_____
PF20	_____	_____
PF21	_____	_____
PF22	_____	_____
PF23	_____	_____
PF24	_____	_____
PA1	_____	_____
PA2	_____	_____
PA3	_____	_____
ATTN	_____	_____
SysRq	_____	_____
Reset	_____	_____
Dev Cancel	_____	_____
Enter	_____	_____

Worksheet 33B—Inbound Sequence Panels

Chapter 14 of the *3174 Planning Guide* contains the planning information you need.

_____ Inbound Sequence Panels (Continued)_

UDT Number: _____

3270 Function	ASCII Sequence from Terminal	
	Primary	Alternate
Clear Screen	————————	————————
Cursor Select	————————	————————
Cursor Up	————————	————————
Cursor Down	————————	————————
Cursor Left	————————	————————
Cursor Right	————————	————————
Tab	————————	————————
Backtab	————————	————————
Newline	————————	————————
Home	————————	————————
Change Screen	————————	————————
Ex Sel	————————	————————
Field Mark	————————	————————
Dup	————————	————————
Erase EOF	————————	————————
Erase Input	————————	————————
Insert	————————	————————
Delete	————————	————————
Print	————————	————————
Ident	————————	————————
Status ON/OFF	————————	————————
Refresh	————————	————————
Fast Left	————————	————————
Fast Right	————————	————————
Suspend Print	————————	————————
Resume Print	————————	————————
Test	————————	————————
File Tran En	————————	————————
File Tran Dis	————————	————————
ECHO	————————	————————
ECHO	————————	————————
ECHO	————————	————————

Worksheet 34—Outbound Sequence Panels

Chapter 14 of the *3174 Planning Guide* contains the planning information you need.

UDT Number: _____

_____ Outbound Sequence Panel_____

Function	ASCII Sequence to the Terminal
Term Init Seq	_____
	_____
	_____
	_____
	_____
	_____
	_____
Term Exit Seq	_____
	_____
Erase EOL	_____
Clear Screen	_____
Cursor Up	_____
Cursor Down	_____
Cursor Left	_____
Cursor Right	_____
Status On	_____
Status Off	_____
Bell	_____
Dim Unprot	_____
Highlit Unprot	_____
Dim Protec	_____
Highlit Protec	_____
Transparency On	_____
Transparency Off	_____
Alpha Clear	_____
Start Printer	_____
Stop Printer	_____

Worksheet 35—Translate Tables Definition

Chapter 14 of the *3174 Planning Guide* contains the planning information you need.

UDX Number: _____

_____ AEA User Translate Table Definition _____

UDX Number   _____

Name   _____

Language   _____

CECP Support _____

Model   _____

Worksheet 36—EBCDIC to ASCII Translation (Outbound)

Chapter 14 of the *3174 Planning Guide* contains the planning information you need.

UDX Number: _____

_____ UDX Translation - EBCDIC to ASCII _____

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
7	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
A	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
B	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
C	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
D	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
E	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Worksheet 37—ASCII to EBCDIC Translation (Inbound)

Chapter 14 of the *3174 Planning Guide* contains the planning information you need.

UDX Number: _____

```
_____ UDX Translation - ASCII to EBCDIC _____

        0   1   2   3      4   5   6   7      8   9   A   B      C   D   E   F

0     —   —   —   —      —   —   —   —      —   —   —   —      —   —   —   —

1     —   —   —   —      —   —   —   —      —   —   —   —      —   —   —   —

2     —   —   —   —      —   —   —   —      —   —   —   —      —   —   —   —

3     —   —   —   —      —   —   —   —      —   —   —   —      —   —   —   —

4     —   —   —   —      —   —   —   —      —   —   —   —      —   —   —   —

5     —   —   —   —      —   —   —   —      —   —   —   —      —   —   —   —

6     —   —   —   —      —   —   —   —      —   —   —   —      —   —   —   —

7     —   —   —   —      —   —   —   —      —   —   —   —      —   —   —   —

8     —   —   —   —      —   —   —   —      —   —   —   —      —   —   —   —

9     —   —   —   —      —   —   —   —      —   —   —   —      —   —   —   —

A     —   —   —   —      —   —   —   —      —   —   —   —      —   —   —   —

B     —   —   —   —      —   —   —   —      —   —   —   —      —   —   —   —

C     —   —   —   —      —   —   —   —      —   —   —   —      —   —   —   —

D     —   —   —   —      —   —   —   —      —   —   —   —      —   —   —   —

E     —   —   —   —      —   —   —   —      —   —   —   —      —   —   —   —

F     —   —   —   —      —   —   —   —      —   —   —   —      —   —   —   —
```

Worksheet 38—Device Definition

Chapter 15 of the *3174 Planning Guide* contains the planning information you need.

_____ Device Definition _____

800 Printer Authorization Matrix (PAM) - ☐☐
                                                                0 0

801 Logical Terminal Assignment (LTA) - ☐
                                                                0

802 Prompts for Extended VPD - ☐
                                                                0

803 ISDN Definition - ☐
                                                                0

Worksheet 39—Printer Authorization Matrix (PAM)

Chapter 15 of the *3174 Planning Guide* contains the planning information you need.

```
_____ PAM Definition _____

Entry        Printer        Mode            Class
             Port                       7              8
                                        01234 56789    012345

  _          __ ‾ __         __         ..... ..... ......
  _          __ ‾ __         __         ..... ..... ......
  _          __ ‾ __         __         ..... ..... ......
  _          __ ‾ __         __         ..... ..... ......
  _          __ ‾ __         __         ..... ..... ......
  _          __ ‾ __         __         ..... ..... ......
  _          __ ‾ __         __         ..... ..... ......
  _          __ ‾ __         __         ..... ..... ......

            3270 Display Ports                  ASCII Display Ports
```

```
Entry
         0                 1                 2                 3     HG 21       HG 22       HG 23
   HG    01234 56789    01234 56789    01234 56789    01    01234567    01234567    01234567

   _  26 ..... .....    ..... .....    ..... .....    ..    ........    ........    ........
      27 ..... .....    ..... .....    ..... .....    ..    ........    ........    ........
   _  26 ..... .....    ..... .....    ..... .....    ..    ........    ........    ........
      27 ..... .....    ..... .....    ..... .....    ..    ........    ........    ........
   _  26 ..... .....    ..... .....    ..... .....    ..    ........    ........    ........
      27 ..... .....    ..... .....    ..... .....    ..    ........    ........    ........
   _  26 ..... .....    ..... .....    ..... .....    ..    ........    ........    ........
      27 ..... .....    ..... .....    ..... .....    ..    ........    ........    ........
   _  26 ..... .....    ..... .....    ..... .....    ..    ........    ........    ........
      27 ..... .....    ..... .....    ..... .....    ..    ........    ........    ........
   _  26 ..... .....    ..... .....    ..... .....    ..    ........    ........    ........
      27 ..... .....    ..... .....    ..... .....    ..    ........    ........    ........
   _  26 ..... .....    ..... .....    ..... .....    ..    ........    ........    ........
      27 ..... .....    ..... .....    ..... .....    ..    ........    ........    ........
```

Worksheet 40—Logical Terminal Assignment (LTA)

Chapter 15 of the *3174 Planning Guide* contains the planning information you need.

———— Logical Terminal Assignment ————

Port	LT1	LT2	LT3	LT4	LT5	Port	LT1	LT2	LT3	LT4	LT5
26-00						26-01					
26-02						26-03					
26-04						26-05					
26-06						26-07					
26-08						26-09					
26-10						26 11					
26-12						26-13					
26-14						26-15					
26-16						26-17					
26-18						26-19					
26-20						26-21					
26-22						26-23					
26-24						26-25					
26-26						26-27					
26-28						26-29					
26-30						26-31					
27-00						27-01					
27-02						27-03					
27-04						27-05					
27-06						27-07					
27-08						27-09					
27-10						26 11					
27-12						27-13					
27-14						27-15					
27-16						27-17					
27-18						27-19					
27-20						27-21					
27-22						27-23					
27-24						27-25					
27-26						27-27					
27-28						27-29					
27-30						27-31					

Worksheet 41—Extended Vital Product Data (VPD)

Chapter 15 of the *3174 Planning Guide* contains the planning information you need.

_____ Extended Vital Product Data _____

Label Descriptions

1 _____

2 _____

3 _____

4 _____

5 _____

6 _____

7 _____

8 _____

Worksheet 42—ISDN Adapter Definition

Chapter 15 of the *3174 Planning Guide* contains the planning information you need.

_____ ISDN Adapter Definition _____

Type the Adapter Options for the ISDN Adapter(s).

Adapter Hardware Group No.	Network	Inactivity Timeout (Y,N)	Range
36	—	n	0030
37	—	n	0030
38	—	n	0030
39	—	n	0030

Worksheet 43—ISDN Port Definition

Chapter 15 of the *3174 Planning Guide* contains the planning information you need.

_____ ISDN Port Definition _____

Type in (Y,N) for Semi-Permanent Connection.
Semi-Permanent Connection valid on ports for
Hardware Group number(s) *

Port	Semi-Permanent Connection	Port	Semi-Permanent Connection
36-00	n	36-01	n
36-02	n	36-03	n
37-00	n	37-01	n
37-02	n	37-03	n
38-00	n	38-01	n
38-02	n	38-03	n
39-00	n	39-01	n
39-02	n	39-03	n

Worksheet 44—ISDN Channel Definition

Chapter 15 of the *3174 Planning Guide* contains the planning information you need.

_____ ISDN Channel Definition _____

Type in the Channel options for the ISDN Channels.

Port	Channel B1		Channel B2	
	TEI	ISDN Number	TEI	ISDN Number
36-00	—	_____	—	_____
36-01	—	_____	—	_____
36-02	—	_____	—	_____
36-03	—	_____	—	_____
37-00	—	_____	—	_____
37-01	—	_____	—	_____
37-02	—	_____	—	_____
37-03	—	_____	—	_____
38-00	—	_____	—	_____
38-01	—	_____	—	_____
38-02	—	_____	—	_____
39-00	—	_____	—	_____
39-01	—	_____	—	_____
39-02	—	_____	—	_____
39-03	—	_____	—	_____

Worksheet 45—Common Network

Chapter 16 of the *3174 Planning Guide* contains the planning information you need.

―――――― Common Network ――――――

900 - ☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐
     X X X X X X X X X X X X 0 4

905 - ☐
   1

908 - ☐☐☐☐☐☐☐
    I B M L A N

911 - ☐
   0

912 - ☐☐
   0 0

920 - ☐☐☐☐☐☐☐
    I B M I S D N

900:	Token-Ring Network – Gateway Address/SAP	911:	Ring Speed of the Gateway
905:	Token-Ring Error Alerts	912:	Group Poll Address
908:	Link Subsystem Name for Token-Ring Network	920:	Link Subsystem Name for ISDN Network

Worksheet 46—Ring Address Assignment

Chapter 16 of the *3174 Planning Guide* contains the planning information you need.

_____940:   Ring Address Assignment_____

S	Ring	Address			SAP	T

(form with blank entry boxes — left column and right column of rows, each row with S, Ring, Address, SAP (0 4), and T (0) fields)

Worksheet 47—Ring Transmission Definition

Chapter 16 of the *3174 Planning Guide* contains the planning information you need.

_____941: Ring Transmission Definition_____

S	Ring	Address	SAP	F	W		S	Ring	Address	SAP	F	W

Worksheet 48—ISDN PUID Assignment

Chapter 16 of the *3174 Planning Guide* contains the planning information you need.

_____ ISDN PUID Assignment _____

CU@/ATTACH

Type in the ISDN PUID. Each PUID must be unique and
can not equal question 215. Question 215 = *****

S	ISDN PUID	S	ISDN PUID	S	ISDN PUID	S	ISDN PUID
	____		____		____		____
	____		____		____		____
	____		____		____		____
	____		____		____		____
	____		____		____		____
	____		____		____		____
	____		____		____		____
	____		____		____		____

Worksheet 49—Storage Requirements

Chapter 3 of the *3174 Planning Guide* contains the procedure for filling in this worksheet. Values are in KB (1024 bytes). **Select only one value from each group.**

Function	Requires	Totals:
Base	2050	2050
Asynchronous Emulation Adapter (one or more)	309	
Large-Screen Support	48	
Multiple Logical Terminals	216	_____
Multi-Host Support (CCA and/or Single Link Multi-Host Support)	159	_____
Single Link Multi-Host Support		
2 Hosts on the link	54	
3 Hosts on the link	108	
4 Hosts on the link	162	
5 Hosts on the link	216	
6 Hosts on the link	270	
7 Hosts on the link	324	
8 Hosts on the link	378	_____
Multiple Logical Terminals (Level or Exact Amount)		
Level 1	64	
Level 2	128	
Level 3	512	
Level 4	896	
Level 5	1152	
Level 6	1536	
Level 7	2048	
Level 8	2688	
Exact Amount	_____	_____
3270 Port Expansion Feature		
Without Multi-Host Support present	377	
With Multi-Host Support present	505	_____
Local Format Storage		
Level 1	77	
Level 2	141	
Level 3	269	
Level 4	525	
Level 5	1037	
Level 6	1548	_____
3174 Peer Communication without 3270 Port Expansion Feature		
3174-Peer	82	
3174-Peer and Bridge Support	181	
3174-Peer, Bridge and LAN Manager	250	
3174 Peer Communication with 3270 Port Expansion Feature		
3174-Peer	129	
3174-Peer and Bridge Support	278	
3174-Peer, Bridge and LAN Manager	347	_____
Central Site Change Management without APPN		
Network Site Controller	248	
Central Site Controller port	248	
Central Site Controller (1 Fixed Disk Drive)	331	
Central Site Controller (2 Fixed Disk Drives)	414	
Central Site Change Management with APPN		
Network Site Controller	155	
Central Site Controller	155	
Central Site Controller (1 Fixed Disk Drive)	238	
Central Site Controller (2 Fixed Disk Drives)	321	_____

Function		Requires	Totals:
APPN Support			
Sessions	**Nodes**		
225	20	968	
225	75	1188	
225	150	1666	
225	225	1966	
500	20	1408	
500	75	1628	
500	150	2106	
500	225	2406	
750	20	1808	
750	75	2028	
750	150	2506	
750	225	2806	
1000	20	2208	
1000	75	2428	
1000	150	2906	
1000	225	3206	_____
Token-Ring Gateway and ISDN Gateway Support		58	_____
RPQ Storage			_____
DSPU Combinations—Local Models			
Refer to Table 3-2 on page 3-7 to figure your totals.			_____
DSPU Combinations—Remote Models			
Refer to Table 3-2 on page 3-7 to figure your totals.			_____
		Total Storage Required:	_____
		Storage Required in MBs:	_____

Non-Katakana Converged Keyboards

Chapter 17 of the *3174 Planning Guide* contains the planning information you need.

Language:	**Keyboard ID:**	**Modify Field:**	**Keyboard Type:**	**Keypad Type:**
_____	A B C D (circle one)	☐ 1 = New Layout ☐ 2 = Update	☐ 1 = Typewriter ☐ 2 = Data Entry ☐ 3 = APL	☐ 0 = National Language Numeric ☐ 1 = Data Entry ☐ 2 = Program Function (PF)

Keyboard			Shift		Function				*From* Key		I/O Interface		*To* Key	
0	1	2	3	4	5	6	7	8	Shift	Character	Code	Character	Shift	Character

0, 1, 2 - Keyboard Group

0 = The desired change is on a Converged Typewriter, Converged Data Entry, Enhanced Typewriter, or the typewriter functions on a Converged APL keyboard.

1 = The desired change applies only to the APL key functions on a Converged APL keyboard.

2 = The desired change applies to both the typewriter and APL functions on a Converged APL keyboard.

3, 4 - Shift Group

3 = Full-key change (includes alternate, upper, and lower shifts).

4 = Single-shift change.

5, 6, 7, 8 - Function Group

5 = Copy from I/O interface code table.

6 = Exchange two functions.

7 = Copy a function to another key.

8 = Delete a key function.

Katakana Converged Keyboards

Chapter 17 of the *3174 Planning Guide* contains the planning information you need.

Language:
_____

Keyboard ID:

A B C D

(circle one)

Modify Field:

☐ 1 = New Layout

☐ 2 = Update

Keyboard Type:

☐ 1 = Typewriter

☐ 2 = Data Entry

☐ 3 = APL

Keypad Type:

☐ 0 = National Language Numeric

☐ 1 = Data Entry

☐ 2 = Program Function (PF)

Keyboard			Shift		Function				From Key		I/O Interface		To Key	
0	1	2	3	4	5	6	7	8	Shift	Character	Code	Character	Shift	Character

0, 1, 2 - Keyboard Group

0 = The desired change is on a Converged Typewriter, Converged Data Entry, Enhanced Typewriter, or the typewriter functions on a Converged APL keyboard.

1 = The desired change applies only to the APL key functions on a Converged APL keyboard.

2 = The desired change applies to both the typewriter and APL functions on a Converged APL keyboard.

3, 4 - Shift Group

3 = Full-key change (includes alternate, upper, and lower shifts).

4 = Single-shift change.

5, 6, 7, 8 - Function Group

5 = Copy from I/O interface code table.

6 = Exchange two functions.

7 = Copy a function to another key.

8 = Delete a key function.

Enhanced Keyboard (US)

Chapter 17 of the *3174 Planning Guide* contains the planning information you need.

Language:

_____

Keyboard ID:

A B C D

(circle one)

Modify Field:

☐ 1 = New Layout

☐ 2 = Update

Keyboard Type:

☒ 4 = Typewriter

Keypad Type:

☐ 0 = National Language Numeric

☐ 1 = Data Entry

☐ 2 = Program Function (PF)

Keyboard			Shift		Function				From Key		I/O Interface		To Key	
0	1	2	3	4	5	6	7	8	Shift	Character	Code	Character	Shift	Character

0, 1, 2 - Keyboard Group

0 =   The desired change is on a Converged Typewriter, Converged Data Entry, Enhanced Typewriter, or the typewriter functions on a Converged APL keyboard.

1 =   The desired change applies only to the APL key functions on a Converged APL keyboard.

2 =   The desired change applies to both the typewriter and APL functions on a Converged APL keyboard.

3, 4 - Shift Group

3 =   Full-key change (includes alternate, upper, and lower shifts).

4 =   Single-shift change.

5, 6, 7, 8 - Function Group

5 =   Copy from I/O interface code table.

6 =   Exchange two functions.

7 =   Copy a function to another key.

8 =   Delete a key function.

Enhanced Keyboard (World Trade)

Chapter 17 of the *3174 Planning Guide* contains the planning information you need.

Language: _____

Keyboard ID:
A B C D
(circle one)

Modify Field:
☐ 1 = New Layout
☐ 2 = Update

Keyboard Type:
☒ 4 = Typewriter

Keypad Type:
☐ 0 = National Language Numeric
☐ 1 = Data Entry
☐ 2 = Program Function (PF)

Keyboard			Shift		Function				From Key		I/O Interface		To Key	
0	1	2	3	4	5	6	7	8	Shift	Character	Code	Character	Shift	Character

0, 1, 2 - Keyboard Group

0 = The desired change is on a Converged Typewriter, Converged Data Entry, Enhanced Typewriter, or the typewriter functions on a Converged APL keyboard.
1 = The desired change applies only to the APL key functions on a Converged APL keyboard.
2 = The desired change applies to both the typewriter and APL functions on a Converged APL keyboard.

3, 4 - Shift Group

3 = Full-key change (includes alternate, upper, and lower shifts).
4 = Single-shift change.

5, 6, 7, 8 - Function Group

5 = Copy from I/O interface code table.
6 = Exchange two functions.
7 = Copy a function to another key.
8 = Delete a key function.

Enhanced Keyboard (Katakana)

Chapter 17 of the *3174 Planning Guide* contains the planning information you need.

Language:	Keyboard ID:	Modify Field:	Keyboard Type:	Keypad Type:
_____	A B C D (circle one)	☐ 1 = New Layout ☐ 2 = Update	☒ 4 = Typewriter	☐ 0 = National Language Numeric ☐ 1 = Data Entry ☐ 2 = Program Function (PF)

Keyboard			Shift		Function				*From* Key		I/O Interface		*To* Key	
0	1	2	3	4	5	6	7	8	Shift	Character	Code	Character	Shift	Character

0, 1, 2 - Keyboard Group

0 = The desired change is on a Converged Typewriter, Converged Data Entry, Enhanced Typewriter, or the typewriter functions on a Converged APL keyboard.

1 = The desired change applies only to the APL key functions on a Converged APL keyboard.

2 = The desired change applies to both the typewriter and APL functions on a Converged APL keyboard.

3, 4 - Shift Group

3 = Full-key change (includes alternate, upper, and lower shifts).

4 = Single-shift change.

5, 6, 7, 8 - Function Group

5 = Copy from I/O interface code table.

6 = Exchange two functions.

7 = Copy a function to another key.

8 = Delete a key function.

Appendix B. AEA Planning Examples

An Overview of the AEA Planning Examples

In the following examples, we present sample computer environments with data communication requirements that are satisfied by the addition of Asynchronous Emulation Adapters (AEA).

- The first example examines ASCII Terminal Emulation; 3270 terminals require access to a nearby ASCII host.

- The second example examines 3270 Terminal Emulation; remote ASCII terminals require access to an IBM host.

- The third example examines both ASCII Terminal Emulation and 3270 Terminal Emulation.

We start with an overall description of the computer environment and the communication requirements. We analyze the requirements for the entire system, divide the load across several controllers as homogeneously as possible, state specific design qualifications, and then concentrate on how to plan the customization of **one** of those controllers. This controller is a piece of the overall system solution; however, its physical layout and customization represent a model or prototype that must be put into effect at each controller equipped for asynchronous
communication.

The following design conventions are observed throughout these examples:

- When applicable, asynchronous traffic is distributed across several 3174 Establishment Controllers; this convention optimizes resource availability and improves the consistency of overall system performance. The even distribution of asynchronous traffic across controllers may also serve to expedite and standardize customizing of the affected controllers; if the controllers are physically and functionally equivalent, then only one controller needs to be manually customized; copies of the customization can be made and used (with minor modifications, such as the channel address) on the other controllers.

- Ports that serve the same function are grouped together; this simplifies the planning, drawing, and understanding of the controller's configuration.

- Room for system expansion is provided.

ASCII Terminal Emulation Planning Example

In this example, we set up communication between 3270 terminals and a local ASCII host. The 3270 terminals can also access an IBM host.

System Description and Communication Requirements

One hundred twenty 3178 display terminals are connected to an IBM 3090 with a VM operating system. Forty-five 3270 terminal users scattered throughout the building need access to a DEC host in the engineering department on the third floor. About one hour per terminal per day is spent using the DEC application called *VAX VMS*. Occasionally, a few of the terminals will need an application called *PARTS*. Both applications support VT100s.

What We Have to Do

- Design a configuration that uses the AEA feature to meet this requirement.

- Decide what connection mechanism to use, how many lines are needed, what controllers are affected, and how many AEA features to install.

- Allow for some expansion in the future.

- Fill out the 3174 Attachment Diagrams and use them to complete the Site Planning and Customization worksheets.

- Enter the data into customization panels.

- IML a customized controller, and check out the system.

Specific Design Qualifications

ASCII traffic will be distributed across three controllers; each controller will support 15 ASCII users.

Traffic analysis indicates that five AEA ports per controller will provide an acceptable level of port availability for the 15 users of VAX VMS. Remember, one port supports only one ASCII host session at a time. The Idle Time-Out can be increased (default = 15 minutes), because port availability should not be a problem.

VAX VMS and PARTS are considered different destinations; these applications control their own ports. On one controller (C1), two additional ports are allocated to PARTS. The other two controllers (C2 and C3) will not have any ports allocated to PARTS.

Limited-distance (nonswitched) modems are capable of handling communication between the controllers and the DEC host.

Hardware Requirements

- 17 DEC ports (seven for C1 users, and five each for C2 and C3 users) and 17 cables

- 17 limited-distance modem pairs

- 17 twisted-pair cable runs to connect LDM pairs

- Three Asynchronous Emulation Adapters and 17 cables.

3174 Attachment Diagrams

Once we have determined the number of ports needed, the modem types, and the method of connecting stations to the AEA ports, we can diagram the layout of the system and identify station sets and port sets. A system layout consists of a 3270 Attachment Diagram and an ASCII Attachment Diagram. These diagrams are a useful reference for both site planning and customization activities.

See Figures B-1 and B-2 for sample attachment diagrams for the first controller (C1). We have filled in portions of the diagrams; these portions are printed in bold italic. The diagrams have been filled in by (1) identifying the stations and station sets, (2) identifying the ports and port sets, and then (3) indicating the assignment of station sets to port sets.

3270 Attachment Diagram

For the 3270 Attachment Diagram, we have:

1. Written in the names of the available hosts (VM SYS 2, VAX VMS, and PARTS) and numbered VAX VMS and PARTS as station sets 2 and 3, respectively.

2. Written in the 3270 station type (3D) and drawn an arrow down to Terminal Adapter port 14 to show that these ports are used by the 3270 displays that require access to the DEC host.

   Note: Terminal Adapter/Multiplexer ports 15 − 31 do not have access to the DEC host; they operate as they did before the addition of the AEA feature.

3. Written in the Default Destinations (1 = VM SYS 2). The arrow shows that all 3270 displays have the same number and sequence of Default Destinations.

4. Added brackets around those stations of the same type and default destination configuration, and assigned these stations the station set name 3178 TERMS.

5. Added brackets around the ports to which the 3178 display stations are connected, and assigned these ports the port set name PSA3178.

6. Added an arrow to show that the station set 3178 TERMS is served by port set PSA3178.

Note: This example only shows terminals attached to HG 26.

3270 Attachment Diagram

	Station Set Name	Station Set Number
	1	
IBM Host =	*VM SYS 2*	= 1
ASCII Host =	*VAX VMS*	= 2
ASCII Host =	*PARTS*	= 3
ASCII Host =		=
ASCII Host =		=
ASCII Host =		=
ASCII Host =		=
ASCII Host =		=
ASCII Host =		=

Note:
For 3270 Stations
Port Type = Coax = 1

3270
Display = 3D
Printer = 3P

Terminal Adapter HG-26	Port Set Name	Station Set Name	Default Destinations					Station Type
			LT1	LT2	LT3	LT4	LT5	
26-00			**3** *1*	—	—	—	—	**2** *3D*
26-01				—	—	—	—	
26-02				—	—	—	—	
26-03				—	—	—	—	
26-04				—	—	—	—	
26-05	**5**	**4**		—	—	—	—	
26-06				—	—	—	—	
26-07	*PSA3178* ←	*3178 TERMS*		—	—	—	—	
26-08				—	—	—	—	
26-09	**6**			—	—	—	—	
26-10				—	—	—	—	
26-11				—	—	—	—	
26-12				—	—	—	—	
26-13				—	—	—	—	
26-14				—	—	—	—	
26-15			—	—	—	—	—	—
26-16			—	—	—	—	—	—
26-17			—	—	—	—	—	—
26-18			—	—	—	—	—	—
26-19			—	—	—	—	—	—
26-20			—	—	—	—	—	—
26-21			—	—	—	—	—	—
26-22			—	—	—	—	—	—
26-23			—	—	—	—	—	—
26-24			—	—	—	—	—	—
26-25			—	—	—	—	—	—
26-26			—	—	—	—	—	—
26-27			—	—	—	—	—	—
26-28			—	—	—	—	—	—
26-29			—	—	—	—	—	—
26-30			—	—	—	—	—	—
26-31			—	—	—	—	—	—

Figure   B-1. ASCII Terminal Emulation—3270 Attachment Diagram

ASCII Attachment Diagram

For the ASCII Attachment Diagram, we have:

1. Written in the names of the available hosts (VMSYS2, VAX VMS, and PARTS), and numbered VAX VMS and PARTS as station sets 2 and 3, respectively.

2. Written in the ASCII station types (AH and AH); default destination does not apply (NA).

3. Added brackets around each AH, and assigned the station set names VAX VMS and PARTS. These names will be displayed in the Connection Menu, so they should be understandable by the application users.

4. Written in the port type (4) for AEA ports 21-00 through 21-04, and 21-06 and 21-07.

   Note: Limited-distance modems are not assigned a Modem Type (NA).

5. Added a bracket around each group of AEA ports that have the same Port Type and Default Destination; all ports in our system have the same Port Type and Default Destination, but five ports (21-00 through 21-04) have been allocated to VAX VMS, and two ports (21-06 and 21-07) have been allocated to PARTS. These two groups of ports must be in different port sets; we have assigned them the port set names PSVAXVMS and PSPARTS.

6. Added arrows to show that station sets VAX VMS and PARTS are served by port sets PSVAXVMS and PSPARTS, respectively.

Hardware Setup

The major tasks required for hardware setup are:

1. Rewire the three controllers so that the fifteen 3270 terminals that require access to the DEC host are connected to ports 00 through 14 on each controller.

2. Install one AEA in C1, C2, and C3. Follow the setup and checkout procedures in the setup instructions provided with the AEA feature.

3. Set up and check out cables, limited-distance modems, twisted-pair cabling, and any required distribution frame cross-connections.

ASCII Attachment Diagram

	Station Set Name	**1**	Station Set Number
IBM Host	= *VM SYS 2*		= 1
ASCII Host	= *VAX VMS*		= 2
ASCII Host	= *PARTS*		= 3
ASCII Host	=		=
ASCII Host	=		=
ASCII Host	=		=
ASCII Host	=		=
ASCII Host	=		=
ASCII Host	=		=

Switched = 2 Direct = 3 Non-switched = 4	Hayes = 1 Micom = 2 IBM = 3 Other = 4				See Station Type Table below

	Port Type	Modem Type	Port Set Name	Station Set Name	Default Destination	Station Type
AEA HG-21	**4**				**2**	
21-00	4	NA				
21-01	4	NA	**5**	**3**		
21-02	4	NA	PSVAXVMS ◄—	VAX VMS	NA	AH
21-03	4	NA				
21-04	4	NA				
21-05						
21-06	4	NA				
21-07	4	NA	PSPARTS ◄—	PARTS	NA	AH
			6			
AEA HG-22						
22-00						
22-01						
22-02						
22-03						
22-04						
22-05						
22-06						
22-07						
AEA HG-23						
23-00						
23-01						
23-02						
23-03						
23-04						
23-05						
23-06						
23-07						

Station Type Table

ASCII Host	= AH	FTTERM (Monochrome)	= FM	Lear Siegler 1178	= L7	Televideo 912	= T1
ASCII Plotter	= AL	Hewlett Packard 2621 B	= H2	IBM 3162 Model 870	= R0	Televideo 970	= T7
ASCII Printer	= AP	IBM 3101	= I1	ROLM Cypress,Cedar,Juniper	= R1	DEC VT100	= V1
ADDS Viewpoint A-1,A-2	= A2	IBM 3151, 3161, 3162, 3163	= I2	ANSI 3.64 Terminal	= S1	DEC VT241	= V2
ADDS Viewpoint 78	= A7	IBM 3151,3161,3162,3163	= I3	UDT5	= U5	DEC VT52	= V5
Esprit Hazeltine 1500	= E1	IBM 3164	= I4	UDT6	= U6	DEC VT220	= V6
Esprit Executive 78	= E7	Lear Siegler ADM 11/12	= L1			Tektronix 4205	= X4
FTTERM (Color)	= FC	Lear Siegler ADM 3A/5	= L3			WYSE 50/60	= W1
UDT1	= U1	UDT3	= U3			Minitel 1B	= M1
UDT2	= U2	UDT4	= U4				

Figure B-2. ASCII Terminal Emulation—ASCII Attachment Diagram

Customization Requirements

The AEA customization worksheets for C1 are shown here. The customization for C2 and C3 differ from that for C1 only in that devices on C2 and C3 will not have access to PARTS.

Using the 3174 Attachment Diagrams as a guide, we have filled out the following worksheets:

- AEA Configuration
- AEA Port Set
- AEA Port to Port Set Map
- AEA Station Set
- AEA Default Destination.

When a default response for a configuration question did not meet the requirements of our network, an alternate response was written on the worksheet. Use of the default response was indicated by circling it.

Note: Most defaults were chosen to simplify the examples; they do not imply a recommendation.

For detailed information on how to fill out the worksheets, refer to Chapter 14, "Planning for the Asynchronous Emulation Adapter."

AEA Configure Worksheet

On the following worksheet, we have filled in question 700 with a **1**.

AEA Port Set Worksheet

Shown below are names of Port Sets. These Port Set names are arbitrary but must consist of no more than 8 characters (including blanks). For 3270 stations, port type is always 1 (coax) and modem type is irrelevant. The 3174 Attachment Diagrams indicate that we have three port sets:

- PSA3178
- PSVAXVMS
- PSPARTS.

PSA3178: Is the port set for Terminal Adapter ports that require access to the DEC host. Session Limit is 1, Port Type is 1 (coax), and Modem Type is irrelevant. Note that PSA3178 is port set 1.

PSVAXVMS: Is the port set for AEA ports attached to the VAX VMS application on the DEC host. Session Limit is irrelevant, Port Type is 4 (nonswitched), and because we are using limited-distance modems, Modem Type need not be specified. Note that PSVAXVMS is port set 2.

PSPARTS: Is the port set for AEA ports attached to the PARTS application on the DEC host. Session Limit is irrelevant, Port Type is 4 (nonswitched), and Modem Type need not be specified. Note that PSPARTS is port set 3.

```
                    _____   AEA Port Set   _____


             Name        Session Limit   Port Type   Modem Type   Password
      1      PSA3178           1              1
      2      PSVAXVMS          0              4           —       _____
      3      PSPARTS           0              4           —       _____
      4      _____        —              —           —       _____
      5      _____        —              —           —       _____
      6      _____        —              —           —       _____
      7      _____        —              —           —       _____
      8      _____        —              —           —       _____
      9      _____        —              —           —       _____
     10      _____        —              —           —       _____
     11      _____        —              —           —       _____
     12      _____        —              —           —       _____
     13      _____        —              —           —       _____
     14      _____        —              —           —       _____
     15      _____        —              —           —       _____
     16      _____        —              —           —       _____
```

AEA Port to Port Set Map Worksheet

On the worksheet shown below, we have assigned ports to a port set by writing the number of the port set (1, 2, or 3) on the line corresponding to the port number that is to be in a particular port set. We have filled in:

- 1 for those ports in PSA3178

  Terminal Adapter ports 0 – 7 and 8 – 14 are mapped to port set PSA3178.

- 2 for those ports in PSVAXVMS

  AEA ports 0 – 4 are mapped to port set PSVAXVMS.

- 3 for those ports in PSPARTS

  AEA ports 6 and 7 are mapped to port set PSPARTS.

```
_____ AEA Port to Port Set Map _____


        3270 Ports              0     1     2     3     4     5     6     7

          26-00 to 26-07        1     1     1     1     1     1     1     1
          26-08 to 26-15        1     1     1     1     1     1     1     __
          26-16 to 26-23       __    __    __    __    __    __    __    __
          26-24 to 26-31       __    __    __    __    __    __    __    __


          27-00 to 27-07       __    __    __    __    __    __    __    __
          27-08 to 27-15       __    __    __    __    __    __    __    __
          27-16 to 27-23       __    __    __    __    __    __    __    __
          27-24 to 27-31       __    __    __    __    __    __    __    __

        AEA Ports               0     1     2     3     4     5     6     7

          21-00 to 21-07        2     2     2     2     2    __     3     3

          22-00 to 22-07       __    __    __    __    __    __    __    __

          23-00 to 23-07       __    __    __    __    __    __    __    __
```

AEA Station Set Worksheets

Referring to the 3174 Attachment Diagrams, we see that we have four station sets: VM SYS 2, VAX VMS, PARTS, and 3178 TERMS. An AEA station set worksheet has been filled out for each station set (Figures B-3 through B-6).

VM SYS 2: The IBM host must be assigned to a station set. In Figure B-3, we have filled in the worksheet number (1) in the upper left corner of the worksheet, and have written in responses to the following configuration questions:

721 Station set name. We have specified **VM SYS 2** as the name of the IBM host station set; it will appear in the Connection Menu.

722 Station type. We have specified **3H** as the IBM (3270) host station type.

Figure B-3. AEA Station Set Worksheet—VM SYS 2

VAX VMS: This is a DEC application that represents a unique destination. In Figure B-4 we have filled in the worksheet number (2) in the upper left corner of the worksheet, and have written in responses to the following configuration questions:

721 Station set name. We have specified **VAX VMS** as the name for this station set; it will appear in the Connection Menu.

722 Station type. We have specified **AH** for the ASCII host station type.

723 Port set name. We have specified **PSVAXVMS** as the port set associated with station set VAX VMS.

733 Line speed. We have specified **6** to indicate a line speed of 9600 bps.

735 Parity. We have specified **1** to indicate that odd parity will be used.

742 Idle time-out. We have increased the idle time-out (default = 15 minutes) to **30** minutes because port availability will not be a problem.

751 Data stream supported by the ASCII host. We have specified **1** to indicate that the ASCII host supports VT100 data stream.

764 Margin bell. We have specified **0** because margin bell is not useful with the applications that will be used.

Figure B-4. AEA Station Set Worksheet—VAX VMS

PARTS: This is another DEC application that represents a unique destination. In Figure B-5, we have filled in the worksheet number (3) in the upper left corner of the worksheet and have written in responses to the following configuration questions:

721 Station set name. We have specified **PARTS** as the name of the station set; this name will appear in the Connection Menu.

722 Station type. We have specified **AH** for the ASCII host station type.

723 Port set name. We have specified **PSPARTS** as the port set associated with station set PARTS.

733 Line speed. We have specified **6** to indicate a line speed of 9600 bps.

735 Parity. We have specified **1** to indicate that odd parity will be used.

742 Idle time-out. We have increased the idle time-out to **30** minutes to allow users more time to do other things.

751 Data stream supported by the ASCII host. We have specified **1** to indicate that the ASCII host supports VT100 data stream.

762 Wraparound option. We have specified a **0** because wraparound is not a useful function when using the PARTS application.

Figure   B-5. AEA Station Set Worksheet—PARTS

B-14

3178 TERMS: This station set consists of those 3178 terminals with access to DEC applications. In Figure B-6, we have filled in the worksheet number (4) in the upper left corner of the worksheet and have written in responses to the following configuration questions:

721 Station set name. We have specified **3178 TERMS** as the name of the station set.

722 Station type. We have specified **3D** for the 3270 display station type.

723 Port set name. We have specified **PSA3178** as the port set associated with station set 3178 TERMS.

Figure B-6. AEA Station Set Worksheet—3178 TERMS

AEA Default Destination Worksheet

On this worksheet, we have specified the IBM host, VM SYS 2, as AEA station set number 1; we have filled in the other station set names in the order that we had defined them on the AEA Station Set worksheets. In addition, we have added a **1** at the intersection of LT1 (logical terminal 1) and 3178 TERMS to indicate that when stations in station set 3178 TERMS are turned on, they will be connected to AEA Station Set Number 1, VM SYS 2.

```
_____AEA Default Destination_____


Station        Station Set      Session                    Session
Set               Name           Limit     LT1   LT2   LT3   LT4   LT5

 1            VM SYS 2           ___       ___   ___   ___   ___   ___
 2            VAX VMS            ___       ___   ___   ___   ___   ___
 3            PARTS              ___       ___   ___   ___   ___   ___
 4            3178 TERMS          1         1    ___   ___   ___   ___
 5            _____        ___       ___   ___   ___   ___   ___
 6            _____        ___       ___   ___   ___   ___   ___
 7            _____        ___       ___   ___   ___   ___   ___
 8            _____        ___       ___   ___   ___   ___   ___
 9            _____        ___       ___   ___   ___   ___   ___
10            _____        ___       ___   ___   ___   ___   ___
11            _____        ___       ___   ___   ___   ___   ___
12            _____        ___       ___   ___   ___   ___   ___
13            _____        ___       ___   ___   ___   ___   ___
14            _____        ___       ___   ___   ___   ___   ___
15            _____        ___       ___   ___   ___   ___   ___
```

Figure   B-7.   AEA Default Destination Worksheet—ASCII Terminal Emulation

This is the end of the section describing filling in the worksheets. Refer to Chapter 14, "Planning for the Asynchronous Emulation Adapter," for more information.

3270 Terminal Emulation Planning Example

In this example, we will set up communication between remote ASCII terminals and a channel-attached IBM host.

System Description and Requirements

A large MVS/VTAM/TSO/IMS installation supports four hundred 3270 displays of various types on three mainframes. Night-time access is needed to two of the mainframes for 40 system programmers who have PCs with 5842 modems at home. Use of this service will be infrequent but intensive when needed. Twelve of the PCs use FTTERM and have color monitors, and attached printers. A VT100 emulator will be used with the other PCs.

What We Have to Do

- Design a configuration that uses the AEA feature to meet this requirement.

- Decide what connection mechanism to use, how many lines are needed, what controllers will be affected, and how many AEA features to install.

- Outline operational and security procedures.

- Complete Site Planning and Customization worksheets to implement your solution.

- Enter the data into customization panels.

- IML a customized controller and check out the system.

Specific Design Qualifications

1. To support the possibility that all 40 users may need IBM host access at the same time, we need to provide 40 AEA ports. Allowing for growth, we will need six AEAs.

2. ASCII traffic will be distributed across six controllers: three of the controllers are connected to one IBM host, and three are connected to the other IBM host. Therefore, each set of three controllers will support 20 ASCII users.

3. One AEA port is needed for each ASCII user. Therefore, for 40 users, seven ports per AEA will support the traffic. To provide room for system growth, we will configure eight AEA ports, but use only six or seven.

4. Switched communication is supported by IBM 5842 auto-call modems attached to the AEA ports.

5. IBM hosts are SNA hosts, so there are no host address limitations.

Hardware Requirements

- Six Asynchronous Emulation Adapters (one per controller)
- 40 cables
- 40 modems
- 40 telephone circuits.

3174 Attachment Diagrams

Once we have determined the number of ports needed, the modem types, and the method of connecting stations to the AEA ports, we can diagram the layout of the system and identify station sets and port sets. A system layout consists of a 3270 Attachment Diagram and an ASCII Attachment Diagram. However, because the 3270 terminals are not involved in this configuration, we need only to fill out an ASCII Attachment Diagram. These diagrams are a useful reference for both site planning and customization activities.

See Figure B-8 on page B-19 for a sample ASCII Attachment Diagram. We have filled in portions of this diagram; these portions are printed in **bold italic**. The diagram has been filled in by (1) identifying the stations and station sets, (2) identifying the ports and port sets, and then (3) indicating the assignment of station sets to port sets.

ASCII Attachment Diagram

For the ASCII Attachment Diagram, we have:

1. Written in the name of the available host, MVS SYS A. The host is already numbered as Station Set 1.

2. Written in the ASCII station types: FC and V1. FC is the station type for the group of FTTERM PC terminals, and V1 is the station type for the group of PC's running VT100 terminal emulators.

3. Written in the Default Destination: 1 = MVS SYS A.

4. Added brackets around those stations of the same type and default destination, and assigned these stations the Station Set names PC FTTERM COLOR and PC VT100.

5. Written in the Port Type (2) and Modem Type (3) for AEA ports 21-00 through 21-07; the arrows indicate the repetition of the previous Port or Modem Type.

6. Added a bracket around this group of AEA ports with the same Port Type, Modem Type, and Default Destination and assigned it the Port Set name, DIALINT.

7. Drawn a switched-line, phone network symbol, and added arrows to show that Station Sets PC FTTERM COLOR and PC VT00 are served by the switched ports of Port Set, DIALINT.

Hardware Setup

Listed are the major tasks required for hardware setup:

1. Install one AEA in each of six controllers (C1 through C6). Follow the setup and checkout procedures in the setup instructions provided with the AEA feature.

2. Set up and check out cables, modems, and telephone connections.

ASCII Attachment Diagram

	Station Set Name	**1**	Station Set Number
IBM Host	= *MVS SYS A*		= 1
ASCII Host	=		=
ASCII Host	=		=
ASCII Host	=		=
ASCII Host	=		=
ASCII Host	=		=
ASCII Host	=		=
ASCII Host	=		=
ASCII Host	=		=

Switched = 2 Direct = 3 Non-switched = 4	Hayes = 1 Micom = 2 IBM = 3 Other = 4				See Station Type Table below

Port Type	Modem Type	Port Set Name	Station Set Name	Default Destination	Station Type

AEA HG-21

	5			**4**	**3**	**2**
21-00	2	3				
21-01				PC FTTERM COLOR	1	FC
21-02						
21-03			DIALINT ▶ ─Phone─			
21-04			─Network─			
21-05			**6**		1	V1
21-06			**7**	PC VT100		
21-07						

AEA HG-22

| 22-00 |
| 22-01 |
| 22-02 |
| 22-03 |
| 22-04 |
| 22-05 |
| 22-06 |
| 22-07 |

AEA HG-23

| 23-00 |
| 23-01 |
| 23-02 |
| 23-03 |
| 23-04 |
| 23-05 |
| 23-06 |
| 23-07 |

Station Type Table

ASCII Host	= AH	FTTERM (Monochrome)	= FM	Lear Siegler 1178	= L7	Televideo 912 = T1
ASCII Plotter	= AL	Hewlett Packard 2621 B	= H2	IBM 3162 Model 870	= R0	Televideo 970 = T7
ASCII Printer	= AP	IBM 3101	= I1	ROLM Cypress,Cedar,Juniper = R1		DEC VT100 = V1
ADDS Viewpoint A-1,A-2 = A2		IBM 3151, 3161, 3162, 3163	= I2	ANSI 3.64 Terminal	= S1	DEC VT241 = V2
ADDS Viewpoint 78	= A7	IBM 3151,3161,3162,3163	= I3	UDT5	= U5	DEC VT52 = V5
Esprit Hazeltine 1500	= E1	IBM 3164	= I4	UDT6	= U6	DEC VT220 = V6
Esprit Executive 78	= E7	Lear Siegler ADM 11/12	= L1			Tektronix 4205 = X4
FTTERM (Color)	= FC	Lear Siegler ADM 3A/5	= L3			WYSE 50/60 = W1
UDT1	= U1	UDT3	= U3			Minitel 1 B = M1
UDT2	= U2	UDT4	= U4			

Figure   B-8. 3270 Terminal Emulation—ASCII Attachment Diagram

Customization Requirements

The AEA customization worksheets for C1 are shown below. The customization for C2 through C6 is identical to that for C1.

Using the ASCII Attachment Diagram, we have filled out the following worksheets:

- AEA Configuration
- AEA Port Set
- AEA Port to Port Set Map
- AEA Station Set
- AEA Default Destination.

When a default response for a configuration question did not meet the requirements of our network, an alternate response was written on the worksheet. Use of the default response was indicated by circling it.

Notes:

1. Most defaults were chosen to simplify the examples; they do not imply a recommendation.

2. An ASCII terminal emulating a 3270 terminal requires a 3270 host address. Therefore, the Port Assignment Worksheet must also be filled out. For attached printer support each port must be assigned two host addresses and the controller must be configured for Multiple Logical Terminals (MLT) support. Refer to Chapter 7 for information on the Port Assignment Worksheet.

For detailed information on how to fill out the worksheets, refer to Chapter 14, "Planning for the Asynchronous Emulation Adapter."

AEA Configure Worksheet

On the following worksheet, we have filled in question 700 with a **1**.

AEA Port Set Worksheet

Shown below is a Port Set name. This Port Set name is arbitrary, but must consist of no more than 8 characters (including blanks). The ASCII Attachment Diagram indicates that we have one port set which is named DIALINT.

DIALINT: Is the port set for the AEA ports used by remote ASCII terminals. Session limit is 1 (even though some devices may have an attached printer), Port Type is 2 (switched), and Modem Type is 3 (IBM). Note that DIALINT is port set 1.

```
_____        AEA Port Set       _____


        Name        Session Limit    Port Type    Modem Type      Password
  1  DIALINT             1               2             3          _____
  2  _____            —               —             —          _____
  3  _____            —               —             —          _____
  4  _____            —               —             —          _____
  5  _____            —               —             —          _____
  6  _____            —               —             —          _____
  7  _____            —               —             —          _____
  8  _____            —               —             —          _____
  9  _____            —               —             —          _____
 10  _____            —               —             —          _____
 11  _____            —               —             —          _____
 12  _____            —               —             —          _____
 13  _____            —               —             —          _____
 14  _____            —               —             —          _____
 15  _____            —               —             —          _____
 16  _____            —               —             —          _____
```

AEA Port to Port Set Map Worksheet

On the worksheet shown below, we have assigned ports to a port set by writing the number of the port set (1) on the line corresponding to the port number that is in the particular port set. We have filled in 1 for ports 0-7 in Port Set DIALINT.

```
_____ AEA Port to Port Set Map _____


        3270 Ports              0    1    2    3    4    5    6    7

            26-00 to 26-07      —    —    —    —    —    —    —    —
            26-08 to 26-15      —    —    —    —    —    —    —    —
            26-16 to 26-23      —    —    —    —    —    —    —    —
            26-24 to 26-31      —    —    —    —    —    —    —    —


            27-00 to 27-07      —    —    —    —    —    —    —    —
            27-08 to 27-15      —    —    —    —    —    —    —    —
            27-16 to 27-23      —    —    —    —    —    —    —    —
            27-24 to 27-31      —    —    —    —    —    —    —    —

        AEA Ports               0    1    2    3    4    5    6    7

            21-00 to 21-07      1    1    1    1    1    1    1    1

            22-00 to 22-07      —    —    —    —    —    —    —    —

            23-00 to 23-07      —    —    —    —    —    —    —    —
```

AEA Station Set Worksheets

Referring to the 3174 ASCII Attachment Diagram, we see that we have three station sets: MVS SYS A, PC FTTERM COLOR, and PC VT100. An AEA Station Set Worksheet must be filled out for each station set (Figures B-9 through B-11).

MVS SYS A: The IBM host must be assigned to a Station Set. In Figure B-9 we have filled in the worksheet number (1) in the upper left corner of the worksheet and have written in responses to the following configuration questions:

721 Station set name. We have specified **MVS SYS A** as the name of the IBM host station set; it will appear in the Connection Menu.

722 Station type. We have specified **3H** as the IBM (3270) host station type.

Figure   B-9. AEA Station Set Worksheet—MVS SYSTEM A

PC FTTERM COLOR: This is the remote PC with a color monitor and attached printer running FTTERM that requires access to MVS SYS A. In Figure B-10, we have filled in the worksheet number (2) in the upper left corner of the worksheet and have written in responses to the following configuration questions:

Note: We have accepted the default values for questions 733 (line speed = autobaud) and 735 (parity = auto) because calls will be coming in at different speeds.

721 Station set name. We have specified **PC FTTERM COLOR** as the name of the station set.

722 Station type. We have specified **FC** as station type to indicate that these IBM PCs are using FTTERM with color displays.

723 Port set name. We have specified **DIALINT** as the port set associated with station set PC FTTERM COLOR.

737 Maximum modem line speed. We have specified a **4** to indicate a maximum modem line speed of 2400 bps (maximum speed supported by the IBM 5842).

742 Idle time-out. We have increased the idle time-out (default = 15 minutes) to **60** minutes because port availability will not be a problem; a separate port is provided for each user.

781 Attached printer prompt. We have responded to this question with a **1**, causing the user to be asked whether he has an attached printer.

DO YOU HAVE A PRINTER ATTACHED TO THIS TERMINAL?
(1 = YES, 0 = NO) = = = = = > _

The user's answer to this prompt will determine whether or not the AEA will manage the attached printer.

Figure   B-10. AEA Station Set Worksheet—PC FTTERM COLOR

PC VT100: These are the remote PCs running a DEC VT100 Emulation Program that require access to MVS SYS A. In Figure B-11 we have filled in the worksheet number (3) in the upper left corner of the worksheet, and have written in responses to the following configuration questions:

Note: Questions 733 and 735 are left at their default values. All display stations assigned to the same port set must have the same settings for line speed, parity, and stop bits.

721 Station set name. We have specified **PC VT100** as the name of the station set.

722 Station type. We have specified **V1** as station type to indicate that these are PCs running a VT100 Emulation Program.

723 Port set name. We have specified **DIALINT** as the port set associated with station set PC VT100.

737 Maximum modem line speed. We have specified a **4** to indicate a maximum modem line speed of 2400 bps (maximum speed for this station set), VT100.

742 Idle time-out. We have increased the idle time-out (default = 15 minutes) to **60** minutes because port availability will not be a problem; a separate port is provided for each user.

Figure   B-11. AEA Station Set Worksheet—PC VT100

AEA Default Destination Worksheet

On this worksheet, we have specified the IBM host, MVS SYS A, as AEA station set number 1. We have filled in the other station set names in the order that we defined them on the AEA Station Set worksheets. We have added a **1** at the intersections of LT1 and PC FTTERM COLOR and LT1 and PC VT100 to indicate that, when stations in these station sets dial in to the controller, they will be connected to the AEA station set number 1, MVS SYS A.

```
                         _____ AEA Default Destination _____


          Station      Station Set      Session                  Session
          Set            Name            Limit       LT1   LT2   LT3   LT4   LT5

            1         MVS SYS A          ___         ___   ___   ___   ___   ___
            2         PC FTTERM COLOR     1           1    ___   ___   ___   ___
            3         PC VT100            1           1    ___   ___   ___   ___
            4         _____      ___         ___   ___   ___   ___   ___
            5         _____      ___         ___   ___   ___   ___   ___
            6         _____      ___         ___   ___   ___   ___   ___
            7         _____      ___         ___   ___   ___   ___   ___
            8         _____      ___         ___   ___   ___   ___   ___
            9         _____      ___         ___   ___   ___   ___   ___
           10         _____      ___         ___   ___   ___   ___   ___
           11         _____      ___         ___   ___   ___   ___   ___
           12         _____      ___         ___   ___   ___   ___   ___
           13         _____      ___         ___   ___   ___   ___   ___
           14         _____      ___         ___   ___   ___   ___   ___
           15         _____      ___         ___   ___   ___   ___   ___
                      _____      ___         ___   ___   ___   ___   ___
                      _____      ___         ___   ___   ___   ___   ___
```

Figure   B-12. AEA Default Destination Worksheet – 3270 Terminal Emulation

This is the end of the section describing filling in the worksheets. Refer to Chapter 14, "Planning for the Asynchronous Emulation Adapter," for more information.

3270 and ASCII Terminal Emulation Planning Example

System Description and Requirements

A VMPROFS system with channel-attached 3274s has a large number of another manufacturer's (OEM) protocol converters attached over BSC lines. 3270 terminals are attached to the 3274s; locally attached ASCII display stations emulating ADDS Viewpoint 78s and dial-in VT220 displays (emulating VT100s) are attached to the OEM protocol converters. Local non-SNA 3274s are to be replaced by 3174s. In so doing, some of the OEM protocol converters will be replaced by AEA features; only the VT220s will be connected to the AEAs. In addition, a number of inexpensive ASCII printers are needed to be used for local copy near some of the 3270 displays. Communication also needs to be set up between the 3270 terminals and a remote information service (INFOSERV). Finally, dial-out communication needs to be set up between the 3270 terminals and a remote ASCII host.

What We Have to Do

Design a representative controller configuration that addresses these requirements; complete only the 3174 Attachment Diagrams for one controller (C1).

Specific Design Qualifications

- Six controllers are required to distribute data traffic evenly.

- VT220s will be prompted for a password.

- Systems analysis shows that the information service and the VT220s can be supported by 12 switched AEA ports per controller; these ports will be used by 3270 terminals to dial out to the information service, or by remote VT220s to dial in to the IBM host. In addition, 12 AEA ports will be used for local ASCII printers.

Hardware Requirements

- Three AEA cards (provides 18 ports)

- Twelve auto-call modems (per controller) to support dialing out to the information service and dialing in from the VT220s

- Twelve limited-distance modem pairs per controller for ASCII printers

- Twenty-four cables per controller for LDMs and auto-call modems

- Twisted-pair wiring to each ASCII printer.

3174 Attachment Diagrams

Once we have determined the number of ports needed, the modem types, and the method of connecting stations to the AEA ports, we can diagram the layout of the system and identify station sets and port sets. A system layout consists of a 3270 Attachment Diagram and an ASCII Attachment Diagram. These diagrams are a useful reference for both site planning and customization activities.

See Figures B-13 and B-14 for sample attachment diagrams for C1. The diagrams have been filled in by (1) identifying the stations and station sets, (2) identifying the ports and port sets, and then (3) indicating the assignment of station sets to port sets.

3270 Attachment Diagram

For the 3270 Attachment Diagram, we have:

1. Written in the names of the available hosts (VMPROFS and INFOSERV), and numbered INFOSERV as station set 2.

2. Written in the 3270 station type (3D), and drawn an arrow down to Terminal Adapter port 27 to show that these ports are used by 3270 displays.

3. Written in the Default Destination (1 = VMPROFS). The arrows show that all 3270 displays have the same default destination.

4. Added a bracket around these stations of the same type and default destination configuration, and assigned to them the station set name 3270 TERMS.

5. Added brackets around the ports to which the 3270 display stations are connected, and assigned these ports the port set name PS3270.

6. Added an arrow to show that the station set 3270 TERMS is served by port set PS3270.

Note: This example only shows terminals attached to HG 26.

3270 Attachment Diagram

	Station Set Name	Station Set Number
IBM Host	= **VMPROFS**	= 1
ASCII Host	= **INFOSERV**	= 2
ASCII Host	=	=
ASCII Host	=	=
ASCII Host	=	=
ASCII Host	=	=
ASCII Host	=	=
ASCII Host	=	=
ASCII Host	=	=

1

Note:
For 3270 Stations
Port Type = Coax = 1

3270
Display = 3D
Printer = 3P

Terminal Adapter HG-26	Port Set Name	Station Set Name	Default Destinations					Station Type
			LT1	LT2	LT3	LT4	LT5	
26-00			**3** *1*					**2** *3D*
26-01								
26-02								
26-03								
26-04								
26-05								
26-06								
26-07								
26-08								
26-09								
26-10								
26-11								
26-12	**5**	**4**						
26-13	**PS3270**	**3270 TERMS**						
26-14								
26-15	**6**							
26-16								
26-17								
26-18								
26-19								
26-20								
26-21								
26-22								
26-23								
26-24								
26-25								
26-26								
26-27								
26-28								
26-29								
26-30								
26-31								

Figure   B-13. 3270/ASCII Terminal Emulation – 3270 Attachment Diagram

ASCII Attachment Diagram

For the ASCII Attachment Diagram, we have:

1. Written in the names of the available hosts (VMPROFS and INFOSERV), and numbered INFOSERV as station set 2.

2. Written in the ASCII station types (AH, V1, and AP); V1 is the station type for the group of VT220 terminals, and AP is the station type for the 12 ASCII printers.

3. Written in the Default Destination (1 = VMPROFS); default destination does not apply (NA) to an AH.

4. Added brackets around those stations of the same type and default destination, and assigned these stations the station set names INFOSERV, VT220, and LOCPRTR.

5. Written in the Port Type (2) and Modem Type (3) for AEA ports 21-00 through 22-03 (12 ports); the arrows indicate the repetition of the previous Port or Modem Type.

6. Written in the Port Type (4) and Modem Type (not applicable) for AEA ports 22-04 through 23-07 (12 ports); the arrows indicate the repetition of the previous Port or Modem Type.

7. Added a bracket around each group of AEA ports that have the same Port Type, Modem Type, and Default Destination and assigned each group a port set name: INFODIAL for ports 21-00—21-05, IBMDIAL for ports 21-06—22-03, and PRTR for ports 22-04—23-07.

8. Added arrows to show that the station sets INFOSERV and VT220 are serviced by the switched ports of port sets INFODIAL and IBMDIAL respectively.

9. Added an arrow to show that Station Set LOCPRTR is served by the nonswitched ports of port set PRTR.

ASCII Attachment Diagram

	Station Set Name	1	Station Set Number
IBM Host	= VMPROFS	=	1
ASCII Host	= INFOSERV	=	2
ASCII Host	=	=	
ASCII Host	=	=	
ASCII Host	=	=	
ASCII Host	=	=	
ASCII Host	=	=	
ASCII Host	=	=	
ASCII Host	=	=	

Switched	= 2	Hayes	= 1
Direct	= 3	Micom	= 2
Non-switched	= 4	IBM	= 3
		Other	= 4

See Station Type Table below

	Port Type	Modem Type	Port Set Name	Station Set Name	Default Destination	Station Type
	5			**4**	**3**	**2**
AEA HG-21	**2**	**3**				
21-00						
21-01						
21-02						
21-03			INFODIAL ◄──	INFOSERV	NA	AH
21-04						
21-05						
21-06						
21-07				**8**		
AEA HG-22						
22-00						
22-01			IBMDIAL ◄──	VT220	1	V1
22-02						
22-03	**6**					
22-04	**4**	**NA**	**7**			
22-05						
22-06						
22-07						
AEA HG-23				**9**		
23-00						
23-01			PRTR ◄──	LOCPRTR	1	AP
23-02						
23-03						
23-04						
23-05						
23-06						
23-07						

Station Type Table

ASCII Host	= AH	FTTERM (Monochrome)	= FM	Lear Siegler 1178	= L7	Televideo 912	= T1
ASCII Plotter	= AL	Hewlett Packard 2621 B	= H2	IBM 3162 Model 870	= R0	Televideo 970	= T7
ASCII Printer	= AP	IBM 3101	= I1	ROLM Cypress,Cedar,Juniper	= R1	DEC VT100	= V1
ADDS Viewpoint A-1,A-2	= A2	IBM 3151, 3161, 3162, 3163	= I2	ANSI 3.64 Terminal	= S1	DEC VT241	= V2
ADDS Viewpoint 78	= A7	IBM 3151,3161,3162,3163	= I3	UDT5	= U5	DEC VT52	= V5
Esprit Hazeltine 1500	= E1	IBM 3164	= I4	UDT6	= U6	DEC VT220	= V6
Esprit Executive 78	= E7	Lear Siegler ADM 11/12	= L1			Tektronix 4205	= X4
FTTERM (Color)	= FC	Lear Siegler ADM 3A/5	= L3			WYSE 50/60	= W1
UDT1	= U1	UDT3	= U3			Minitel 1 B	= M1
UDT2	= U2	UDT4	= U4				

Figure   B-14. 3270/ASCII Terminal Emulation – ASCII Attachment Diagram

Additional Customizing Requirements

To provide system security on the dial-in ports (VT220s only), a password could be specified on the AEA Configuration worksheet, question 701. Additionally, on the AEA Station Set worksheet, you could restrict the stations in the VT220 station set from using the Connection Menu; the VT220s would have access only to the IBM host.

When a default response for a configuration question on the AEA Station Set worksheet did not meet the requirements of our network, an alternate response was specified. Use of the default response was indicated by circling it.

Note: Most defaults were chosen to simplify the examples; they do not imply a recommendation.

To assign the ASCII printers to 3270 terminals, you will have to define the printer authorization matrix (PAM). Refer to Chapter 15, "Planning to Define Devices," for more information.

AEA Station Set Worksheet

INFOSERVE: The controller dialing out to a remote host requires access to a modem operating at 1200bps. In Figure B-15, we have filled in the worksheet number (1) in the upper left corner of the worksheet and have written in responses to the following configuration questions:

721 Station set name. We have specified **ASCII HOST** as the name of the station set.

722 Station type. We have specified **AH** as station type to indicate that this station can dial out to an ASCII host.

723 Port set name. We have specified **INFODIAL** as the port set associated with station set ASCII HOST.

733 Line speed. We have specified **3** to indicate a line speed of 1200 bps.

735 Parity. We have specified **4** to indicate that space parity will be used.

742 Idle time-out. We have specified **60** minutes for idle time-out because port availability will not be a problem; a separate port is required for each user.

751 Data stream support by the ASCII host. We have specified **1** to indicate that the ASCII host supports VT100 data stream.

752 ASCII host phone number. We have specified (as an example only) the phone number of the ASCII host. This number will be sent to an auto-call modem when a connection to this host is requested. This dial string can contain control characters the modem uses to perform certain operations (for example, "wait for second dial tone").

Figure B-15. AEA Station Set Worksheet—ASCII HOST

This is the end of the section describing filling in the worksheets. Refer to Chapter 14, "Planning for the Asynchronous Emulation Adapter," for more information.

Appendix C. Token-Ring Planning Examples

An Overview of the Token-Ring Planning Examples

In the following planning examples, we present sample computer environments with data communication requirements that are managed through a Token-Ring Network. The first planning example shows the configuration of a local gateway and three downstream 3174 Model 13Rs. The second planning example shows the configuration of a remote gateway.

In each example, we start with the overall description of the computer environment and provide a diagram of the network. Then, the completed planning worksheets for the controllers in the network are presented and explained.

Example 1 – Local Gateway and Downstream 3174 Model 13Rs

A sales organization on the east coast is housed in a two-story building. On the first floor, administrative personnel carry out the day-to-day duties of entering sales orders and administrative records using personal computers. On the second floor, the sales representatives require access to product, availability, and cost data.

In Figure C-1 on page C-4, we have a network that meets these needs. The network consists of:

- A host

- A 3174 Model 11L being used as the 3270 gateway controller

- A terminal attached to the 3270 gateway controller for running online tests

- A backbone ring on the second floor running at 16Mbps

- Three 3174 Model 13Rs attached to the backbone ring, each controlling twenty 3270 terminals

- A bridge connecting the two Token-Ring Networks

- A local ring on the first floor running at 4Mbps

- Fifteen IBM personal computers attached to the local ring.

Host

4000 3174 0010 08

Local
Gateway Controller (11L)

Terminal
(online tests)

3174 Controlling
3270 Terminals

Backbone Ring

4000 1234 0020 08

3174 Controlling
3270 Terminals (13R)

Bridge

3174 Controlling
3270 Terminals

Second Floor

Local Ring

Multiple
Personal Computers

Multiple
Personal Computers

Multiple
Personal Computers
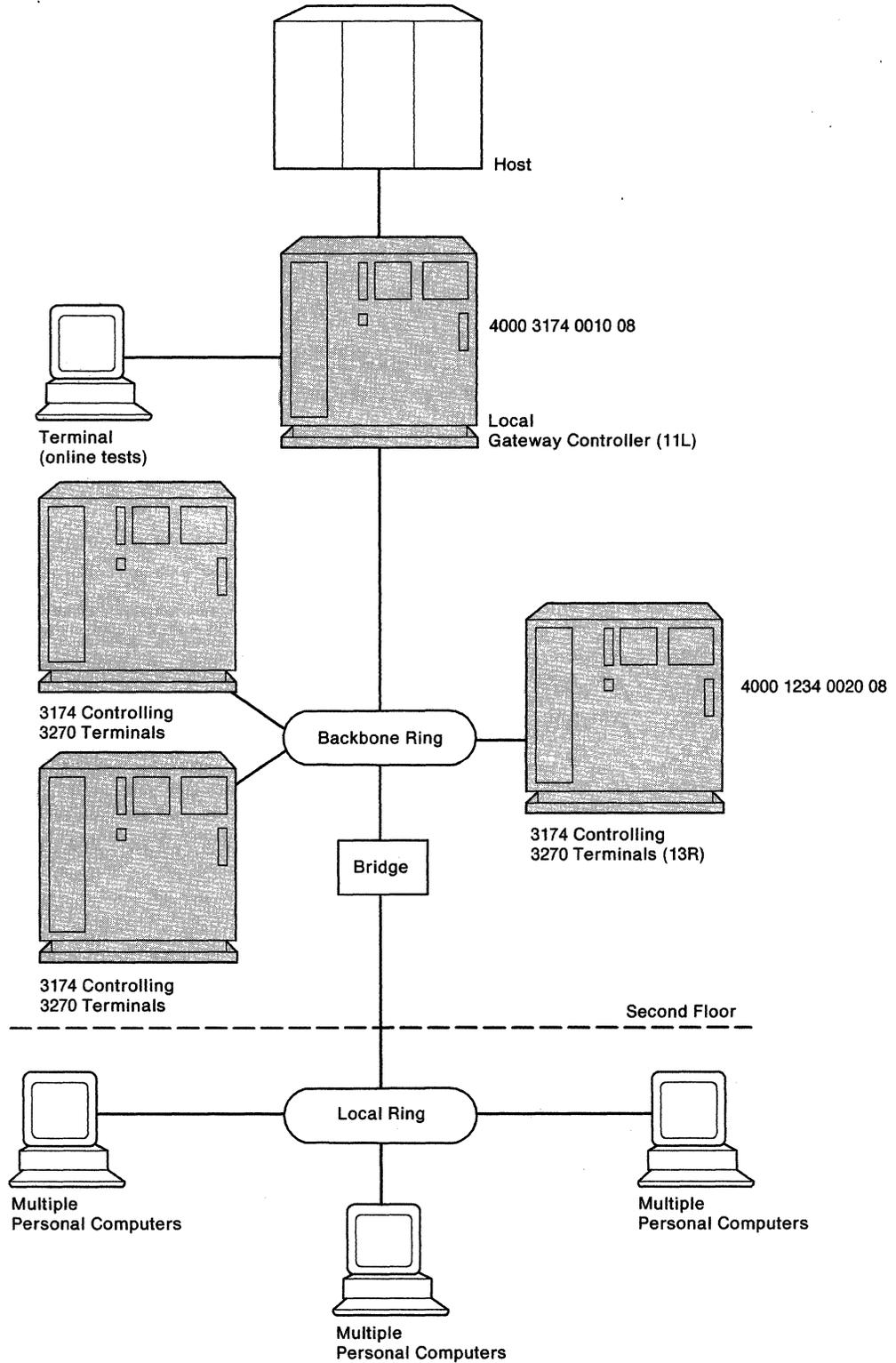
Figure   C-1. Token-Ring Network — Local Gateway and Downstream 3174 13Rs

Worksheets for the Local Gateway

To plan for the local gateway, we have responded to configuration questions on the following worksheets:

- "Worksheet 1—Host Attachment"
- "Worksheet 7—SNA (Channel)"
- "Worksheet 45—Common Network"
- "Worksheet 46—Ring Address Assignment"
- "Worksheet 47—Ring Transmission Definition"
- "Worksheet 14—Common SNA."

When a default response for a configuration question did not meet the requirements of our network, an alternate response was written on the worksheet. Use of the default response was indicated by circling it.

Note: Most defaults were chosen to simplify the examples; they do not imply a recommendation.

Host Attachment Worksheet — Local Gateway

On worksheet 1 (Figure C-2), we have written in responses to the following configuration questions:

098 Online Test Password. We have taken the default underscores.

099 Product assistance data. We have indicated that the **Systems Analysts** at telephone number **919-999-9999** should be contacted if there is a problem with the controller.

100 Model number. We have specified **11L**, the gateway's model number.

101 Host attachment. A response of **5** was given to indicate that local SNA is the protocol being used.

Chapter 6 contains additional information on the configuration questions that appear on this worksheet.

Figure   C-2. Worksheet 1 — Local Gateway

Local (SNA) Worksheet – Local Gateway

On worksheet 7 (Figure C-3), we have written in responses to the following configuration questions:

104   Controller address. We have assigned the lower I/O address X'**10**' to the gateway.

105   Upper limit address. We specified X'**2E**' as the highest I/O address that can be assigned to the Token-Ring-attached devices. The responses to questions 104 and 105 provide a range of 31 addresses, allowing for future expansion.

108   Unique machine identifier. We have written in the Gateway's serial number **1234567** as the identifier.

150   Gateway Controller. A **10** was specified to identify this controller as the Token-Ring Gateway.

215   Physical unit identification. We have specified **EB001** as the host's identifier for our Gateway.

220   Alert/CMIP Event Report Function A response of **2** has been given, allowing an operator to send alert messages from port 0.

222   Support of command retry. A response of **1** has been given to indicate that commands are retried when error conditions are detected.

225   Channel burst size. We have responded with **7** to indicate 512 bytes per burst.

Chapter 6 contains additional information on the configuration questions that appear on this worksheet.

Figure   C-3.   Worksheet 7 – Local Gateway

Common Network Worksheet — Local Gateway

On worksheet 45 (Figure C-4), we have written in responses to the following configuration questions:

900 Token-Ring Network address and SAP for the gateway. The locally administered address **4000 3174 0010** was assigned to the gateway. The SAP is **08**.

908 Link subsystem name. We have written in **GATE01**. The host will use this name to identify any alerts sent from the gateway.

911 Ring speed of the gateway. A response of **2** has been given to indicate that the backbone ring is running at 16Mbps with early token release.

Chapter 16 contains additional information on the questions that appear on this worksheet.
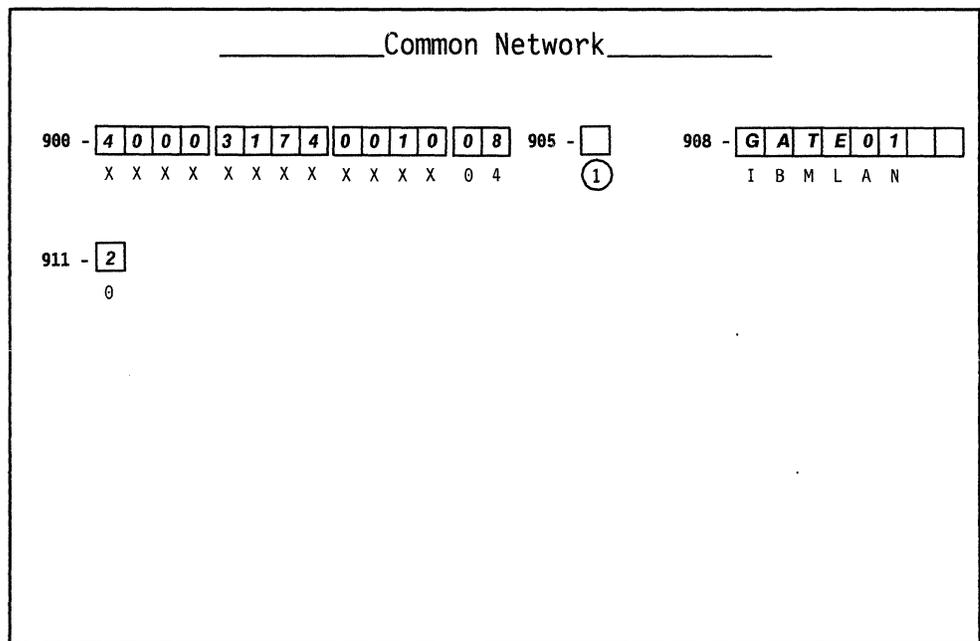
Figure   C-4. Worksheet 45 — Local Gateway

940: Ring Address Assignment Worksheet – Local Gateway

On worksheet 46 (Figure C-5), we have:

- Left the S columns blank. The range of I/O addresses defined in questions 104 and 105 will fill these columns automatically during customization.

- Left the first Ring entry blank. The response to question 900 (gateway address) will automatically fill this entry during customization.

  In the remaining Ring columns, we have entered the locally administered addresses of the attaching devices. To be consistent with the cursor movement on the customizer's screen, these addresses were entered from left to right. We chose to include the device types and I/O addresses in our addressing scheme.

- We entered 08 as the value for the SAP columns.

- In the T (type) columns, we circled the default (workstation) for each personal computer and wrote in a **1** (controller) for each 3174 13R.

Chapter 16 contains additional information pertaining to the columns on this worksheet.

Figure   C-5. Worksheet 46 – Local Gateway

941: Ring Transmission Definition Worksheet — Local Gateway

On worksheet 47 (Figure C-6), we have:

- Duplicated our Ring entries from the previous worksheet.
- Taken the 08 for the SAP columns.
- Made entries into the F (transmit I-frame size) columns:
  - For our personal computers, we have written a **0** (the default for workstations) to indicate 265-byte I-frame transmissions.
  - For our 3174 13Rs, we have written a **4** to indicate 4105-byte I-frame transmissions (these controllers have 16/4Mbps Token-Ring Adapters).
- Written responses in the W (maximum-out) columns. We have specified a **2** for all of the W entries to indicate the maximum number of transmissions allowed before an acknowledgment.

Chapter 16 contains additional information pertaining to the columns on this worksheet.

Figure C-6. Worksheet 47 — Local Gateway

Common SNA Worksheet – Local Gateway

On worksheet 14 (Figure C-7), we have circled the defaults for configuration questions 500, 501, 502, 510, 511, and 512. Although the Central Site Change Management (CSCM) function and APPN will not be used, we filled out this worksheet because it appears on the customizer's screen during the Configure procedure.

Chapter 11 contains information on the configuration questions that appear on this worksheet. The *Central Site Customizing User's Guide*, GA27-3868, contains information on CSCM.

Figure C-7. Worksheet 14 – Local Gateway

Worksheets for the 3174 13Rs

Although there are actually three 3174 Model 13Rs, the worksheets for only one are shown. Except for questions 106, 108, and 215, the worksheets for the other 3174 13Rs are identical.

To plan for the 3174 Model 13R, we have responded to configuration questions on the following worksheets:

- "Worksheet 1—Host Attachment"
- "Worksheet 9—Token-Ring Network"
- "Worksheet 14—Common SNA."

When a default response for a configuration question did not meet the requirements of our network, an alternate response was written on the worksheet. Use of the default response was indicated by circling it.

Note: Most defaults were chosen to simplify the examples; they do not imply a recommendation.

Host Attachment Worksheet – 3174 Model 13R

On worksheet 1 (Figure C-8), we have written in responses to the following configuration questions:

098 Online Test Password. We have taken the default underscores.
099 Product assistance data. We have indicated that the **Systems Analysts** at telephone number **919-999-9999** should be contacted if there is a problem with the controller.
100 Model number. We have specified **13R**, this controller's model number.
101 Host attachment. A response of **7** was given to indicate the Token-Ring Network.

Chapter 6 contains additional information on the configuration questions that appear on this worksheet.

Figure C-8. Worksheet 1 – 3174 Model 13R

Token-Ring Network Worksheet – 3174 Model 13R

On worksheet 9 (Figure C-9), we have written in responses to the following configuration questions:

106 Token-Ring Network address and service access point of the 3174. The locally administered address **4000 3174 0020** was assigned to this controller and a SAP of 08.

107 Token-Ring Network address and service access point of the gateway. We have written in the gateway's address, **4000 3174 0010** with a SAP of 08.

108 Unique machine identifier. We have written in this controller's serial number **2345678** as the identifier.

215 Physical unit identification. We have specified **EB002** as the host's identifier for this controller.

220 Alert/CMIP Event Report Function A response of **3** has been given, allowing operators to send alert messages from all ports.

382 Maximum receive I-frame size. We indicated the default of **0521** for the ring I-frame size.

384 Ring speed of the Token-Ring Network. We responded with a **2** to indicate a 16Mbps ring speed with early token release.

Chapter 6 contains additional information on the configuration questions that appear on this worksheet.

Figure C-9. Worksheet 9 – 3174 Model 13R

Common SNA Worksheet – 3174 Model 13R

On worksheet 14 (Figure C-10), we have circled the defaults for questions 500, 501, 502, 510, 511, and 512. Although the Central Site Change Management (CSCM) function and APPN will not be used, we filled out this worksheet because it appears on the customizer's screen during the Configure procedure.

Chapter 11 contains information on the configuration questions that appear on this worksheet. The *Central Site Customizing User's Guide*, GA27-3868, contains information on CSCM.

Figure   C-10. Worksheet 14 – 3174 Model 13R

Example 2 – Remote Gateway

A large insurance company needs to pass information and claims records between its headquarters and branch offices. To accomplish this, the branch offices require access to a host at headquarters.

This insurance company has chosen to concentrate its customizing expertise at the headquarters location. Therefore, Central Site Change Management (CSCM) is used throughout each of the networks.

The network consists of:

- A host

- A 3725 communications controller

- Two modems on both ends of the telecommunication link

- A 3174 Model 1R being used as the remote 3270 gateway controller. The gateway controller also supports several terminals

- A backbone ring running at 4Mbps

- Ten IBM personal computers attached to the backbone ring.

Host

3725

Modem

Modem

4000 3174 0001 04

Remote
Gateway Controller

Backbone Ring

Multiple IBM
Personal Computers

Multiple IBM
Personal Computers
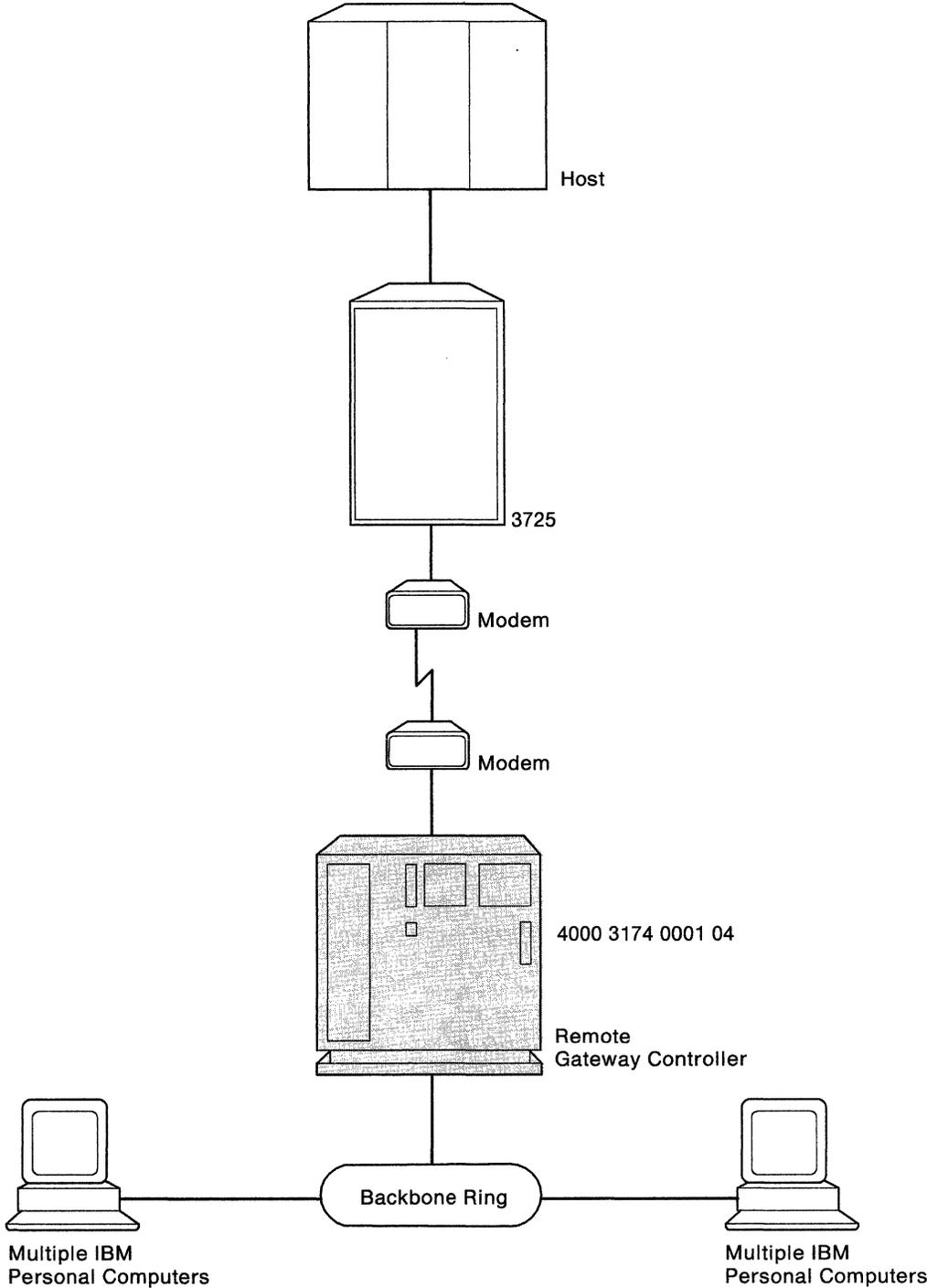
Figure   C-11. Token-Ring Network — Remote Gateway

Worksheets for the Remote Gateway

To plan for the remote gateway, we have responded to configuration questions on the following worksheets:

- "Worksheet 1—Host Attachment"
- "Worksheet 4—SDLC"
- "Worksheet 45—Common Network"
- "Worksheet 46—Ring Address Assignment"
- "Worksheet 47—Ring Transmission Definition"
- "Worksheet 14—Common SNA."

When a default response for a configuration question did not meet the requirements of our network, an alternate response was written on the worksheet. Use of the default response was indicated by circling it.

Note: Most defaults were chosen to simplify the examples; they do not imply a recommendation.

Host Attachment Worksheet – Remote Gateway

On worksheet 1 (Figure C-12), we have written in responses to the following configuration questions:

098 Online Test Password. We have taken the default underscores.
099 Product assistance data. We have indicated that the **Service Department** at **Headquarters** should be contacted if there is a problem with the controller.
100 Model number. We have specified **01R**, the gateway's model number.
101 Host attachment. A response of **2** was given to indicate that SDLC is the protocol being used.

Chapter 6 contains additional information on the configuration questions that appear on this worksheet.

```
                              _____MODEL/ATTACH_____

   098 - [ | | | | | | | ]
   099 - [C O N T A C T   T H E   S E R V I C E   D E P A R T M E N T   A T ]
         [H E A D Q U A R T E R S | | | | | | | | | | | | | | | | | | | | | ]

   100 - [0 1 R]
          X X X

   101 - [2]
          X
```

Figure   C-12. Worksheet 1 – Remote Gateway

SDLC Worksheet — Remote Gateway

On worksheet 4 (Figure C-13), we have written in responses to the following configuration questions:

104 Controller address. We have assigned the lower SDLC address X'**01**' to the gateway.

105 Upper limit address. We specified X'**14**' as the highest SDLC address that can be assigned to the Token-Ring-attached devices. The responses to questions 104 and 105 provide a range of 20 addresses, allowing for future expansion.

108 Unique machine identifier. We have written in the gateway's serial number **3456789** as the identifier.

150 Gateway Controller. A **10** was specified to identify this controller as the Token-Ring Gateway.

215 Physical unit identification. We have specified **EB005** as the host's identifier for our gateway.

220 Alert/CMIP Event Report Function A response of **2** has been given, allowing an operator to send alert messages from port 0.

340 RTS control response options. The gateway is communicating with the host through modems that are operating in duplex mode in their primary and secondary facilities. Therefore, **1** was specified to indicate use of permanent request-to-send (RTS).

Chapter 6 contains additional information on the configuration questions that appear on this worksheet.

Figure C-13. Worksheet 4 — Remote Gateway

Common Network Worksheet — Remote Gateway

On worksheet 45 (Figure C-14), we have written in responses to the following configuration questions:

900 Token-Ring Network address for the gateway. The locally administered address **4000 3174 0001** was assigned to the gateway. The default SAP was used.

908 Link subsystem name. We have written in **GATE02**. The host will use this name to identify any alerts sent from this gateway.

Chapter 16 contains additional information on the configuration questions that appear on this worksheet.

Figure   C-14. Worksheet 45 — Remote Gateway

940: Ring Address Assignment Worksheet — Remote Gateway

On worksheet 46 (Figure C-15), we have:

- Left the S columns blank. The range of I/O addresses defined in questions 104 and 105 will fill these columns automatically during customization.

- Left the first Ring entry blank. The response to question 900 (gateway address) will automatically fill this entry during customization.

  In the remaining Ring columns, we have entered the locally administered addresses of the attaching devices. To be consistent with the cursor movement on the customizer's screen, these addresses were entered from left to right. We chose to include the device types and I/O addresses in our addressing scheme.

- Circled the defaults for the SAP (service access point) columns.

- In the T (type) columns, we circled the default (workstation) for each IBM personal computer.

Chapter 16 contains additional information pertaining to the columns on this worksheet.

Figure C-15. Worksheet 46 — Remote Gateway

941: Ring Transmission Definition Worksheet — Remote Gateway

On worksheet 47 (Figure C-16), we have:

- Duplicated our Ring entries from the previous worksheet.

- Circled the defaults for the SAP (service access point) columns.

- Written **0s** (the default for workstations) into the F (transmit I-frame size) columns to indicate 265-byte I-frame transmissions.

- Written **2s** (the default for workstations) into the W (maximum-out) columns to indicate the maximum number of transmissions allowed before and an acknowledgment.

Chapter 16 contains additional information pertaining to the columns on this worksheet.

Figure   C-16. Worksheet 47 — Remote Gateway

Common SNA Worksheet — Remote Gateway

On worksheet 14 (Figure C-17), we have written in responses to the following configuration questions: (APPN is not active).

500 CSCM unique. A response of **1** was given to indicate that the remote Gateway is operating as a network site controller using CSCM.

501 Network ID. We have written in **NETCONTA** to identify the network that our controller is in.

502 Logical unit name. We have specified the name **S050600A** to identify our controller within the network.

Chapter 11 contains additional information on the configuration questions that appear on this worksheet. The *Central Site Customizing User's Guide*, GA27-3868, contains information on CSCM.

Figure C-17. Worksheet 14 — Remote Gateway

Appendix D. Examples of 3174 VTAM/NCP Definitions

This appendix contains VTAM and NCP definition examples for 3174 Establishment Controllers attached to an SDLC link, to an X.25 connection, to the Token-Ring Network, and examples for channel-attached SNA, non-SNA, and gateway definitions.

Channel Attached 3174 Definitions (SNA) — Dependent LUs

<u>PU DEFINITION</u>

LOCAL 3174 DEFINITIONS

```
LOCCOLOR VBUILD   TYPE=LOCAL
LOCAPU   PU      CUADDR=05E,ISTATUS=ACTIVE,PUTYPE=2,MAXBFRU=10,          *
                 MODETAB=MT327X

*        Dependent LUs

LOCCSCM  LU      LOCADDR=1,ENCR=NONE,DLOGMOD=BATCH,ISTATUS=ACTIVE,SSCPFM=FSS
LOC791   LU      LOCADDR=2,VPACING=4,DLOGMOD=T3279M3,USSTAB=US327X
LOC32872 LU      LOCADDR=3,VPACING=4,DLOGMOD=T3287M2C
LOC793   LU      LOCADDR=4,VPACING=4,DLOGMOD=T3279M2,USSTAB=US327X
LOC794   LU      LOCADDR=5,VPACING=4,DLOGMOD=T3279M2,USSTAB=US327X
LOC795   LU      LOCADDR=6,VPACING=4,DLOGMOD=T3279M4E,USSTAB=US327X
LOC32876 LU      LOCADDR=7,VPACING=4,DLOGMOD=T3287M2C,USSTAB=US327X
LOC32877 LU      LOCADDR=8,VPACING=4,DLOGMOD=T3287M2C
LOC798   LU      LOCADDR=9,VPACING=4,DLOGMOD=T3279M4,USSTAB=US327X
```

Notes:

1. LOCCSCM is a dependent LU 6.2 for CSCM.

2. The *ACF/VTAM Installation* manual, ST27-0439, describes how local SNA major nodes are defined.

Channel Attached 3174 Definitions (SNA) — APPN Type 2.1

PU DEFINITION

```
                              LOCAL 3174 DEFINITIONS
ACL701N  VBUILD   TYPE=LOCAL
C7010A   PU       CUADDR=701,DISCNT=NO,ISTATUS=ACTIVE,MAXBFRU=5,XID=YES,      *
                  MODETAB=SAMMODE,PACING=0,PUTYPE=2,SSCPFM=FSS,VPACING=0

*        Independent LUs for APPN Network

LS7011   LU     LOCADDR=0,ISTATUS=ACTIVE
LS7012   LU     LOCADDR=0,ISTATUS=ACTIVE
LS7013   LU     LOCADDR=0,ISTATUS=INACTIVE
LS7014   LU     LOCADDR=0,ISTATUS=INACTIVE
LS7015   LU     LOCADDR=0,ISTATUS=INACTIVE
LS7016   LU     LOCADDR=0,ISTATUS=INACTIVE
LS7017   LU     LOCADDR=0,ISTATUS=INACTIVE
LS7018   LU     LOCADDR=0,ISTATUS=INACTIVE
*        Dependent LUs for 3174
LS7019   LU     LOCADDR=2,VPACING=4,DLOGMOD=T3279M3,USSTAB=US327X
LS70110  LU     LOCADDR=3,VPACING=4,DLOGMOD=T3279M2C
LS70111  LU     LOCADDR=4,VPACING=4,DLOGMOD=T3279M2,USSTAB=US327X
LS70112  LU     LOCADDR=5,VPACING=4,DLOGMOD=T3279M2,USSTAB=US327X
LS70113  LU     LOCADDR=6,VPACING=4,DLOGMOD=T3279M4E,USSTAB=US327X
LS70114  LU     LOCADDR=7,VPACING=4,DLOGMOD=T3287M2C,USSTAB=US327X
LS70115  LU     LOCADDR=8,VPACING=4,DLOGMOD=T3287M2C
LS70116  LU     LOCADDR=9,VPACING=4,DLOGMOD=T3279M4,USSTAB=US327X
*        Independent LU for CSCM
LS70CSC  LU     LOCADDR=0,ISTATUS=ACTIVE,ENCR=NONE,DLOGMOD=BATCH,SSPFM=FSS
```

Notes:

1. If the 3174 controller is customized for the Wildcard option, independent LUs in the APPN network may be defined under that controller's PU statement.

2. LS70CSC is an independent LU 6.2 for CSCM. CSCM may also use a dependent LU, as shown in the first example.

Local 3174 Terminal Definition (Non-SNA)

```
                          LOCAL 3270 TERMINAL DEFINITION

          LBUILD
H11L420   LOCAL CUADDR=420,TERM=3277,                                        X
                MODETAB=AMODETAB,LOGAPPL=SAMON11,USSTAB=US3270,              X
                ISTATUS=ACTIVE,SPAN=(SPH111),DLOGMOD=M2BSCNQ
*               STATOPT=('3277 420 -SYS3')
H11L421   LOCAL CUADDR=421,TERM=3277,                                        X
                MODETAB=AMODETAB,LOGAPPL=SAMON11,USSTAB=US3270,              X
                ISTATUS=ACTIVE,SPAN=(SPH111),DLOGMOD=M2BSCNQ
*               STATOPT=('3277 420 -SYS3')
.
.
.

H11L42F   LOCAL CUADDR=42F,TERM=3286,FEATUR2=(MODEL2),                       X
                MODETAB=AMODETAB,ISTATUS=INACTIVE,                           X
                SPAN=(SPH11L)
*               STATOPT=('3286 42F -SYS3')
H11L430   LOCAL CUADDR=430,TERM=3277,                                        X
                MODETAB=AMODETAB,USSTAB=US3270,LOGAPPL=SAMON11,              X
                ISTATUS=ACTIVE,SPAN=(SPH11L),DLOGMOD=M3BSCQ
*               STATOPT=('3277 430 -SYS3')
H11L431   LOCAL CUADDR=431,TERM=3277,                                        X
                MODETAB=AMODETAB,USSTAB=US3270,LOGAPPL=SAMON11,              X
                ISTATUS=ACTIVE,SPAN=(SPH11L),DLOGMOD=M3BSCQ
*               STATOPT=('3277 431 -SYS3')
H11L436   LOCAL CUADDR=436,TERM=3277,                                        X
                MODETAB=AMODETAB,USSTAB=US3270,DLOGMOD=M3BSCNQ,              X
                ISTATUS=ACTIVE,SPAN=(SPH11L)
*               STATOPT=('3277 436 -SYS3')
H11L437   LOCAL CUADDR=437,TERM=3277,                                        X
                MODETAB=AMODETAB,USSTAB=US3270,DLOGMOD=M3BSCNQ,              X
                ISTATUS=ACTIVE,SPAN=(SPH11L)
*               STATOPT=('3277 437 -SYS3')
.
.
.
```

Note: The *ACF/VTAM Installation* manual, ST27-0439, describes the definition and filing of local terminals.

SDLC 3174 Definitions

Build Macro for NCP

BUILD	BUILD	ADDSESS=500,	Changed for T2.1	X
		AUXADDR=300,	Changed for T2.1	X
		BFRS=128,		X
		CA=TYPE5,		X
		CATRACE=NO,		X
		DELAY=0.2,		X
		DR3270=NO,		X
		LOADLIB=NCPLIB,		X
		MAXSESS=1000,	Changed for T2.1	X
		MAXSSCP=3,		X
		MAXSUBA=31,		X
		MODEL=3720,		X
		NAMTAB=300,		X
		NCPCA=ACTIVE,		X
		NUMHSAS=2,		X
		NETID=MVSXA1,		X
		NEWNAME=N53LB03,		X
		OLT=YES,		X
		QUALIFY=SYS1,		X
		SLODOWN=12,		X
		SUBAREA=4,		X
		TIMEOUT=840,		X
		TRANSFR=32,		X
		ENABLTO=150,		X
		TYPGEN=NCP,		X
		TYPSYS=OS,		X
		USGTIER=2,		X
		VERSION=V5R3,		X
		VRPOOL=12		

SDLC Group Specification for 3174

```
GSDL        (definition model)
```

	GROUP MACRO SPECIFICATIONS FOR SDLC LINES		
G13S1	GROUP LNCTL=SDLC,	SYNCHRONOUS DATA LINK	X
	DUPLEX=FULL,	REQUEST TO SEND ALWAYS UP	X
	NRZI=YES,		X
	REPLYTO=1,	1 SECOND FOR SDLC	X
	RETRIES=(7,4,5),	7 RETRIES PER SECOND FOR 5 TIMES	X
	TYPE=NCP	NCP ONLY	

Line Macro for SDLC 3174

LSD3174   (definition model)

SDLC 3174		
LINE MACRO SPECIFICATION	SDLC LINK 000 MODEM	
L13000 LINE ADDRESS=(000,FULL),	FULL DUPLEX	X
ATTACH=MODEM,	MODEM ATTACH	X
OWNER=M11,		X
ANS=CONTINUE,	DON'T BREAK CROSS DOMAIN SESSIONS	X
CLOCKING=EXT,	MODEM ATTACHED	X
NRZI=YES,		X
ISTATUS=ACTIVE,		X
DUPLEX=FULL,	REQUEST TO SEND ALWAYS UP	X
ETRATIO=30,	DEFAULT	X
MAXPU=1,	ALLOW NO MORE THAN 1 PU ON LINE	X
SERVLIM=10,		X
SRT=(,64),		X
SPEED=9600,		X
STATOPT='3174 LINE'		

Note: This example could also be used for a gateway controller, except that the MAXPU value would be greater than 1.

SDLC Service Macro Specifications Remote 3174

SERVICE   (definition model)

SERVICE MACRO SPECIFICATION FOR SDLC (LINE 000)	
SERVICE ORDER=(P13000A),	X
MAXLIST=1	

3174 PU/LU Specifications for PU Type 2.0
CBS3174   (definition model)

		PU/LU MACRO SPECIFICATION FOR SDLC (LINE 000)		
P13000A	PU	ADDR=C1,	CLUSTER ADDRESS = C1	X
		DATMODE=HALF,		X
		MAXDATA=265,	MAXIMUM AMOUNT OF DATA	X
		MAXLU=64,	MAXIMUM LUS ON THIS PU	X
		MAXOUT=7,	MAX SDLC FRAMES BEFORE RESPONSE	X
		PACING=0	PACING SET BY BIND IMAGE	X
		PASSLIM=8,		X
		PUDR=YES,		X
		PUTYPE=2,		X
		RETRIES=(7,4,5),	7 RETRIES PER SECOND FOR 5 TIMES	X
		DISCNT=(NO),	(V) VTAM	X
		ISTATUS=ACTIVE,	(V) VTAM	X
		VPACING=0	(V) VTAM	
*				
T130CSCM	LU	LOCADDR=01,	DEPENDENT 6.2 LU FOR CSCM	X
		DLOGMOD=BATCH,	BATCH OR #BATCH REQUIRED	X
		ENCR=NONE,		X
		SSCPFM=FSS,		X
		ISTATUS=ACTIVE	(V) VTAM	
*				
T1300002	LU	LOCADDR=02,	3278	X
		MODETAB=AMODETAB,		X
		DLOGMOD=M2SDLCNQ,		X
		ISTATUS=ACTIVE	(V) VTAM	
*				
T1300003	LU	LOCADDR=03,	3278	X
		MODETAB=AMODETAB,		X
		DLOGMOD=M2SDLCNQ,		X
		ISTATUS=ACTIVE	(V) VTAM	
*				
T1300004	LU	LOCADDR=04,	3287	X
		MODETAB=AMODETAB,		X
		DLOGMOD=M3278SCS,		X
		ISTATUS=ACTIVE	(V) VTAM	
*				
T1300005	LU	LOCADDR=05,	3179G	X
		MODETAB=AMODETAB,		X
		DLOGMOD=M2SDLCNQ,		X
		ISTATUS=ACTIVE	(V) VTAM	
*				
T1300006	LU	LOCADDR=06	3270PC	X
		MODETAB=MTPSPC,		X
		DLOGMOD=PCMODE,		X
		ISTATUS=ACTIVE	(V) VTAM	
*				
T1300007	LU	LOCADDR=07	3270PC	X
		MODETAB=MTPSPC,		X
		DLOGMOD=PCMODE,		X
		ISTATUS=ACTIVE	(V) VTAM	
*				

3174 PU/LU Specifications for APPN Type 2.1
NCU521

```
                  PU/LU MACRO SPECIFICATION FOR SDLC (LINE 000)
P00101    PU   ADDR=01,MAXDATA=521,PUTYPE=2,                               X
               XID=YES                     INDICATES T2.1                  X
*      Independent LU
T0010103   LU   LOCADDR=0,RESSCB=5
T0010104   LU   LOCADDR=0,RESSCB=5
T0010105   LU   LOCADDR=0,RESSCB=5
T0010106   LU   LOCADDR=0,RESSCB=5
T0010107   LU   LOCADDR=0,RESSCB=5
T0010108   LU   LOCADDR=0,RESSCB=5
T0010109   LU   LOCADDR=0,RESSCB=5
T001010A   LU   LOCADDR=0,RESSCB=5
*      Independent LU for CSCM
*      BATCH or #BATCH Required
T0010CSCM  LU   LOCADDR=0,RESSCB=2,ENCR=NONE,SSCPFM=FSS,DLOGMOD=BATCH
*      Dependent LUs for 3174
T0010102   LU   LOCADDR=2,MODETAB=AMODETAB,DLOGMOD=M2SDLCNQ,ISTATUS=ACTIVE
T001010B   LU   LOCADDR=3,MODETAB=AMODETAB,DLOGMOD=M2SDLCNQ,ISTATUS=ACTIVE
T001010C   LU   LOCADDR=4,MODETAB=AMODETAB,DLOGMOD=M3278SCS,ISTATUS=ACTIVE
T001010D   LU   LOCADDR=5,MODETAB=AMODETAB,DLOGMOD=M2SDLCNQ,ISTATUS=ACTIVE
T001010E   LU   LOCADDR=6,MODETAB=MTPSPC,DLOGMOD=PCMODE,ISTATUS=ACTIVE
T001010F   LU   LOCADDR=7,MODETAB=AMODETAB,DLOGMOD=PCMODE,ISTATUS=ACTIVE
T0010110   LU   LOCADDR=8,MODETAB=AMODETAB,DLOGMOD=PCMODE,ISTATUS=ACTIVE
T0010111   LU   LOCADDR=9,MODETAB=AMODETAB,DLOGMOD=PCMODE,ISTATUS=ACTIVE
```

Specifications for a Gateway with Group Poll

Refer to "SDLC Group Specification for 3174" and "Line Macro for SDLC 3174" on page D-7 for information on group specification.

CBS3174   (definition model)

PU/LU MACRO SPECIFICATION FOR SDLC (LINE 000)			
P13000A PU	ADDR=C1,	CLUSTER ADDRESS = C1	X
	DATMODE=HALF,		X
	MAXDATA=265,	MAXIMUM AMOUNT OF DATA	X
	MAXLU=64,	MAXIMUM LUS ON THIS PU	X
	MAXOUT=7,	MAX SDLC FRAMES BEFORE RESPONSE	X
	PACING=0,	PACING SET BY BIND IMAGE	X
	PASSLIM=8,		X
	PUDR=YES,		X
	GP3174=C5,	GROUP POLL ADDRESS	X
	PUTYPE=2,		X
	RETRIES=(7,4,5),	7 RETRIES PER SECOND FOR 5 TIMES	X
	DISCNT=(NO),	(V) VTAM	X
	ISTATUS=ACTIVE,	(V) VTAM	X
	VPACING=0	(V) VTAM	
*			
T130CSCM LU	LOCADDR=01,	DEPENDENT 6.2 LU FOR CSCM	X
	DLOGMOD=BATCH,	BATCH OR #BATCH REQUIRED	X
	ENCR=NONE,		X
	SSCPFM=FSS,		X
	ISTATUS=ACTIVE	(V) VTAM	
*			
T1300002 LU	LOCADDR=02,	3278	X
	MODETAB=AMODETAB,		X
	DLOGMOD=M2SDLCNQ,		X
	ISTATUS=ACTIVE	(V) VTAM	
*			
T1300003 LU	LOCADDR=03,	3278	X
	MODETAB=AMODETAB,		X
	DLOGMOD=M2SDLCNQ,		X
	ISTATUS=ACTIVE	(V) VTAM	
*			
P14000A PU	ADDR=C2,	CLUSTER ADDRESS = C1	X
	DATMODE=HALF,		X
	MAXDATA=265,	MAXIMUM AMOUNT OF DATA	X
	MAXLU=64,	MAXIMUM LUS ON THIS PU	X
	MAXOUT=7,	MAX SDLC FRAMES BEFORE RESPONSE	X
	PACING=0	PACING SET BY BIND IMAGE	X
	PASSLIM=8,		X
	PUDR=YES,		X
	GP3174=C5,	GROUP POLL ADDRESS	X
	PUTYPE=2,		X
	RETRIES=(7,4,5),	7 RETRIES PER SECOND FOR 5 TIMES	X
	DISCNT=(NO),	(V) VTAM	X
	ISTATUS=ACTIVE,	(V) VTAM	X
	VPACING=0	(V) VTAM	
*			

```
T140CSCM LU   LOCADDR=01,          DEPENDENT 6.2 LU FOR CSCM      X
              DLOGMOD=BATCH,       BATCH OR #BATCH REQUIRED       X
              ENCR=NONE,                                          X
              SSCPFM=FSS,                                         X
              ISTATUS=ACTIVE       (V) VTAM
*




T1400002 LU   LOCADDR=02,          3278                           X
              MODETAB=AMODETAB,                                   X
              DLOGMOD=M2SDLCNQ,                                   X
              ISTATUS=ACTIVE       (V) VTAM
*
T1400003 LU   LOCADDR=03,          3278                           X
              MODETAB=AMODETAB,                                   X
              DLOGMOD=M2SDLCNQ,                                   X
              ISTATUS=ACTIVE       (V) VTAM
*
```

X.25 Definitions

VTAM and NPSI Release 4.2 definitions used in testing 3174 functions.

```
X.25 NPSI R 4.2 STAGE1 INPUT
*
THIS GENERATION IS FOR 1 MCH LINK.  FOR:
*
CPU TO 3174  PVC  AND SVC; WITH QLLC CONTROL FOR BOTH.
*
            X25BUILD - THIS MACRO DESCRIBES THE GENERATION PROCESS.
```

X25R41	X25BUILD IDNUMH=01,	ID FOR NON-SNA SWITCHED SUPPORT	C
	MAXPIU=4K,	MAXIMUM PIU LENGTH	C
	MCHCNT=1,	1 MCH LINK DEFINED	C
	MODEL=3725,	3725	C
	SNAP=NO,	SNAP FACILITY OFF	C
	SRCHI=X25BLK1,	STAGE 2 OUTPUT MEMBER NAME (1 = GENNO)	C
	SRCLO=X25TBL1,	STAGE 2 OUTPUT MEMBER NAME (1 - GENNO)	C
	SCRPRFX=X25,	STAGE 2 OUTPUT TABLES & BLOCKS PREFIX	C
	VERSION=V4,	NPSI RELEASE 4.2 ONLY	C
	TYPSYS=OS	MVS 3.8 WITH ACF/VTAM V3	

```
        X25 NET - DESCRIBES THE PPSN.
```

NETX25	X25NET DM=YES,	LAPB DM COMMAND	C
	NETTYP=1,	TYPE 1 TYMNET NETWORK	C
	CPHINDX=2,	2 ENTRIES IN VIRTUAL CIRCUIT TABLE	C
	OUHINDX=1	1 ENTRY IN THE OPTIONAL FACILITY TABLE	

```
        X25VCCPT - VIRTUAL CIRCUIT CONNECTION PARAMETERS TABLE.
```

	X25VCCPT INDEX=1,	TABLE ENTRY NUMBER	C
	MAXPKTL=128,	MAXIMUM PACKET LENGTH EXCL PACKET HDR	C
	INSLOW=(25,0),	FREE BUFFER PERCENTAGE	C
	VWINDOW=2	PACKET TRANSMIT/RECEIVE WINDOW SIZE	

```
        X25OUFTT - SVC USER FACILITIES AND CALL USER DATA TABLE.
```

	X25OUFT INDEX=1	TABLE ENTRY NUMBER

```
        X25MCH - DESCRIBE THE PHYSICAL MULTICHANNEL LINK.
                 DTE END 15
```

	X25MCH ADDRESS=15,	3725 FDX LINE ADDRESS	C
	FRMLGTH=259,	MAXIMUM FRAME LENGTH (+3 BYTE PKT HDR)	C
	LCGDEF=0(20),	LOGICAL CHAN GRP 0, UP TO CHAN 12	C
	MWINDOW=7,	LINK ACCESS FRAME WINDOW SIZE (HDLC)	C
	ANS=STOP,	AUTO NETWORK SHUTDOWN DECISION	C
	ENABLTO=3,	ENABLE TO 3 SECONDS	C
	DSABLTO=3,	DISABLE TO 3 SECONDS	C
	DBIT=NO,	DELIVERY CONFIRMATION BIT SUPPORTED	C
	GATE=NO,	GATE OR DATE FUNCTION SUPPORT	C
	SUBADDR=NO,	SUBADDRESING	C
	LCNO=NOTUSED,	LOGICAL CHANNEL 0 NOT USED	C
	LLCLIST=(LLC3),	SVC'S TYPES SUPPORTED	C
	NDRETRY=2,	NP/TP SEQUENCE EXECUTED	C
	NPRETRY=10,	I OR U FRAME TIMEOUT RECOVERY	C
	PAD=INTEG,	PAD FUNCTION SUPPORTED	C
	TRAN=ODD,	NO TRANSLATION IF NO PAD FUNCTION	C
	PKTMODL=8,	MODULO 8 PACKET NUMBERING	C
	STATION=DTE,	NETWORK CONNECTION	C
	SPEED=9600,	PHYSICAL LINK SPEED	C

```
            TDTIMER=2,         TIME (SECS) BETWEEN ND RETRANSMISSIONS C
            TPTIME=3.0         X25 T1 TIMER IN SECS
```

X25LCG - DESCRIBE THE LOGICAL CHANNEL GROUP.

```
      X25LCG LCGN=0            LOGICAL CHANNEL GROUP NUMBER
```

PU/LU MACRO SPECIFICATION FOR 3174 LOGICAL CHANNEL 4 (PVC)

```
XL15004  X25LINE LCN=1,                                                    C
             DSTNODE=BNN,                                                  C
             LLC=LLC3,                                                     C
             TYPE=P,                                                       C
             VCCINDX=1
*
XP15004  X25PU  PUTTYPE=2,     ATTACH TO AN X.25/SNA 3174                  C
             ADDR=C1,          STATION ADDRESS                            C
             MAXDATA=265,      DEPENDENT ON PU CONSTRAINTS                C
             PASSLIM=7,        MAXIMUM PIU SEGMENTS IN TRANSMISSION       C
             MAXOUT=7,         MAXIMUM SDLC FRAMES BEFORE LINK RESP       C
             ISTATUS=ACTIVE,   ACTIVATE AT INITIALIZATION                C
             SSCPFM=USSSCS,    LOGON FORMAT                              C
             MODETAB=MT3274C2, MODE TABLE REFERENCE FOR VTAM             C
             DLOGMOD=T3278M2,  MODE TABLE REFERENCE FOR VTAM             C
             USSTAB=US327X     USS TABLE REFERENCE FOR VTAM
*
XT1541   X25LU LOCADDR=2,      ADDRESS OF LU                             C
             ISTATUS=ACTIVE    ACTIVATE WITH PU
XT1542   X25LU LOCADDR=3,      ADDRESS OF LU                             C
             ISTATUS=INACTIVE  ACTIVATE WITH PU
```

X25VC - DESCRIBE RESERVE PVCS

```
      X25VC  LCN=(2,10),       LOGICAL CHANNELS WITHIN A GROUP           C
             TYPE=P,           V C TYPE - P=PERMANENT, S=SWITCHED        C
             VCCINDX=1,        INDEX IN CONNECTION PARAMETER TABLE       C
             LLC=LLC0          LOGICAL LINK CONTROL
```

X25VC - DESCRIBE THE SWITCHED VIRTUAL CIRCUITS

```
      X25VC  LCN=(11,20),      LOGICAL CHANNELS WITHIN A GROUP           C
             NCPGRP=X25S01B,   TO ASSOCIATE WITH VTAM PATH STMT          C
             TYPE=S,           V C TYPE - P=PERMANENT, S=SWITCHED        C
             VCCINDX=1,        INDEX IN CONNECTION PARAMETER TABLE       C
             CALL=INOUT,       INCOMING AND OUTGOING CALLS ACCEPTED      C
             OUFINDX=1         INDEX IN USER TABLE
```

X25END - NPSI GENERATION END, NAME MEMBERS FOR STAGE 2 OUTPUT.

```
      X25END INCPRFX=X25,      STAGE 2 OUTPUT MEMBERS PREFIX             C
             LSTUACB=YES,      NPSI SUPPLY LASTUACB MACRO                C
             NCPSTG1=X25NCP1,  STAGE 2 OUTPUT MEMBER NAME (1 = GENNO) C
             X25VTAM=YES,      VTAM ACCEPT ADDRESS=NONE & AUTO=YES       C
             INCHI=X25HJI1,    STAGE 2 OUTPUT MEMBER NAME (1 = GENNO) C
             INCL2HI=X25HII1,  STAGE 2 OUTPUT MEMBER NAME (1 = GENNO) C
             INCINIT=X25INI1,  STAGE 2 OUTPUT MEMBER NAME (1 = GENNO) C
             INCL2LO=X25LOI1,  STAGE 2 OUTPUT MEMBER NAME (1 = GENNO) C
             ORDINIT=X25IN01,  STAGE 2 OUTPUT MEMBER NAME (1 = GENNO) C
             ORDHI=X25HJ01,    STAGE 2 OUTPUT MEMBER NAME (1 = GENNO) C
             ORDL2HI=X25HI01,  STAGE 2 OUTPUT MEMBER NAME (1 = GENNO) C
             ORDL2LO=X25L1,    STAGE 2 OUTPUT MEMBER NAME (1 = GENNO) C
      END
```

In an ACF/VTAM switched major node:

```
X3174    VBUILD MAXGRP=5,                 REQUIRED                              X
                MAXNO=12,                 REQUIRED                              X
                TYPE=SWNET                REQUIRED
*
XP3174   PU     ADDR=C1,                                                        X
                IDBLK=017,                Same as 3274                          X
                IDNUM=A0076,              user defined                          X
                DISCONT=YES,                                                    X
                MAXDATA=265,                                                    X
                MAXOUT=7,                                                       X
                PASSLIM=7,                                                      X
                MODETAB=MT3274C2,                                               X
                MAXPATPH=6,                                                     X
                VPACING=0,                                                      X
                PUTYPE=2,                                                       X
                SSCPFM=USSSCS,                                                  X
                DLOGMOD=T3278M2,                                                X
                USSTAB=US327X
*
PAT3174  PATH   DIALNO=31060019833,       Host DTE address, LLC type 3          X
                GRPNM=X25S01B,            association to NCP/NPSI group          X
                GID=2,                                                          X
                PID=21
*
XT3174   LU     LOCADDR=2
XT3174A  LU     LOCADDR=3
```

Definitions for 3174 Token-Ring Network Models

The following sections describe how 3174 x3R models are defined at the host when using NCP/Token-Ring Interconnect (NTRI) instead of the 3174 gateway function.

VTAM Definitions for 3174 DSPUs

VTAM definitions used for a Switched Major Node for downstream 3174s.

```
*
            VTAM SWITCHED MAJOR NODE FOR NTRI WITH 3174
*

E13SW9   VBUILD MAXGRP=5,                REQUIRED                    X
                MAXNO=12,                REQUIRED                    X
                TYPE=SWNET               REQUIRED
**
E13PS09  PU     ADDR=13,                 COULD BE ANYTHING (NOT USED) X
                IDBLK=017,               3274/3174 BURNED IN         X
                IDNUM=A0001,             SEE CUSTOMIZATION # 215     X
                DISCNT=NO,                                           X
                XID=YES                                              X
                MAXOUT=1,                                            X
                MODETAB=AMODETAB,                                    X
                MAXPATH=2,                                           X
                VPACING=0,                                           X
                PUTYPE=2,                                            X
                SSCPFM=USSSCS,                                       X
                DLOGMOD=M2SDLCQ,                                     X
                USSTAB=US327X
**
E13D0901 PATH   DIALNO=0004400043301002, TO 3174 MODEL              X
                GRPNM=EG22L01,           LOGICAL GROUP OF TIC 1      X
                GID=1,                                               X
                PID=1
**
E13D0902 PATH   DIALNO=0004400033301004, TO PC WITH 3270 EMULATION  X
                GRPNM=EG22L02,           LOGICAL GROUP OF TIC 2      X
                GID=1,                                               X
                PID=2,                                               X
                USE=NO                   INITIALLY INACTIVE
**
E13L0902 LU     LOCADDR=2                FOR A DISPLAY
E13L0903 LU     LOCADDR=3                FOR A DISPLAY/PRINTER
E13L0904 LU     LOCADDR=4                FOR A DISPLAY/PRINTER

                  –
                  –
                  –
```

NCP Definitions for 3174 DSPU

G22XLLL	GROUP	LNCTL=SDLC,REPLYTO=1		

L22000	LINE	ADDRESS=(00,FULL),	LINE ADDRESS	X
		ATTACH=DIR3725,	INN LINK	X
		CLOCKING=EXT,	REQUIRED FOR DIRECT	X
		DUPLEX=FULL,	MODEM STRAPPING IS FULL	X
		MONLINK=YES,	MONITOR LINK FOR ACTPU	X
		NRZI=YES,		X
		PAUSE=0.1,		X
		SDLCST=(SDL22PRI,SDL22SEC),		X
		RETRIES=(7,3,5),		X
		SERVLIM=254,		X
		ISTATUS=ACTIVE	INITIAL STATUS	

PU MACRO SPECIFICATION FOR THE ADJACENT 3720 SA12

P22000	PU	MAXOUT=7,	MAX PIU'S SENT BEFORE RESP REQ	X
		PUTYPE=4,	PHYSICAL UNIT TYPE LOCAL 3720	X
		ISTATUS=ACTIVE,	INITIAL STATUS	X
		TGN=8,	TRANSMISSION GROUP 8	X
		ANS=CONTINUE	DON'T BREAK THE X-DOMAIN SESSIONS	

PHYSICAL GROUP FOR TIC 1

EG22P01	GROUP	ECLTYPE=PHYSICAL,	TIC DEFINITION	X
		PUDR=NO,		X
		STATOPT='NTRI TIC1'		
EL22017	LINE	ADDRESS=(17,FULL),	TIC ADDRESS	X
		PORTADD=0,	FIRST TIC	X
		LOCADD=400012201001,	LOCAL ADMIN. ADDRESS OF TIC	X
		RCVBUFC=4095,	NTRI RECEIVE BUFFER	X
		MAXTSL=1108	NTRI TRANSMIT DATA CAPACITY	
EP22017	PU	ADDR=01		
EU22017	LU	ISTATUS=INACTIVE,		X
		LOCADDR=0		

LOGICAL GROUP FOR TIC 1

EG22L01	GROUP	ECLTYPE=LOGICAL,	DEFINE TERMINALS IN THE RING	X
		AUTOGEN=20,	LOGICAL CONNECTIONS	X
		MAXLU=20,	NUMBER OF LOGICAL UNITS	X
		PHYPORT=0,	FIRST TIC	X
		CALL=INOUT,	DIAL IN / DIAL OUT POSSIBILITY	X
		DIAL=YES,		X
		LINEADD=YES,		X
		LINEAUT=YES,		X
		MAXPU=1,		X
		PUTYPE=2		

VSE/VTAM Definitions

The following is an example of a typical VSE/VTAM B-book for a local SNA major node containing a gateway and two DSPUs.

```
CATALOG SNA3174.B
SNA3174  VBUILD TYPE=LOCAL

SNAE40    PU    CUADDR=E40,MODETAB=MODE3290,             GATEWAY     X
                PUTYPE=2,ISTATUS=ACTIVE,MAXBFRU=1
VSE3L000  LU    LOCADDR=2,                                           X
                SSCPFM=USSSCS,USSTAB=USSTAB,PACING=1,VPACING=2,      X
                ISTATUS=ACTIVE,LOGAPPL=MWTC,DLOGMOD=GMOD3E
VSE3L001  LU    LOCADDR=3,                                           X
                SSCPFM=USSSCS,USSTAB=USSTAB,PACING=1,VPACING=2,      X
                ISTATUS=ACTIVE,LOGAPPL=MWTC,DLOGMOD=GMOD3E
          LU    ...
SNAE41    PU    CUADDR=E41,MODETAB=MODE3290,             DSPU 1      X
                PUTYPE=2,ISTATUS=ACTIVE,MAXBFRU=1
VSE3L100  LU    LOCADDR=2,                                           X
                SSCPFM=USSSCS,USSTAB=USSTAB,PACING=1,VPACING=2,      X
                ISTATUS=ACTIVE,LOGAPPL=MWTC,DLOGMOD=GMOD3E
VSE3L101  LU    LOCADDR=3,                                           X
                SSCPFM=USSSCS,USSTAB=USSTAB,PACING=1,VPACING=2,      X
                ISTATUS=ACTIVE,LOGAPPL=MWTC,DLOGMOD=GMOD3E
          LU    ...
SNAE42    PU    CUADDR=E42,MODETAB=MODE3290,             DSPU 2      X
                PUTYPE=2,ISTATUS=ACTIVE,MAXBFRU=1
VSE3L200  LU    LOCADDR=2,                                           X
                SSCPFM=USSSCS,USSTAB=USSTAB,PACING=1,VPACING=2,      X
                ISTATUS=ACTIVE,LOGAPPL=MWTC,DLOGMOD=GMOD3E
VSE3L201  LU    LOCADDR=3,                                           X
                SSCPFM=USSSCS,USSTAB=USSTAB,PACING=1,VPACING=2,      X
                ISTATUS=ACTIVE,LOGAPPL=MWTC,DLOGMOD=GMOD3E
          LU    ...
```

Appendix E. Examples of Using Service Access Points for Single Link Multi-Host Support

An Overview of the Service Access Point Examples

Service access points (SAPs) are used when the gateway supports access to multiple hosts. If you are using Single Link Multi-Host Support, you can access additional hosts through a single gateway (if supported) by specifying additional service access points (SAPs). Usage of the SAP depends on the capabilities of the gateways.

The following examples are provided to help you respond to the SAP portion of configuration questions "106: Token-Ring Network Address and Service Access Point of the 3174" and "107: Token-Ring Network Address and Service Access Point of the Gateway." Each example assumes that you are using Single Link Multi-Host Support to access additional hosts. Look at each example and use the ones that most closely resemble your network. Examples are provided for the following:

- A gateway that supports a single host connection

- A non-3174 gateway that supports multiple host connections

- A gateway that supports multiple host connections and SAPs

- A gateway that supports multiple host connections through the Model 12L ESCON Channel

- A combination of gateway capabilities.

When trying to understand SAPs, it may help to think of an apartment building. The building has one common street address and the apartments within the building are identified with unique numbers. These unique apartment numbers can be equated to SAPs.

Gateway Supports Single Host Connection

Figure E-1 shows the usage of SAPs in its simplest form. Each gateway supports only one host connection and SAP.
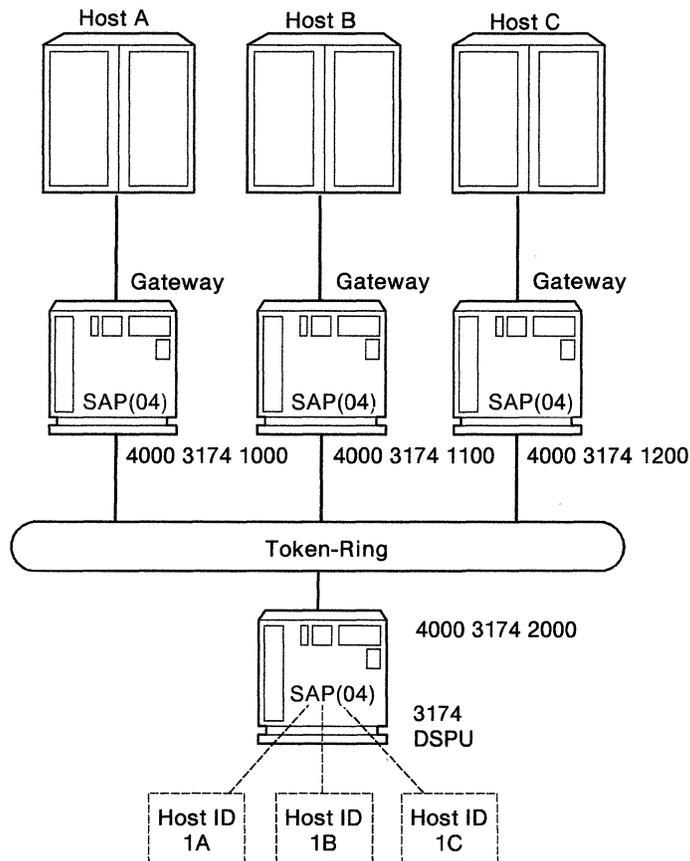
Figure E-1. One Gateway for Each Host Connection

The following table shows responses to configuration questions 106 and 107 for the network in Figure E-1. The **address portions** of these responses are used for example purposes only; they do not imply a recommendation.

| Host ID | 106: 3174 | | 107: Gateway | |
	Address	SAP	Address	SAP
1A	400031742000	04	400031741000	04
1B	400031742000	04	400031741100	04
1C	400031742000	04	400031741200	04

Non-3174 Gateway with Multiple Host Connections and SAPs

Figure E-2 shows attachment to multiple hosts through a non-3174 gateway that does not support SAPs.
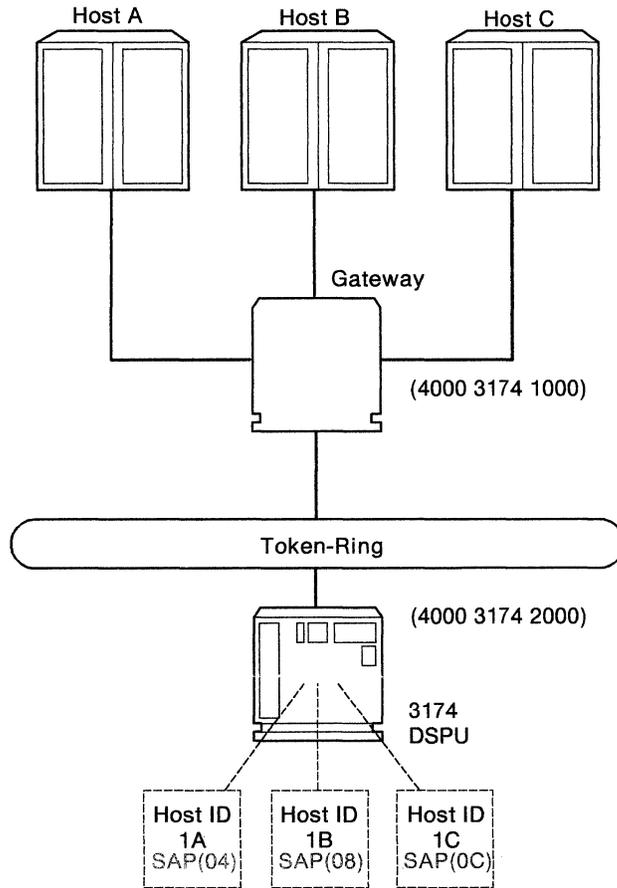
Figure   E-2. Attachment to Multiple Hosts through Non-3174 Gateway without SAPs

The following table shows responses to configuration questions 106 and 107 for the network in Figure E-1 on page E-4. The **address portions** of these responses are used for example purposes only; they do not imply a recommendation.

Host ID	106: 3174		107: Gateway	
	Address	**SAP**	**Address**	**SAP**
1A	400031742000	04	400031741000	04
1B	400031742000	08	400031741000	04
1C	400031742000	0C	400031741000	04

Gateway Supports Multiple Host Connection and SAPs

Figure E-3 shows attachment to multiple hosts through a gateway that supports three SAPs.
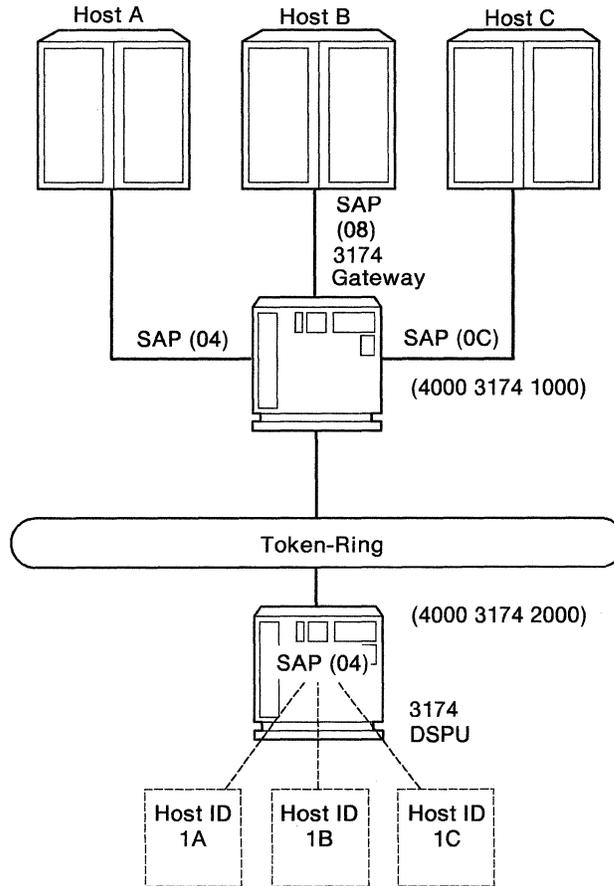
Figure   E-3. Gateway With Multiple Host Connection and SAPs

The following table shows responses to configuration questions 106 and 107 for the network in Figure E-3. The **address portions** of these responses are used for example purposes only; they do not imply a recommendation.

| Host ID | 106: 3174 | | 107: Gateway | |
	Address	SAP	Address	SAP
1A	400031742000	04	400031741000	04
1B	400031742000	04	400031741000	08
1C	400031742000	04	400031741000	0C

Gateway Supports Multiple Host Connection and SAPs with the ESCON Channel

The Model 12L supports multiple host connections and SAPs. Figure E-4 shows attachment to multiple hosts through the Model 12L and ESCON Channel Director.
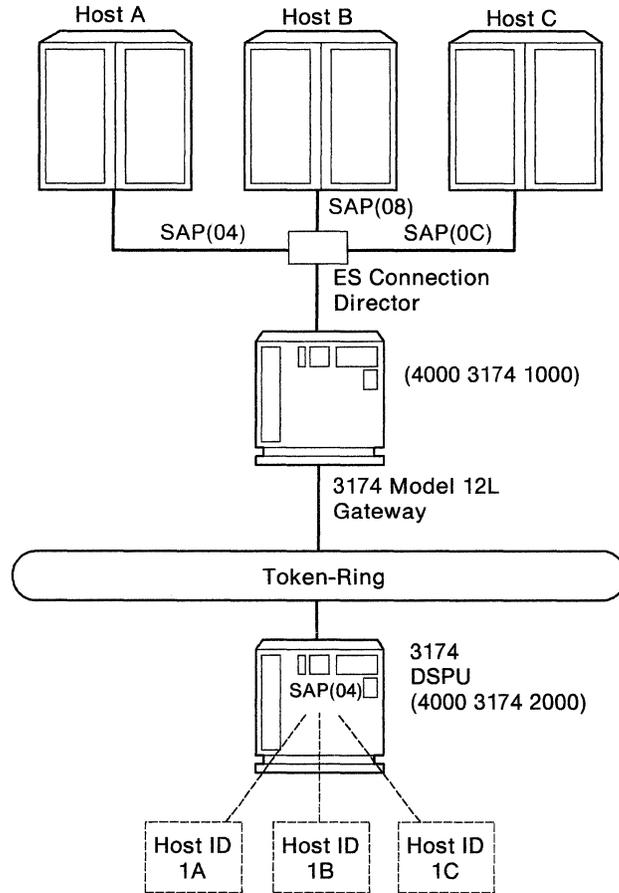
Figure   E-4. Gateway With Multiple Host Connection and Multiple SAPs

The following table shows responses to configuration questions 106 and 107 for the network in Figure E-4. The **address portions** of these responses are used for example purposes only; they do not imply a recommendation.

| Host ID | 106: 3174 | | 107: Gateway | |
	Address	SAP	Address	SAP
1A	400031742000	04	400031741000	04
1B	400031742000	04	400031741000	08
1C	400031742000	04	400031741000	0C

Combination of Gateway Capabilities

Figure E-5 shows the usage of SAPs in a network that consists of all three of the previous examples.
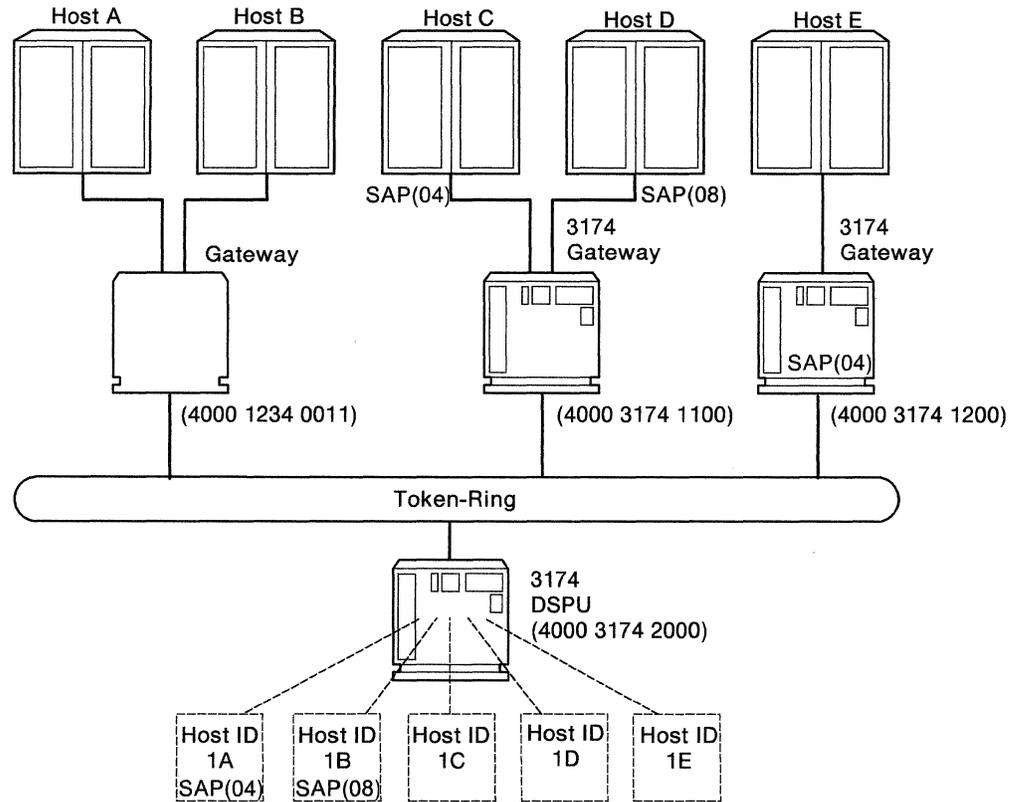
Figure   E-5. Combination of Gateway Capabilities

The following table shows responses to configuration questions 106 and 107 for the network in Figure E-5. The **address portions** of these responses are used for example purposes only; they do not imply a recommendation.

	106: 3174		107: Gateway	
Host ID	**Address**	**SAP**	**Address**	**SAP**
1A	400031742000	04	400012340011	04
1B	400031742000	08	400012340011	04
1C	400031742000	04	400031741100	04
1D	400031742000	04	400031741100	08
1E	400031742000	04	400031741200	04

Appendix F. IBM Default COS Tables

F-2

The following panels contain the values supplied by IBM for COS Definitions #BATCH, #BATCHSC, #INTER, #INTERSC and #CONNECT.

In addition to these five definitions, IBM supplies definitions for two more Classes of Service, CPSVCMG and SNASVCMG. The definitions for these are not displayable and are reserved for internal use only. These definitions currently have the same values as those provided for #CONNECT with the exception that they have a transmission priority of 'network' (not one of the options provided on COS Node Definition Panel). The mode names corresponding to these Classes of Service are the same as the Class of Service names.

#BATCH

```
_____COS Node Definition_____

COS Name = #BATCH__
Transmission Priority (1,2,3) = 3


                             1     2     3     4     5     6     7     8

Node Weight                 _5   _10   _20   _40   _60   _80   120   160
(0-255)


Route Addition     Min      _0    _0    _0    _0    _0    _0    _0    _0
Resistance         Max      _31   _63   _95   127   159   191   223   255
(0-255)

Congestion         Min       0     0     0     0     0     0     0     0
(0,1)              Max       0     0     0     0     0     0     1     1




PF:  3=Quit   4=Default            8=Fwd
```

Figure   F-1. IBM-Supplied Node Definition Defaults - #BATCH

```
_____COS Transmission Group Definition_____

COS Name = #BATCH__
                             1     2     3     4     5     6     7     8

TG Weight (0-255)           _30   _60   _90   120   150   180   210   240

Cost/Connect       Min      _0    _0    _0    _0    _0    _0    _0    _0
(0-255)            Max      _0    _0   128    _0   128   196   196   255

Cost/Byte          Min      _0    _0    _0    _0    _0    _0    _0    _0
(0-255)            Max      _0    _0   128    _0   128   196   196   255

User-Defined 1     Min      _0    _0    _0    _0    _0    _0    _0    _0
(0-255)            Max      255   255   255   255   255   255   255   255

User-Defined 2     Min      _0    _0    _0    _0    _0    _0    _0    _0
(0-255)            Max      255   255   255   255   255   255   255   255

User-Defined 3     Min      _0    _0    _0    _0    _0    _0    _0    _0
(0-255)            Max      255   255   255   255   255   255   255   255

PF:  3=Quit  4=Default  7=Back    8=Fwd
```

Figure   F-2. IBM-Supplied TG Definition Defaults - #BATCH

```
                        COS Transmission Group Definition Continued

     COS Name = #BATCH__
                             1     2     3     4     5     6     7     8

     Link Speed      Min    9     7     7     5     5     5     3     0
                     Max    13    13    13    13    13    13    13    13

     (0=MIN  1=1.2K  2=2.4K  3=4.8K  4=7.2K  5=9.6K  6=14.4K  7=19.2K  8=48K
      9=56K  10=64K  11=4M  12=16M  13=MAX)

     Security        Min    0     0     0     0     0     0     0     0
                     Max    6     6     6     6     6     6     6     6

     (0=NONSECURE 1=PUBSWTNET 2=UNDRGRDCB 3=SECURECND 4=GUARDCND 5=ENCRYPTED
      6=MAX)

     Propagation     Min    0     0     0     0     0     0     0     0
     Delay           Max    5     5     5     5     5     5     5     5

     (0=MIN 1=LAN 2=TELEPHONE 3=PKTSWTNET 4=SATELLITE 5=MAX)


     PF: 3=Quit    4=Default    7=Back    8=Fwd
```

Figure   F-3. IBM-Supplied TG Definition Continued Defaults - #BATCH

#BATCHSC

```
_____COS Node Definition_____

COS Name = #BATCHSC
Transmission Priority (1,2,3) = 3


                            1     2     3     4     5     6     7     8

Node Weight                _5   _10   _20   _40   _60   _80   120   160
(0-255)


Route Addition    Min      _0    _0    _0    _0    _0    _0    _0    _0
Resistance        Max      _31   _63   _95   127   159   191   223   255
(0-255)

Congestion        Min       0     0     0     0     0     0     0     0
(0,1)             Max       0     0     0     0     0     0     1\    1




PF:  3=Quit   4=Default            8=Fwd
```

Figure   F-4. IBM-Supplied Node Definition Defaults - #BATCHSC

```
_____COS Transmission Group Definition_____

COS Name = #BATCHSC
                            1     2     3     4     5     6     7     8

TG Weight (0-255)          _30   _60   _90   120   150   180   210   240

Cost/Connect      Min      _0    _0    _0    _0    _0    _0    _0    _0
(0-255)           Max      _0    _0    128   _0    128   196   196   255

Cost/Byte         Min      _0    _0    _0    _0    _0    _0    _0    _0
(0-255)           Max      _0    _0    128   _0    128   196   196   255

User-Defined 1    Min      _0    _0    _0    _0    _0    _0    _0    _0
(0-255)           Max      255   255   255   255   255   255   255   255

User-Defined 2    Min      _0    _0    _0    _0    _0    _0    _0    _0
(0-255)           Max      255   255   255   255   255   255   255   255

User-Defined 3    Min      _0    _0    _0    _0    _0    _0    _0    _0
(0-255)           Max      255   255   255   255   255   255   255   255

PF:  3=Quit   4=Default   7=Back   8=Fwd
```

Figure   F-5. IBM-Supplied TG Definition Defaults - #BATCHSC

```
_____COS Transmission Group Definition Continued_____

COS Name = #BATCHSC
                              1      2      3      4      5      6      7      8

Link Speed        Min        9      7      7      5      5      5      3      0
                  Max       13     13     13     13     13     13     13     13

(0=MIN  1=1.2K  2=2.4K  3=4.8K  4=7.2K  5=9.6K  6=14.4K  7=19.2K  8=48K
 9=56K  10=64K  11=4M  12=16M  13=MAX)

Security          Min        1      1      1      1      1      1      1      0
                  Max        6      6      6      6      6      6      6      6

(0=NONSECURE 1=PUBSWTNET 2=UNDRGRDCB 3=SECURECND 4=GUARDCND 5=ENCRYPTED
 6=MAX)

Propagation       Min        0      0      0      0      0      0      0      0
Delay             Max        5      5      5      5      5      5      5      5

(0=MIN 1=LAN 2=TELEPHONE 3=PKTSWTNET 4=SATELLITE 5=MAX)


PF: 3=Quit    4=Default    7=Back    8=Fwd
```

Figure   F-6. IBM-Supplied TG Definition Continued Defaults - #BATCHSC

#INTER

```
                          _____COS Node Definition_____

         COS Name = #INTER
         Transmission Priority (1,2,3) = 1

                               1     2     3     4     5     6     7     8

         Node Weight          _5   _10   _20   _40   _60   _80   120   160
         (0-255)


         Route Addition  Min   _0    _0    _0    _0    _0    _0    _0    _0
         Resistance      Max   _31   _63   _95   127   159   191   223   255
         (0-255)

         Congestion      Min    0     0     0     0     0     0     0     0
         (0,1)           Max    0     0     0     0     0     0     1     1




         PF:  3=Quit    4=Default            8=Fwd
```

Figure   F-7. IBM-Supplied Node Definition Defaults - #INTER

```
                      _____COS Transmission Group Definition_____

         COS Name = #INTER__
                               1     2     3     4     5     6     7     8

         TG Weight (0-255)    _30   _60   _90   120   150   180   210   240

         Cost/Connect    Min   _0    _0    _0    _0    _0    _0    _0    _0
         (0-255)         Max   _0    _0   128    _0   128    _0   196   255

         Cost/Byte       Min   _0    _0    _0    _0    _0    _0    _0    _0
         (0-255)         Max   _0    _0   128    _0   128    _0   196   255

         User-Defined 1  Min   _0    _0    _0    _0    _0    _0    _0    _0
         (0-255)         Max  255   255   255   255   255   255   255   255

         User-Defined 2  Min   _0    _0    _0    _0    _0    _0    _0    _0
         (0-255)         Max  255   255   255   255   255   255   255   255

         User-Defined 3  Min   _0    _0    _0    _0    _0    _0    _0    _0
         (0-255)         Max  255   255   255   255   255   255   255   255

         PF:  3=Quit  4=Default  7=Back    8=Fwd
```

Figure   F-8. IBM-Supplied TG Definition Defaults - #INTER

```
_____COS Transmission Group Definition Continued_____

COS Name = #INTER
                                 1     2     3     4     5     6     7     8

Link Speed          Min         11     9     9     7     7     5     5     0
                    Max         13    13    13    13    13    13    13    13

(0=MIN   1=1.2K   2=2.4K   3=4.8K   4=7.2K   5=9.6K   6=14.4K   7=19.2K   8=48K
 9=56K   10=64K   11=4M   12=16M   13=MAX)

Security            Min          0     0     0     0     0     0     0     0
                    Max          6     6     6     6     6     6     6     6

(0=NONSECURE  1=PUBSWTNET  2=UNDRGRDCB  3=SECURECND  4=GUARDCND  5=ENCRYPTED
 6=MAX)

Propagation         Min          0     0     0     0     0     0     0     0
Delay               Max          1     2     2     2     3     3     5     5

(0=MIN  1=LAN  2=TELEPHONE  3=PKTSWTNET  4=SATELLITE  5=MAX)


PF: 3=Quit     4=Default     7=Back     8=Fwd
```

Figure   F-9. IBM-Supplied TG Definition Continued Defaults - #INTER

#INTERSC

```
                          _____COS Node Definition_____

        COS Name = #INTERSC
        Transmission Priority (1,2,3) = 1


                                 1    2    3    4    5    6    7    8

        Node Weight             _5   _10  _20  _40  _60  _80  120  160
        (0-255)



        Route Addition   Min    _0   _0   _0   _0   _0   _0   _0   _0
        Resistance       Max    _31  _63  _95  127  159  191  223  255
        (0-255)

        Congestion       Min     0    0    0    0    0    0    0    0
        (0,1)            Max     0    0    0    0    0    0    1    1




        PF:  3=Quit   4=Default          8=Fwd
```

Figure   F-10. IBM-Supplied Node Definition Defaults - #INTERSC

```
                          _____COS Transmission Group Definition_____

        COS Name = #INTERSC
                                 1    2    3    4    5    6    7    8

        TG Weight (0-255)       _30  _60  _90  120  150  180  210  240

        Cost/Connect     Min    _0   _0   _0   _0   _0   _0   _0   _0
        (0-255)          Max    _0   _0   128  _0   128  _0   196  255

        Cost/Byte        Min    _0   _0   _0   _0   _0   _0   _0   _0
        (0-255)          Max    _0   _0   128  _0   128  _0   196  255

        User-Defined 1   Min    _0   _0   _0   _0   _0   _0   _0   _0
        (0-255)          Max    255  255  255  255  255  255  255  255

        User-Defined 2   Min    _0   _0   _0   _0   _0   _0   _0   _0
        (0-255)          Max    255  255  255  255  255  255  255  255

        User-Defined 3   Min    _0   _0   _0   _0   _0   _0   _0   _0
        (0-255)          Max    255  255  255  255  255  255  255  255


        PF:  3=Quit  4=Default  7=Back    8=Fwd
```

Figure   F-11. IBM-Supplied TG Definition Defaults - #INTERSC

```
                    COS Transmission Group Definition Continued

COS Name = #INTERSC
                              1      2      3      4      5      6      7      8

Link Speed          Min      11     _9     _9     _7     _7     _5     _5     _0
                    Max      13     13     13     13     13     13     13     13

(0=MIN   1=1.2K   2=2.4K   3=4.8K   4=7.2K   5=9.6K   6=14.4K   7=19.2K   8=48K
 9=56K   10=64K   11=4M   12=16M   13=MAX)

Security            Min      1      1      1      1      1      1      1      1
                    Max      6      6      6      6      6      6      6      6

(0=NONSECURE  1=PUBSWTNET  2=UNDRGRDCB  3=SECURECND  4=GUARDCND  5=ENCRYPTED
 6=MAX)

Propagation         Min      0      0      0      0      0      0      0      0
Delay               Max      1      2      2      2      3      3      5      5

(0=MIN  1=LAN  2=TELEPHONE  3=PKTSWTNET  4=SATELLITE  5=MAX)


PF: 3=Quit    4=Default    7=Back    8=Fwd
```

Figure   F-12. IBM-Supplied TG Definition Continued Defaults - #INTERSC

#CONNECT

```
_____COS Node Definition_____

COS Name = #CONNECT
Transmission Priority (1,2,3) = 2


                            1     2     3     4     5     6     7     8

Node Weight                _5   _10   _20   _40   _60   _80   120   160
(0-255)


Route Addition    Min      _0    _0    _0    _0    _0    _0    _0    _0
Resistance        Max      _31   _63   _95   127   159   191   223   255
(0-255)

Congestion        Min      0     0     0     0     0     0     0     0
(0,1)             Max      0     0     0     0     0     0     1     1




PF:  3=Quit   4=Default              8=Fwd
```

Figure   F-13. IBM-Supplied Node Definition Defaults - #CONNECT

```
_____COS Transmission Group Definition_____

COS Name = #CONNECT
                            1     2     3     4     5     6     7     8

TG Weight (0-255)          _30   _60   _90   120   150   180   210   240

Cost/Connect      Min      _0    _0    _0    _0    _0    _0    _0    _0
(0-255)           Max      _0    _0    _0    _0    _0    128   196   255

Cost/Byte         Min      _0    _0    _0    _0    _0    _0    _0    _0
(0-255)           Max      _0    _0    _0    _0    _0    128   196   255

User-Defined 1    Min      _0    _0    _0    _0    _0    _0    _0    _0
(0-255)           Max      255   255   255   255   255   255   255   255

User-Defined 2    Min      _0    _0    _0    _0    _0    _0    _0    _0
(0-255)           Max      255   255   255   255   255   255   255   255

User-Defined 3    Min      _0    _0    _0    _0    _0    _0    _0    _0
(0-255)           Max      255   255   255   255   255   255   255   255

PF:  3=Quit   4=Default   7=Back    8=Fwd
```

Figure   F-14. IBM-Supplied TG Definition Defaults - #CONNECT

F-12

```
                      COS Transmission Group Definition Continued

  COS Name = #CONNECT
                                  1     2     3     4     5     6     7     8

  Link Speed          Min       11     9     7     5     7     5     3     0
                      Max       13    13    13    13    13    13    13    13

  (0=MIN  1=1.2K  2=2.4K  3=4.8K  4=7.2K  5=9.6K  6=14.4K  7=19.2K  8=48K
   9=56K  10=64K  11=4M  12=16M  13=MAX)

  Security            Min        0     0     0     0     0     0     0     0
                      Max        6     6     6     6     6     6     6     6

  (0=NONSECURE  1=PUBSWTNET  2=UNDRGRDCB  3=SECURECND  4=GUARDCND  5=ENCRYPTED
   6=MAX)

  Propagation         Min        0     0     0     0     0     0     0     0
  Delay               Max        1     2     2     2     3     3     5     5

  (0=MIN  1=LAN  2=TELEPHONE  3=PKTSWTNET  4=SATELLITE  5=MAX)


  PF: 3=Quit      4=Default    7=Back     8=Fwd
```

Figure   F-15. IBM-Supplied TG Definition Continued Defaults - #CONNECT

List of Abbreviations

A

A. (1) Ampere. (2) Angstrom.

AC. Alternating current.

ACF/TCAM. Advanced Communications Function for the Telecommunications Access Method.

ACF/VTAM. Advanced Communications Function for the Virtual Telecommunications Access Method.

ACK. Acknowledge.

ACTPU. Activate Physical Unit.

AEA. Asynchronous Emulation Adapter.

AID. Attention identifier.

Alt. Alternate.

ANSI. American National Standards Institute.

APAR. Authorized program analysis report.

APL. A Programming Language.

APPC. Advanced program-to-program communications.

APPN. Advanced peer-to-peer networking.

ASCII. American National Standard Code for Information Interchange.

ATTN. Attention.

B

B. Busy.

BB. Begin bracket.

BIS. Bracket initiation stopped.

bps. Bits per second.

BSC. Binary synchronous communication.

C

C. Celsius.

CA. Character attributes.

C&D. Cause and diagnostic (codes)

CC. (1) Control check. (2) Chain Command (flag).

CCA. Concurrent Communication Adapter.

CCITT. International Telegraph and Telephone Consultative Committee.

CCW. Channel command word.

CD. Change direction.

CE. (1) IBM Customer Engineer. (2) Correctable error. (3) Channel-end.

CECP. Country extended code page.

ChgSc. Change screen.

CICS. Customer Information Control System.

CICS/VS. Customer Information Control System/Virtual Storage.

CID. Connection identifier.

CMIP. Common Management Information Protocol.

CMS. Conversational monitor system.

cncl. Cancel.

coax. Coaxial (cable).

comm. Communication.

cont. Continuous.

COS. Class of service.

CP. Control point.

cps. Characters per second.

CPS. Call Progress Signal.

CR. (1) Command Reject. (2) Carriage return.

CSCF. Central Site Control Facility.

CSCM. Central Site Change Management.

CSCU. Central Site Customizing Utility.

CU. Control unit.

CUG. Closed user group.

CUT. Control unit terminal.

D

D. Display.

dB. Decibel.

DB. (1) Data base. (2) Device Busy.

DCE. Data circuit-terminating equipment.

DE. Device-end.

dec. Decimal.

DEL. The delete character.

dev. Device.

Dev Cncl. Device Cancel.

DFT. (1) Distributed function terminal. (2) Diagnostic function test.

DISC. Disconnect.

DLC. (1) Data link control. (2) Data length check.

DM. (1) Disconnect mode. (2) Distribution Manager.

DOS. Disk Operating System.

DPPX. Distributed Processing Programming Executive.

DS. Directory services.

DSC. Data stream compatibility.

DSE. Data stream emulation.

DSL. (1) Downstream load. (2) Data set label.

DSPU. Downstream physical unit.

DSR. Data set ready.

DTE. Data terminal equipment.

DTR. Data terminal ready.

dup, DUP. Duplicate.

E

EAB. Extended Attribute Buffer.

EAU. Erase All Unprotected.

EB. End bracket.

EBCDIC. Extended Binary-Coded Decimal Interchange Code.

EC. Engineering change.

EIA. Electronic Industries Association.

EM. End of message.

EN. End node.

EOF. End of field.

EOT. End-of-transmission character.

ESC. Escape.

ESCON. Enterprise Systems Connection.

ETX. End of Text.

EVPD. Extended Vital Product Data.

E/W. Erase/Write.

EX. Exception (response).

F

F. Fahrenheit.

FF. Form Feed.

FM. (1) Frequency modulation. (2) Function management. (3) Field mark.

FMH. Function management header.

FRU. Field-replaceable unit.

G

GDDM. Graphical Data Display Manager.

GDS. General data stream.

H

H. Height.

HAP. Host addressable printer.

HDLC. High-level data link control.

hex. Hexadecimal.

HG. Hardware group.

HNAD. Host network (DTE) address.

I

I. Information (format).

ID. (1) Identification. (2) Identifier.

Ident. Identification.

IML. Initial microcode load.

in. Inch (or inches).

INS. Insert.

I/O. Input/output.

IOCP. Input/output control program.

IPDS. Intelligent Printer Data Stream.

IR. Intervention Required.

ISO. International Organization for Standardization.

ISDN. Integrated Services Digital Network.

ISR. Intermediate session routing

K

k. 1000.

K. 1024.

Kb. Kilobit.

KB. Kilobyte.

KDU. Keyboard Definition Utility.

L

L. Left.

LAN. Local area network.

LAPB. Link access procedure balanced.

lb. Pound.

LEN. Low-entry networking.

LFS. Local Format Storage.

LFU. Limited Function Utility.

LH. Link header.

LIB. Library.

LIC. Last in chain.

LLC. Logical link control.

LT. Logical terminal.

LTA. Logical terminal assignment.

LU. Logical unit.

LU/SSCP. Logical unit/system services control point.

M

m. Meter (or meters).

MAC. (1) Medium access control. (2) Message authentication code.

MAP. Maintenance analysis procedure.

max. Maximum.

MB. Megabyte.

Mbps. Megabits per second.

min. (1) Minimum. (2) Minute.

MIS. Multiple interactive sessions.

MLT. Multiple Logical Terminals.

modem. Modulator-demodulator.

MPP. Maximum print position.

MVS. Multiple virtual storage.

N

NCCF. Network Communications Control Facility.

NCP. Network Control Program.

NETID. Network identifier.

NI. Not initialized.

NL. New Line.

NLDM. Network Logical Data Manager.

NN. Network node.

No. Number.

NPDA. Network Problem Determination Application.

NPKT. Negotiated packet size.

NRZ. Nonreturn to zero.

NRZI. Nonreturn to zero inverted.

NTRI. NCP Token-Ring Interconnection.

NTT. Nippon Telephone and Telegraph.

NUM. Numeric.

NWND. Negotiated window size.

O

OEM. Original equipment manufacturer.

OIA. Operator information area.

P

P. (1) Printer. (2) Protected.

PA. (1) Program access. (2) Program attention.

PAM. Printer authorization matrix.

PC. (1) Path control. (2) Personal computer.

pF. Picofarad.

PF. Program function.

PID. Product-set ID.

PIU. Path information unit.

PLU. Primary logical unit.

PN. Port number.

P/N. Part number.

PS. Programmed symbols.

PU. Physical unit.

PUID. Physical unit identification.

PVC. Permanent virtual circuit.

Q

QLLC. Qualified logical link control.

R

R. (1) Rear. (2) row. (3) riser.

RECFMS. Record Formatted Maintenance Statistics.

rel. Relative.

REM. Ring error monitor.

Req. Request.

REQMS. Request Maintenance Statistics.

resp. Response.

RFS. Ready-For-Sending.

RH. Request/response header.

ROS. Read-only storage.

RPOA. Recognized Private Operating Agency.

RPQ. Request for price quotation.

R/R. Request/response.

RSCV. Route selection control vector.

RTM. Response Time Monitor.

RTS. Request to send.

RU. Request/response unit.

S

S. Sequenced (format), side.

SAP. Service access point.

SCS. SNA character string.

SDLC. Synchronous Data Link Control.

SI. Suppress Index.

SLU. Secondary logical unit.

SNA. Systems Network Architecture.

SNBU. Switched network backup.

SOEMI. Serial Original Equipment Manufacturer Interface.

SP. (1) Space. (2) Specific Poll.

SSCP. System services control point.

SVC. Switched virtual circuit.

SYSGEN. System generation.

T

TA. Terminal adapter.

TCLS. Throughput class negotiation.

TG. Transmission group.

TH. Transmission header.

TMA. Terminal Multiplexer Adapter.

TP. Teleprocessing.

TRS. Topology and routing services.

U

U. Unprotected.

UCW. Unit control word.

UDT. User defined terminal tables.

UDX. User defined translate tables.

UKPSS. United Kingdom Packet Switched Service.

U.S. United States.

US. (1) Unit specify. (2) Unit separator.

V

V. Volt.

VM. Virtual machine.

VM/SP. Virtual machine/System Product.

VPD. Vital Product Data.

VS. Virtual storage.

VSE. Virtual storage extended.

VTAM. Virtual Telecommunications Access Method.

W

WACK. Wait before transmit positive acknowledgement.

WCC. Write control character.

WE. Western Electric.

WSF. Write Structured Field.

X

X.25. Packet-switched networks.

XID. Exchange identification.

XOFF. Transmitter off.

XON. Transmitter on.

Glossary

A

access method. A technique for moving data between main storage and input/output devices.

acknowledgment. The transmission, by a receiver, of acknowledge characters as an affirmative response to a sender.

active. (1) Able to communicate on the network. A token-ring network adapter is active if it is able to transmit and receive on the network. (2) Operational. (3) Pertaining to a node or device that is connected or is available for connection to another node or device. (4) Currently transmitting or receiving.

active logical terminal (LT). In MLT, the currently displayed logical terminal. Synonymous with *foreground logical terminal.* Contrast with *background logical terminal.*

adapter. (1) A general term for a device that provides some transitional function between two or more devices. (2) In a local area network, within a communicating device, a circuit card with its associated software that enables the device to communicate over the network.

address. (1) A value that identifies a register, a particular part of storage, a data source, or a data sink. The value is represented by one or more characters. (2) To refer to a device or an item of data by its address. (3) In word processing, the location, identified by an address code, of a specific section of the recording medium or storage. (4) The location in the storage of a computer where data is stored. (5) In data communication, the unique code assigned to each device or workstation connected to a network.

address space. A set of addresses used to uniquely identify network accessible units, sessions, adjacent link stations, and links in a node for each network in which the node participates. A type 2.1 node has one address space for intranode routing and one for each transmission group on which it can send message units.

Advanced Communications Function for the Telecommunications Access Method (ACF/TCAM). (1) An IBM licensed program that provides single domain network capability and, optionally, multiple-domain capability. ACF/VTAM runs under MVS and OS/VS1 and provides message queuing. (2) An IBM licensed program that provides queued message-handling.

Note: TCAM, Versions 1 and 2, are telecommunications access methods, but TCAM, Version 3, is a message-handling subsystem.

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 and reconfiguration, adaptive route selection, and simplified network definition; and (c) automated resource registration and directory lookup. APPN extends the LU 6.2 peer orientation for end-user services to network control; APPN also uses LU 6.2 protocols on its own control point sessions that provide the network control.

advanced peer-to-peer networking (APPN) end node. A type 2.1 end node that provides full SNA end-user services and supports sessions between its local control point (CP) and the CP in an adjacent network node, 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; it can also attach to a subarea network as a peripheral node.

Advanced peer-to-peer networking (APPN) network. A type 2.1 network having at least one APPN node.

Advanced peer-to-peer networking (APPN) network node. A type 2.1 node that besides offering full SNA end-user services, provides intermediate routing services within a T2.1 network, and network services to its local LUs and attached T2.1 end nodes in its domain; it can also attach to a subarea network as a peripheral node.

Advanced program-to-program communications (APPC). (1) The general facility characterizing the LU 6.2 architecture and its various implementations in products. (2) Sometimes used to refer to the LU 6.2 architecture and its product implementations as a whole, or an LU 6.2 product feature in particular, such as an *APPC application program interface.*

AEA. See *Asynchronous Emulation Adapter.*

AEA port. A communication connector on the Asynchronous Emulation Adapter (AEA).

AEA port set. (1) One or more 3174 ports that support individual AEA station sets; they must have the same port (connection) type and modem type, but different station types. (2) One or more 3174 station sets that have different station types, but the same port type, modem type, and number of default destinations.

AEA station. A 3270 or ASCII display station, printer, or host that communicates through the Asynchronous Emulation Adapter.

AEA station set. (1) One or more AEA stations that have the same attributes, for example, line speed and parity. (2) One or more AEA stations that share the same characteristics of station type, port type, modem type, and default destination.

Alert. A message sent to a management services focal point in a network to identify a problem or an impending problem.

alternate cursor. (1) An image reversal of each dot in the character cell at the cursor position. (2) A cursor other than the one displayed on the display surface at power on time.

alternate 1 initial microcode load (Alt 1 IML). The initiating procedure for running specific adapter tests, starting customizing, or doing a normal IML.

alternate 2 initial microcode load (Alt 2 IML). The initiating procedure for running a general 3174 controller test.

American National Standard Code for Information Interchange (ASCII). The standard code, using a coded character set consisting of 7-bit coded characters (8 bits including parity check), used for information interchange among data processing systems, data communication systems, and associated equipment. The ASCII set consists of control characters and graphics characters.

APAR. Authorized program analysis report. A report of a problem caused by a suspected defect in a current unaltered release of a program.

application. (1) The use to which an information processing system is put, for example, a payroll application, an airline reservation application, or a network application. (2) A collection of software components used to perform specific types of work on a computer.

application program. (1) A program written for or by a user that applies to the user's work. Some application programs receive support and services from a special kind of application program called a network application program. (2) A program used to connect and communicate with stations in a network, enabling users to perform application-oriented activities.

APPN end node. See *advanced peer-to peer networking (APPN) end node*.

APPN network node. See *advanced peer-to peer networking network node*

ASCII emulation. The ability of a 3270 display station or printer to communicate with an ASCII host using the DEC VT100, DEC VT220, Data General D210, or IBM 3101 data stream.

ASCII pass-through. The transmission of unmodified data between ASCII display stations or printers and an ASCII host or public data network.

asynchronous. (1) Pertaining to two or more processes that do not depend upon the occurrence of a specific event such as a common timing signal. (2) In Fiber Distributed Data Interface (FDDI) rings, a type of data traffic that does not need bounded access delay to the medium and guaranteed throughput.

Asynchronous Emulation Adapter (AEA). In the 3174, an adapter that enables an ASCII terminal to communicate with a 3270 host using the 3270 data stream, an ASCII terminal to communicate with an ASCII host through the 3174, and a 3270 terminal to communicate with an ASCII host using data streams, such as the DEC VT100, DEC VT220, Data General D210, or IBM 3101 data streams.

attach. To make a device part of a network logically.

attaching device. Any device that is physically connected to a network and can communicate over the network.

attention (ATTN). An occurrence external to an operation that could cause an interruption of the operation.

attention identifier (AID). (1) A code in the inbound 3270 data stream that identifies the source or type of data that follows. (2) A character in a data stream indicating that the user has pressed a key, such as ENTER, that requests an action by the system.

attention key. A function key on terminals that, when pressed, causes an I/O interruption in the processing unit.

attribute. (1) A characteristic. (2) A terminal display language or transformation definition language (TDL) keyword that specifies a particular quality for the TDL object with which it is associated.

audible alarm. (1) An alarm that is sounded when designated events occur that require operator attention or intervention before system operation can continue. (2) A special feature that sounds a short, audible tone automatically when a character is entered from the keyboard into the next-to-last character position on the screen. The tone can also be sounded under program control.

autobaud. In the 3174 AEA feature, the process of determining the line speed and parity settings of a connecting display station from a specific sequence of

characters (CR . CR) entered from the keyboard. ASCII hosts may also support automatic speed and parity detection, but the character sequence they require may differ.

automatic answering (auto-answer). (1) Answering in which the called data terminal equipment (DTE) automatically responds to the calling signal.

Note: The call may be established whether or not the called DTE is attended.

(2) A machine feature that permits a station to respond without operator action to a call it receives over a switched line. See also *manual answering.* Contrast with *automatic calling.*

automatic calling (auto-call). (1) Calling in which the elements of the selection signal are entered into the data network contiguously at the full data signaling rate. (2) A machine feature that permits a station to initiate a connection with another station over a switched line without operator action. (3) See also *manual calling.* Contrast with *automatic answering.*

auto-removal. The removal of a device from data-passing activity without human intervention. This action is accomplished by the adapter in the device, and can be initiated by a network management program.

B

backbone. In a multiple-ring local area network, a high-speed link to which the rings are connected by means of bridges. A backbone may be configured as a bus or as a ring.

backbone ring. A ring that interconnects ring networks.

background logical terminal (LT). In MLT, any logical terminal that is not currently displayed. Contrast with *active logical terminal (LT).*

bandwidth. The difference, expressed in Hertz, between the highest and the lowest frequencies of a range of frequencies.

Base data set. A data set that contains only those characters contained in a country's base character set. A base character set may or may not be a subset of CECP.

batch. A program or operation that is performed with little or no interaction between the user and the system. Contrast with *interactive.*

beaconing. An error-indicating function of token-ring adapters that assists in locating a problem causing a hard error on a token-ring network.

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).*

bind command. A command used to start a session and to define the characteristics of that session. Contrast with *unbind command.*

bind pacing. A technique by which the address space manager (ASM) at one node controls the rate of transmission of Bind requests of a sending ASM at another node. Bind pacing can be used to prevent Bind standoff, in which each of two nodes has reserved most of its resources for sessions it is attempting to initiate through the other and thus rejects any Binds received from the other.

bits per second (bps). The rate at which bits are transmitted per second.

boundary node (BN). A subarea node with boundary function.

bracket. One or more chains of request units and their responses that are exchanged between two session partners and that represent a transaction between them. A bracket must be completed before another bracket can be started. Examples of brackets are data base inquiries/replies, update transactions, and remote job entry output sequences to workstations.

bridge. (1) An attaching device that connects two LAN segments to allow the transfer of information from one LAN segment to the other. A bridge may connect the LAN segments directly by network adapters and software in a single device, or may connect network adapters in two separate devices through software and use of a telecommunications link between the two adapters. (2) A functional unit that connects two LANs that use the same logical link control (LLC) procedures but may use the same or different medium access control (MAC) procedures. Contrast with *gateway* and *router.*

bridge number. The identifier that distinguishes parallel bridges (that is, bridges spanning the same two rings).

broadcast. Simultaneous transmission of data to more than one destination.

broadcast search. The propagation of a search request, when the location of a resource is unknown to the requester, to all network nodes in an APPN network. Contrast with *directed Locate search.*

buffer. (1) A portion of storage used to hold input or output data temporarily. (2) A routine or storage used to compensate for a difference in data rate or time of

occurrence of events, when transferring data from one device to another.

burst. In data communication, a sequence of signals counted as one unit in accordance with some specific criterion or measure.

bus. (1) In a processor, a physical facility on which data is transferred to all destinations, but from which only addressed destinations may read in accordance with appropriate conventions. (2) A network configuration in which nodes are interconnected through a bidirectional transmission medium. (3) One or more conductors used for transmitting signals or power.

bypass. To eliminate an attaching device or an access unit from a ring network by allowing the data to flow in a path around it.

byte. (1) A string that consists of a number of bits, treated as a unit, and representing a character. (2) A binary character operated upon as a unit and usually shorter than a computer word. (3) A string that consists of a particular number of bits, usually 8, that is treated as a unit, and that represents a character. (4) A group of 8 adjacent binary digits that represent one extended binary-coded decimal interchange code (EBCDIC) character.

C

cache. An optional part of the directory data base, in network nodes where frequently used directory information may be stored to speed directory searches.

card. In the 3174, a unit of electronic circuitry contained in a plastic casing (or cassette) and providing the controller with a specialized function, for example, a Terminal Adapter or an Encrypt/Decrypt Adapter.

carrier. A wave or pulse train that may be varied by a signal bearing information to be transmitted over a communication system.

CECP-capable device. A device that supports the Country Extended Code Page.

CECP character set. A collection of symbols in Character Set 697 required for CECP languages.

CECP data set. A data set that contains any CECP-unique graphic.

CECP-unique graphic. A graphic symbol that is in the CECP character set and not in the base character set.

Central site change management (CSCM). A function of the 3174 microcode that tracks the microcode for each controller in a network and, in conjunction with

NetView DM, electronically distributes and retrieves microcode changes for each controller.

Central Site Controller. The controller that contains the central site library for all of the controllers in a network.

central site customizing. The process of tailoring the 3174 Licensed Internal Code for each controller in a network, at the central site.

central site library. One or more Library disks that contain customizing data and label information for the controllers in a network.

chain. (1) A group of logically linked user data records processed by LU 6.2. (2) A group of request units delimited by begin-chain and end-chain. Responses are always single-unit chains.

change direction (CD). A data flow control function in which the sending logical unit stops sending requests, signals the receiving logical unit using the change direction indicator (in the request/response header of the last request), and prepares to receive requests.

channel. (1) A functional unit, controlled by a host computer, that handles the transfer of data between processor storage and local peripheral equipment. (2) A path along which signals can be sent. (3) The portion of a storage medium that is accessible to a given reading or writing station. (4) In broadband transmission, a designation of a frequency band 6 MHz wide.

channel-attached. Pertaining to attachment of devices directly by data channels (I/O channels) to a computer. Synonym for *local*. Contrast with *telecommunication-attached*.

character position. (1) A location on the screen at which one character can be displayed. (2) An addressed location in the buffer at which 1 character can be stored.

character set. (1) A defined collection of characters. (2) A group of characters used for a specific reason, for example, the set of characters a printer can print. (3) The collection of graphic characters required to support a specific language.

Class of service (COS). A designation of the transport network characteristics, such as route security, transmission priority, and bandwidth, needed for a particular session. The class of service is derived from a *mode name* specified in the Bind by the initiator of a session.

class-of-service (COS) database. A database maintained independently by each network node, and optionally by APPN end nodes. It contains one entry

per class-of-service name; each database entry contains:

- A definition of the acceptable values for transmission group (TG) and node characteristics for routes described by that class-of-service name and the weight function to be used to compute the weights of nodes and TGs that meet the acceptable values

- The transmission priority to be used for traffic that flows on routes described by that class-of-service name.

cluster. A station that consists of a control unit (a cluster controller) and the terminals attached to it.

cluster control unit. Synonym for *cluster controller*.

cluster controller. A device that can control the input/output operations of more than one device connected to it. A cluster controller may be controlled by a program stored and executed in the unit, for example, the IBM 3174 Establishment Controller. Or, it may be entirely controlled by hardware, for example, the IBM 3272 Control Unit. See also *cluster* and *cluster controller node*. Synonymous with *cluster control unit*.

cluster controller node. A peripheral node that can control a variety of devices. See also *host node*, *Network Control Program (NCP) node*, and *terminal node*.

coaxial cable. A cable consisting of one conductor, usually a small copper tube or wire, within and insulated from another conductor of larger diameter, usually copper tubing or copper braid.

code page. An assignment of graphic characters and control function meanings to all code points.

code point. A 1-byte code representing one of 256 potential characters.

command. (1) A request for performance of an operation or execution of a program. (2) A character string from a source external to a system that represents a request for system action.

command retry. A channel and control unit procedure that causes a command to be retried without requiring an I/O interruption.

communication adapter. (1) A circuit card with associated software that enables a processor, controller, or other device to be connected to a network. (2) See *EIA communication adapter*, *V.35 communication adapter*, and *X.21 communication adapter*.

communication controller. (1) A device that directs the transmission of data over the data links of a network; its operation may be controlled by a program processed in a processor to which the controller is connected or by a program executed within the device. (2) 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. (3) See also *cluster controller*, *communication controller node*, and *transmission control unit*.

communication controller node. A subarea node that does not contain a system services control point (SSCP).

communication link. Physical (hardware) link.

communication management host. In ACF/TCAM, the host in a communication management configuration that performs all network-control functions in the network except control of locally attached stations of data hosts.

communication network management (CNM). The process of designing, installing, operating, and managing distribution of information and control among users of communication systems.

component. (1) Hardware or software that is part of a functional unit. (2) A functional part of an operating system, for example, the scheduler or supervisor. (3) In systems with VSAM, a named, cataloged collection of stored records, such as the data component or index component of a key-sequenced file or alternate index. (4) In System/38 graphics, the representation of a data group on a chart. (5) See *terminal component* and *solid state component*.

Concurrent Communication Adapter (CCA). In the 3174, a communication adapter that, along with the necessary microcode, provides terminals attached to the 3174 the ability to concurrently access an additional 3270 host.

configuration. The arrangement of a computer system or network as defined by the nature, number, and chief characteristics of its functional units. More specifically, the term *configuration* may refer to a hardware configuration or a software configuration. See also *system configuration*.

configuration parameters. Variables in a configuration definition, the values of which characterize the relationship of a product, such as a bridge, to other products in the same network.

configuration services (CS). One of the types of network services in a control point (SSCP, NNCP, ENCP, or PUCP). CS activates, deactivates, and records the status of physical units, links, and link stations.

Connection Menu. A menu on the screen of a display station attached to the 3174, from which a user can select an available host.

connection network. A representation within an APPN network of a shared-access transport facility, such as a token-ring, that reduces the system-definition burden on each APPN end node attached to the facility. Each such node may represent its connectivity to the other, *real* nodes on the facility generically, by a single, *virtual* routing node, which each reports to its network node server in the APPN network. The report includes local signaling information needed by any partner wanting to contact it over the facility. The transport facility represented this way, and the assemblage of nodes using the same virtual routing node representation, are collectively referred to as a *connection network*. By matching references to the same virtual routing node during its route selection, the network node server passes the required DLC signaling information in the search reply to the node originating a session over the connection network.

connector. A means of establishing electrical flow.

contention. In a session, a situation in which both NAUs attempt to initiate the same action at the same time, such as when both attempt to send data in a half-duplex protocol (half-duplex contention). At session initiation, one NAU is defined to be the contention winner; its action will take precedence when contention occurs. The contention loser must get explicit or implicit permission from the contention winner to begin its action.

contention-loser session. To a NAU, a session for which it was defined during session initiation to be the contention loser.

contention-winner session. To a NAU, a session for which it was defined during session initiation to be the contention winner.

control character. (1) A character whose occurrence in a particular context specifies a control function. (2) A character used to specify that a control unit is to perform a particular operation.

control codes. (1) Code points and their assigned control function meanings. (2) The hexadecimal values hex 00 through hex 3F, and hex FF in the 3270 data stream. ASCII control codes are the hexadecimal values hex 00 through hex 1F and 7F.

Control (CTL) disk. A customized diskette or fixed disk containing the microcode that describes a particular controller's attached terminals, and its method of attachment to the host.

Control (CTL) diskette. A customized diskette containing the microcode that describes a particular controller's attached terminals, and its method of attachment to the host.

control function. Synonym for *control operation*.

control operation. An action that affects the recording, processing, transmission, or interpretation of data; for example, starting or stopping a process, carriage return, font change, rewind, and end of transmission. Synonymous with *control function*.

control point (CP). (1) 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 node, a physical unit control point (PUCP) in a type 4 node, a network node control point (NNCP) in a type 2.1 (T2.1) network node, and an end node control point (ENCP) in a T 2.1 end node. An SSCP and an NNCP can provide services to other nodes. (2) A component of a T 2.1 node that manages the resources of that node. If the T2.1 node is an APPN node, the CP is capable of engaging in CP-CP sessions with other APPN nodes. If the T2.1 node is a network node, the CP also provides services to adjacent end nodes in the T2.1 network.

control unit. A general term for any device that provides common functions for other devices or mechanisms. Synonym for controller.

control unit terminal (CUT). A terminal that relies on the 3174 to interpret the data stream. Examples are the 3178, 3179, 3278 Model 2, and 3279 Model S2A.

control unit terminal (CUT) mode. A host-interactive mode that enables an IBM 3270 Personal Computer customized in this mode to run only one session emulating a 3178, 3179, 3278 Model 2, or 3279 Model S2A.

control vector. One of a general class of RU substructures that has variable length, is carried within some enclosing structure, and has a one-byte key used as an identifier.

controller. A unit that controls input/output operations for one or more devices.

conversion. (1) In programming languages, the transformation between values that represent the same data item but belong to different data types. Information may be lost as a result of conversion because accuracy of data representation varies among different data types. (2) The process of changing from one method of data processing to another or from one data processing system to another. (3) The process of changing from one form of representation to another, for example, to change from decimal representation to binary representation.

copy operation. An operation that copies the contents of the buffer from one terminal to another terminal attached to the same controller.

country extended code page (CECP). A function of the 3174 microcode that provides a code page containing additional code points beyond those available with Table 5A code pages. CECP is supported by a universal character set, Character Set 697, which contains 190 characters.

CP-CP sessions. The parallel sessions between two control points, using LU 6.2 protocols and a mode name of CPSVCMG, on which network services requests and replies are exchanged. Each CP of a given pair has one contention-winner session and one contention-loser session with the other.

CP name. A network-qualified name of a control point (CP), consisting of a network ID qualifier identifying the network (or name space) to which the CP's node belongs, and a unique name within the scope of that network ID identifying the CP. Each T2.1 node has one CP name assigned to it at system-definition time. Within an APPN network, all network nodes share a common network ID. End nodes may have distinct network IDs; this allows them to connect into separate APPN networks and to manage their own name spaces independently of the rest of the network.

create. In 3174 central site customizing, to create a library member for a network controller, and store the customizing data for that library member on a Library diskette.

cursor. (1) A movable, visible mark used to indicate the position at which the next operation will occur on a display surface. (2) A unique symbol that identifies a character position in a screen display, usually the character position at which the next character to be entered from the keyboard will be displayed.

Customer Information Control System (CICS). An IBM licensed program that enables transactions entered at remote terminals to be processed concurrently by user-written application programs. It includes facilities for building, using, and maintaining data bases.

customization. Procedures that tailor the controller microcode to fit the various types of display stations and printers and the method of host attachment that a particular controller will handle.

customizing display station. A display station used to perform the customizing procedures; this display station must be attached to port 26-00 of the controller. Only these display stations can be used for customizing: a 3178, a 3179 Model 1 operating in native or 3279-emulation mode, a 3180 operating in native or 3278-emulation mode, a 3191, a 3192, a 3194 operating in control unit terminal (CUT) mode, a 3270 Personal Computer with 3278/3279 emulation,

operating in CUT mode, a 3278 (except Model 1), a 3279, a 5550 family operating in CUT mode, a 6150 RT Personal Computer, and a 6151 RT Personal Computer.

customizing keyboard. A keyboard used to type in the customizing responses; this keyboard must be a Typewriter, Data Entry, APL (with APL off), or Text (with Text off) keyboard with a QWERTY layout. (On a QWERTY layout, the first six characters on the left side of the top row of alphabetic characters are Q, W, E, R, T, Y.)

D

data. (1) A representation of facts, concepts, or instructions in a formalized manner suitable for communication, interpretation, or processing by human or automatic means. (2) Any representations such as characters or analog quantities to which meaning is or might be assigned.

data base. A set of data, part or the whole of another set of data, that consists of at least one file, and that is sufficient for a given purpose or for a given data processing system.

data chaining. In synchronous data link control (SDLC) data transmission, the chaining together of scattered segments of storage data to assemble a complete SDLC frame.

data circuit. (1) A pair of associated transmit and receive channels that provide a means of two-way data communication. (2) In SNA, see also *link connection*.

Notes:

1. Between data-switching exchanges, the data circuit may include data circuit-terminating equipment (DCE), depending on the type of interface used at the data-switching exchange.

2. Between a data station and a data-switching exchange or data concentrator, the data circuit includes the data-terminating equipment at the data station end. It may also include equipment similar to a DCE at the data-switching exchange or data-concentrator location.

data circuit-terminating equipment (DCE). In a data station, the equipment that provides the signal conversion and coding between the data terminal equipment (DTE) and the line.

Data Entry keyboard. A keyboard layout designed for data entry applications.

data flow control (DFC). In SNA, a request/response unit category used for requests and responses exchanged between the data flow control layer in one-half session and the data flow control layer in the session partner.

data frame. See *frame.*

data host. In an ACF/TCAM communication management configuration, a host that is dedicated to processing applications and does not control network resources, except for its locally attached devices. See also *communication management host.*

data link. (1) Any physical link, such as a wire or a telephone circuit, that connects one or more remote terminals to a communication control unit, or connects one communication control unit with another. (2) The assembly of parts of two data terminal equipment (DTE) devices that are controlled by a link protocol, and the interconnecting data circuit, that enable data to be transferred from a data source to a data sink. (3) In SNA, see also *link.*

Note: A telecommunication line is only the physical medium of transmission. A data link includes the physical medium of transmission, the protocol, and associated devices and programs; it is both physical and logical.

data link control (DLC). The process responsible for performing communication over a link using a specific data link control protocol, such as SDLC or token ring.

data link control (DLC) layer. (1) In SNA or Open Systems Interconnection (OSI), the layer that schedules data transfer over a link between two nodes and performs error control for the link. Examples of DLC are synchronous data link control (SDLC) for serial-by-bit connection and DLC for the System/370 channel. (2) See *Systems Network Architecture (SNA).* (3) See also *logical link control (LLC) sublayer, medium access control (MAC).*

Note: The DLC layer is usually independent of the physical transport mechanism and ensures the integrity of data that reach the higher layers.

data link control (DLC) protocol. DLC protocol is used to send information onto and receive information from the network, exchange data, and control information with network higher level protocols and interfaces.

data stream. (1) All data transmitted through a data channel in a single read or write operation. (2) A continuous stream of data elements being transmitted, or intended for transmission, in character or binary-digit form, using a defined format. See also *data stream format.*

data stream format. In SNA, the format of the data elements (end-user data) in the request unit (RU). See also *3270 data stream* and *SNA character string (SCS).*

data streaming. A protocol for transmitting data on a channel. In this protocol, the sender maintains the channel in a transmit state for an extended length of time.

data terminal equipment (DTE). (1) That part of a data station that serves as a data source, data receiver, or both. (2) Equipment that sends or receives data, or both.

Data Terminal Ready (DTR) flow control. A procedure for a communicating device to signal its readiness to receive data by raising the DTR lead on an EIA 232D interface.

data transfer. (1) The result of the transmission of data signals from any data source to a data receiver. (2) The movement, or copying, of data from one location and the storage of the data at another location.

decibel (dB). (1) One tenth of a bel. (2) A unit that expresses the ratio of two power levels on a logarithmic scale. (3) A unit for measuring relative power. The number of decibels is 10 times the logarithm (base 10) of the ratio of the measured power levels; if the measured levels are voltages (across the same or equal resistance), the number of decibels is 20 times the log of the ratio.

deconfigure. In the 3174, the ability of the controller to disable functions or features to a partially operating or non-operating state, when the configuration of the control disk requires more 3174 storage than is available.

default. Pertaining to an attribute, value, or option that is assumed when none is explicitly specified.

default destination. A destination for display stations and printers that is defined in AEA customization.

default response. A response supplied by the customizing utility if a different response is not specified during customization.

destination. Any point or location, such as a node, station, or a particular terminal, to which information is to be sent.

device. (1) A mechanical, electrical, or electronic contrivance with a specific purpose. (2) An input/output unit such as a terminal, display, or printer.

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

diagnostics. Modules or tests used by computer users and service personnel to diagnose hardware problems.

directed Locate search. A search request sent to a specific destination node known to contain a resource, such as a logical unit, to verify the continued presence of the resource at the destination node and to obtain the node's connectivity information for route calculation. Contrast with *broadcast search.*

directory. A database in an APPN node that lists names of resources (in particular, logical units) and records the CP name of the node where each resource is located.

directory services (DS). A component of an APPN node that maintains a directory and manages searches of that directory.

disk. A direct-access data storage medium, which may be either flexible (diskette) or hard (fixed disk).

diskette. A flexible magnetic disk enclosed in a protective container.

diskette drive. The mechanism used to seek, read, and write data on diskettes.

display field. (1) An area in the display buffer that contains a set of characters that can be manipulated or operated upon as a unit. (2) A group of consecutive characters (in the buffer) that starts with an attribute character (defining the characteristics of the field) and contains one or more alphanumeric characters. The field continues to, but does not include, the next attribute character.

display station. An input/output device containing a display screen and an attached keyboard that allows a user to send information to or receive information from the system.

distributed function terminal (DFT). A programmable terminal that can perform operations previously performed by the control unit. These terminals can interpret the 3270 data stream themselves. Examples are the IBM 3270 Personal Computer and the 3290 Information Panel.

distributed function terminal (DFT) mode. A host-interactive mode that enables an IBM 3270 Information Display System customized in this mode to run as many as four host sessions. The sessions can emulate a 3178, 3179, 3278 Model 2, or 3279 Model S2A.

downstream. (1) In the direction of data flow or toward the destination of transmission. (2) From the processor toward an attached unit or end user. (3) Contrast with *upstream*.

downstream load (DSL). The capability of a distributed function terminal to receive its control program from the control unit to which it is attached. A disk containing the terminal's control program is loaded into the control unit.

downstream physical unit (DSPU). A controller or a workstation downstream from a gateway that is attached to a host.

drop. A cable that leads from a faceplate to the distribution panel in a wiring closet. When the IBM Cabling System is used with the IBM Token-Ring Network, a drop may form part of a lobe. See also *lobe.*

duplex. Pertaining to communication in which data can be sent and received at the same time. Synonymous with *full duplex.*

E

Early Token Release (ETR). In token-ring and Fiber Distributed Data Interface (FDDI) networks, a function that allows a transmitting adapter to release a new token as soon as it has completed frame transmission, whether or not the frame header has returned to that adapter.

EBCDIC. Extended binary-coded decimal interchange code. A coded character set consisting of 8-bit coded characters.

EIA communication adapter. A communication adapter conforming to EIA standards that can combine and send information on two lines at speeds up to 19.2 kbps.

EIA 232D. An electrical interface defined by the Electronics Industries Association for establishing connections and controlling data flow between data terminal equipment and data communication equipment. The interface has been adapted to allow communication between DTEs.

emulate. To imitate one system with another, primarily by hardware, so that the imitating system accepts the same data, executes the same computer programs, and achieves the same results as the imitated computer system.

emulation. (1) The imitation of all or part of one system by another, primarily by hardware, so that the imitating system accepts the same data, executes the same programs, and achieves the same results as the imitated computer system. (2) The use of programming techniques and special machine features to permit a computing system to execute programs written for another system. (3) Imitation; for example, imitation of a computer or device. (4) See *terminal emulation.* (5) Contrast with *simulation.*

enabled. (1) On a LAN, pertaining to an adapter or device that is active, operational, and able to receive frames from the network. (2) Pertaining to a state of a processing unit that allows the occurrence of certain types of interruptions. (3) Pertaining to the state in which a transmission control unit or an audio response unit can accept incoming calls on a line.

end node. A T2.1 node that supports sessions between its own control point (CP) and the CP in an adjacent network node, to dynamically register its resources with the adjacent CP, to send and receive directory search requests, and to obtain network services and management services.

equipment rack. A metal stand for mounting components.

Erase All Unprotected (EAU) command. A 3270 data stream command that erases all unprotected fields and inserts nulls.

Enterprise Systems Connection Adapter (ESCON Adapter). In the 3174, this adapter allows the controller to communicate with an IBM S/390* host through an Enterprise Systems Connection Channel using optical fiber cable.

event. (1) An occurrence or happening. (2) An occurrence of significance to a task; for example the completion of an asynchronous operation, such as an input/output operation.

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 characteristics, and after link activation to communicate changes in these characteristics.

extended attribute buffer (EAB). The buffer in which the extended field attributes are stored. Examples of extended field attributes are:

- Extended highlighting
- Color (blue, red, pink, green, turquoise, yellow, white)
- Character sets
- Transparency.

extended binary-coded decimal interchange code (EBCDIC). A coded character set consisting of 8-bit coded characters.

extended highlighting. (1) A function that provides blink, reverse video, and underscore for emphasizing fields or characters on devices supporting extended field attributes and character attributes. (2) An attribute type in the extended field attribute and character attribute. (3) An attribute passed between session partners in the Start Field Extended, Modify Field, and Set Attribute orders.

F

fault. An accidental condition that causes a functional unit to fail to perform its required function.

fault domain. (1) In IBM LAN problem determination, the portion of a network that is expected to be involved with an indicated error. (2) The segment of a token-ring network between a station and its nearest active upstream neighbor (NAUN).

feature. A part of an IBM product that may be ordered separately by the customer.

fiber. See *optical fiber*.

fiber optics. The branch of optical technology concerned with the transmission of radiant power through fibers made of transparent materials such as glass, fused silica, and plastic.

Notes:

1. Telecommunication applications of fiber optics use optical fibers. Either a single discrete fiber or a nonspatially aligned fiber bundle may be used for each information channel. Such fibers are often called *optical fibers* to differentiate them from fibers used in noncommunication applications.

2. Various industrial and medical applications use (typically high-loss) flexible fiber bundles in which individual fibers are spatially aligned, permitting optical relay of an image.

3. Some specialized industrial applications use rigid (fused) aligned fiber bundles for image transfer.

fiber optic cable. See *optical cable*.

Fiber Optic Terminal Adapter (FTA). In the 3174, this adapter allows a 3299 Model 032 to be attached to the 3174 using optical fiber cable.

field. See *display field*.

file. A named set of records stored or processed as a unit.

fixed disk. A rigid magnetic disk used in a fixed disk drive.

fixed disk drive. A disk storage device that reads and writes on rigid magnetic disks.

flag. (1) An indicator or parameter that shows the setting of a switch. (2) Any of various types of indicators used for identification, for example, a wordmark. (3) A character that signals the occurrence of some condition, such as the end of a word. (4) Deprecated term for *mark*.

flow control. (1) In data communication, control of the data transfer rate. (2) 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, neither to overflow the buffers at the receiver or at intermediate routing nodes nor to leave the receiver waiting for more message units. (3) The methods used to control the flow of information across a network.

focal point. See *management services focal point*.

foreground logical terminal (LT). Synonym for *active logical terminal (LT)*.

frame. (1) The unit of transmission in some LANs, including the IBM Token-Ring Network and the IBM PC Network. It includes delimiters, control characters, information, and checking characters. On a token-ring network, a frame is created from a token when the token has data appended to it. On a token bus network (IBM PC Network), all frames including the token frame contain a preamble, start delimiter, control address, optional data and checking characters, end delimiter, and are followed by a minimum silence period. (2) A housing for machine elements. (3) In synchronous data link control (SDLC), the vehicle for every command, every response, and all information that is transmitted using SDLC procedures. Each frame begins and ends with a flag.

full duplex. Synonym for *duplex.*

function. In NetView DM, a function is the specification of a transmission activity on a resource or group of resources. Functions are grouped into phases. In CSCM, resources are known as data objects.

function management header (FMH). One or more headers, optionally present in the leading request units (RUs) of an RU chain, that allow one half-session to: (a) select a destination at the session partner and control the way in which the end-user data it sends is handled at the destination, (b) change the destination or the characteristics of the data during the session, and (c) transmit between session partners status or user information about the destination (for example, a program or device). Function management headers can be used with LU type 1, 4, and 6.2 protocols.

G

gateway. A device and its associated software that interconnect networks or systems of different architectures. The connection is usually made above the reference model network layer. For example, a gateway allows LANs access to System/370 host computers. Contrast with *bridge* and *router*.

general data stream (GDS) variable. A type of RU substructure that is preceded by an identifier and a length field and includes either application data, user control data, or SNA-defined control data.

generate. In 3174 central site customizing, to write a Control diskette containing the customizing data for a particular controller. Also, to print a mailing address label and a diskette label for a particular controller.

get. In 3174 central site customizing, to select the type of data you want and store it in working copy.

group. (1) A set of related records that have the same value for a particular field in all records. (2) A collection of users who can share access authorities for protected resources. (3) A list of names that are known together by a single name.

H

half-duplex. In data communication, pertaining to transmission in only one direction at a time. Contrast with *duplex.*

hexadecimal. (1) Pertaining to a selection, choice, or condition that has 16 possible values or states. (2) Pertaining to a fixed-radix numeration system, with radix of 16. (3) Pertaining to a numbering system with base of 16; valid numbers use the digits 0 through 9 and characters A through F, where A represents 10 and F represents 15.

hexadecimal number. The 1-byte hexadecimal equivalent of an EBCDIC character.

hop. In APPN, a portion of a route that has no intermediate nodes. It consists of only a single transmission group connecting adjacent nodes.

hop count. (1) On a Token-ring, the number of bridges through which a frame has passed on the way to its destination.

Note: Hop count applies to all broadcast frames except single-route broadcast frames.

(2) In APPN, the number of network nodes traversed by a Locate search, or the number of APPN nodes traversed by a Bind for session establishment.

host access method. The access method that controls communication with a domain.

host attachment. A mode of SNA communication in which the processor acts as a secondary SNA device.

host interface. Interface between a network and the host computer.

host logical unit (LU). An SNA logical unit (LU) located in a host processor, for example, an ACF/VTAM application program.

host mode. The operating mode of an HASP main processor communicating with an HASP workstation.

host node. (1) A node at which a host processor is located. (2) In SNA, a subarea node that contains a system services control point (SSCP); for example, a System/370 computer with OS/VS2 and ACF/TCAM.

host system. (1) A data processing system used to prepare programs and operating environments for use on another computer or controller. (2) The data processing system to which a network is connected and with which the system can communicate. (3) The controlling or highest-level system in a data communication configuration; for example, a System/38 is the host system for the workstations connected to it.

I

IBM Cabling System. A permanently installed wiring system that eliminates the need to rewire when terminals are moved from one location to another within an office complex. It allows transmission of data at very high speeds and is the foundation for installing a local area network.

individual address. An address that identifies a particular network adapter on a local area network.

initial microcode load (IML). The action of loading the operational microcode.

input mode. A mode in which records can be read from a file.

input/output (I/O). (1) Pertaining to a device whose parts can perform an input process and an output process at the same time. (2) Pertaining to a functional unit or channel involved in an input process, output process, or both, concurrently or not, and to the data involved in such a process. (3) Pertaining to input, output, or both.

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.

interactive. Pertaining to a program or system that alternately accepts input and then responds. An interactive system is conversational, that is, a continuous dialog exists between user and system. Contrast with *batch*.

interface. (1) A shared boundary between two functional units, defined by functional characteristics, common physical interconnection characteristics, signal characteristics, and other characteristics as appropriate. (2) A shared boundary. An interface may be a hardware component to link two devices or a portion of storage or registers accessed by two or more computer programs. (3) Hardware, software, or both, that links systems, programs, or devices.

intermediate network node. In APPN, a node that is part of a route between an origin LU (OLU) and a destination LU (DLU) but neither contains the OLU or the DLU nor serves as the network server for either the OLU or DLU.

intermediate routing function. A capability within a node that allows it to receive and route path information units that neither originate from, nor are destined for, network accessible units in that node.

intermediate session. In APPN, a session which has been routed through an APPN network node, but the origin and destination LUs are not located in the network node.

intermediate session routing (ISR). A type of intermediate routing function provided by an APPN network node that provides session-level outage reporting and flow control for all routes passing through it.

International Organization for Standardization (ISO). An organization of national standards bodies from various countries established to promote development of standards to facilitate international exchange of goods and services, and develop cooperation in intellectual, scientific, technological, and economic activity.

K

keyboard definition. A customizing procedure for defining a maximum of four modified keyboard layouts for modifiable keyboards only. Most characters, symbols, and functions can be relocated, duplicated, or deleted from almost any keyboard position. Synonym for *modify keyboard*.

kilobit (Kb). One thousand binary digits.

kilobyte (KB). 1024 bytes for processor and data storage (memory) size; otherwise, 1000 bytes.

L

LAN segment. (1) Any portion of a LAN (for example, a single bus or ring) that can operate independently but is connected to other parts of the establishment network via bridges. (2) An entire ring or bus network without bridges.

large cluster. In 3174, the specific models of the controller that support attachment of up to 64 IBM 3270 Terminals.

layer. (1) One of the seven levels of the Open Systems Interconnection reference model. (2) In open systems architecture, a collection of related functions that comprise one level of hierarchy of functions. Each layer specifies its own functions and assumes that lower level functions are provided. (3) In SNA, a grouping of related functions that are logically separate from the functions of other layers. Implementation of the functions in one layer can be changed without affecting functions in other layers.

leased line. Synonym for *nonswitched line*.

LEN end node. See *low-entry networking (LEN)* .

LEN node. Synonym for *LEN end node*.

Library (LIB) diskette. A diskette that contains customizing data for some or all of the controllers in a network.

limited broadcast. The forwarding of specially designated broadcast frames only by bridges that are enabled to forward them.

Limited Function Utility (LFU) diskette. A diskette that contains the microcode to run only a limited number of utilities. These are: Diagnostics, Copy Files, Encrypt/Decrypt Master Key, Identify Customizing Keyboard, and Media Management. The Limited Function Utility diskette is used mainly in networks that are under central site control.

line speed. (1) The rate at which data is transmitted from one point to another over a telecommunication line. (2) The number of binary digits that can be sent over a telecommunication line in 1 second, expressed in bits per second (bps).

link. (1) The logical connection between nodes including the end-to-end link control procedures. (2) The combination of physical media, protocols, and programming that connects devices on a network. (3) In computer programming, the part of a program, in some cases a single instruction or an address, that passes control and parameters between separate portions of the computer program. (4) To interconnect items of data or portions of one or more computer programs. (5) In SNA, the combination of the link connection and link stations joining network nodes.

link connection. (1) All physical components and protocol machines that lie between the communicating link stations of a link. The link connection may include a switched or leased physical data circuit, a LAN, or an X.25 virtual circuit. (2) In SNA, the physical equipment providing two-way communication and error correction and detection between one link station and one or more other link stations.

link station. (1) A specific place in a service access point (SAP) that enables an adapter to communicate with another adapter. (2) A protocol machine in a node that manages the elements of procedure required for the exchange of data traffic with another communicating link station. (3) A logical point within a SAP that enables an adapter to establish connection-oriented communication with another adapter. (4) In SNA, the combination of hardware and software that allows a node to attach to and provide control for a link.

lobe. In the IBM Token-Ring Network, the section of cable (which may consist of several cable segments) that connects an attaching device to an access unit.

local. Pertaining to a device accessed directly without use of a telecommunication line. Synonym for *channel-attached*. Contrast with *remote*.

local area network (LAN). A computer network located on a user's premises within a limited geographical area.

Note: 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.

local format storage. In the 3174, this function allows the controller to store pre-defined formatted screens and subsequently be viewed by a terminal user. The formatted screens are downloaded from the host into the 3174.

local topology database. A database in a type 2.1 node containing an entry for each transmission group (TG) having at least one end node for an endpoint. In an end node, the database has one entry for each TG connecting to the node. In a network node, the database has an entry for each TG connecting the network node to an end node. Each entry describes the current characteristics of the TG that it represents. A network node has both a local and a network topology database while an end node has only a local topology database.

locally administered address. An adapter address that the user can assign to override the universally

administered address. Contrast with *universally administered address*.

Locate search. The means directory services in a node uses to find a resource that is not in that node. The Locate search enables directory services to ask the directory services components in other APPN nodes for information on the target resource.

location. With reference to a 3174, a place within the 3174 chassis where a particular card or adapter is inserted.

logical connection. In a network, devices that can communicate or work with one another because they share the same protocol. See also *physical connection*.

logical link control (LLC) sublayer. One of two sublayers of the ISO Open Systems Interconnection data link layer (which corresponds to the SNA data link control layer), proposed for LANs by the IEEE Project 802 Committee on Local Area Networks and the European Computer Manufacturers Association (ECMA). It includes those functions unique to the particular link control procedures that are associated with the attached node and are independent of the medium; this allows different logical link protocols to coexist on the same network without interfering with each other. The LLC sublayer uses services provided by the medium access control (MAC) sublayer and provides services to the network layer.

logical terminal (LT). In MLT, one of five sessions available to share one display station.

logical unit (LU). A type of network accessible unit that enables end users to communicate with each other and gain access to network resources.

low-entry networking (LEN). A capability in type 2.1 nodes allowing them to be directly attached to one another using peer-to-peer protocols and allowing them to support multiple and parallel sessions between logical units.

low-entry networking end node. A type 2.1 end node that provides:

> SNA end-user services

> Attaches directly to other T2.1 nodes using peer protocols

> Derives network services implicitly from an adjacent network node when attached to an APPN network without a session between its local control point (CP) and another CP;

A low-entry networking end node can also attach to a subarea network as a peripheral node.

LU-LU session. A session between two logical units (LUs) in an SNA network. It provides communication between two end users, or between an end user and an LU services component.

LU type. The classification of an LU in terms of the specific subset of SNA protocols and options it supports for a given session, namely:

- The mandatory and optional values allowed in the session activation request.

- The usage of data stream controls, function management headers (FMHs), request unit parameters, and sense data values.

- Presentation services protocols such as those associated with FMH usage.

LU types 0, 1, 2, 3, 4, 6.1, 6.2, and 7 are defined.

LU type 6.2 (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 processing, and (d) a generic application program interface consisting of structured verbs that are mapped into a product implementation.

M

management services (MS). One of the types of network services in control points and physical units. Management services are the services provided to assist in the management of SNA networks, such as problem management, performance and accounting management, configuration management, and change management.

management services focal point (MSFP). For any given management services discipline (for example, problem determination or response time monitoring), the control point that is responsible for that type of network management data for a sphere of control. This responsibility may include storing or displaying the data or both. (For example, a problem determination focal point is a control point that stores and displays problem determination data).

main storage. Program-addressable storage from which instructions and other data can be loaded directly into registers for subsequent processing.

maintenance analysis procedure (MAP). A maintenance document that gives an IBM service representative a step-by-step procedure for tracing a symptom to the cause of a failure.

make-break key. On a control unit terminal (CUT) device, a key that sends a signal to the control unit, invoking a function, both when the key is first pressed down (make) and again when it is released (break).

X-20

manual answering. (1) Answering in which a call is established only if the called user signals a readiness to receive the call by means of a manual operation. (2) Operator actions to prepare a station to receive a call on a switched line. Contrast with *automatic answering*.

manual calling. (1) Calling that permits the entry of selection signals from a calling data station at an undefined character rate. (2) Operator actions to place a call over a switched line. Contrast with *automatic calling*.

mark. A symbol or symbols that indicate the beginning or the end of a field, a word, an item of data or a set of data such as a file, record, or block.

medium. A physical carrier of electrical or optical energy.

Medium Access Control (MAC) frame. Frames that control the operation of the IBM Token-Ring Network and any ring station operations that affect the ring.

medium access control (MAC) protocol. In a local area network, the part of the protocol that governs access to the transmission medium independently of the physical characteristics of the medium, but taking into account the topological aspects of the network, in order to enable the exchange of data between data stations.

medium cluster. In 3174, the specific models of the controller that support attachment of up to 16 IBM 3270 Terminals.

megabit (Mb). A unit of measure for throughput. 1 megabit = 1 048 576 bits.

megabyte (MB). A unit of measure for data. 1 megabyte = 1 048 576 bytes.

memory. Program-addressable storage from which instructions and other data can be loaded directly into registers for subsequent execution or processing. Synonymous with *main storage*.

microcode. (1) One or more microinstructions. (2) A code, representing the instructions of an instruction set, that is implemented in a part of storage that is not program-addressable. (3) To design, write, and also to test one or more microinstructions.

mode name. The name used by the initiator of a session to designate the characteristics desired for the session, such as traffic pacing values, message-length limits, sync point and cryptography options, and the class of service within the transport network.

modem (modulator/demodulator). 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.

modify keyboard. Synonym for *keyboard definition*.

modulation. (1) The process by which a characteristic of a signal is varied according to a characteristic of another signal. (2) The process by which a message signal is impressed upon a carrier signal so that the carrier is altered to represent the message signal.

multidrop (network). A network configuration in which there are one or more intermediate nodes on the path between a central node and an endpoint node.

multi-host support. In the 3174, the ability of a terminal to access more than one host at a time.

multiple logical terminal (MLT). In the 3174, a function that provides a CUT-attached, fixed-function display station with the ability to interact with as many as five host sessions. Each session is processed as though it were a separate display station.

multipoint. Pertaining to communication among more than two stations over a single telecommunication line.

N

name. An alphanumeric term that identifies a data set, statement, program, or cataloged procedure.

native mode. A 3179 or 3180 operational mode that uses the full capabilities of those models' display and keyboard.

NetView. A host-based IBM licensed program that provides communication network management (CNM) or communications and systems management (C&SM) services. It supersedes NCCF, NPDA, NLDM, and NPM.

network. (1) A configuration of data processing devices and software connected for information interchange. (2) An arrangement of nodes and connecting branches. Connections are made between data stations.

network administrator. A person who manages the use and maintenance of a network.

Network Control Program (NCP) node. In SNA products, a subarea node that contains an ACF/NCP program but not a system services control point (SSCP).

network node (NN). A node that can define the paths or routes, control route selection, and handle directory services for APPN.

network node server. An APPN network node that provides network services for its local LUs and adjacent end nodes.

Network Problem Determination Application (NPDA). An IBM licensed program that helps the user identify network problems from a central control point using interactive display techniques.

Network Site Controller. In 3174, any 3174 that is configured for central site change management, but does not contain the central site library. Contrast with *central site controller* .

node. An endpoint of a link or 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.

node type. A designation of a node according to the protocols it supports and the network accessible units that it can contain. Five types are defined: 1, 2.0, 2.1, 4, and 5. Within a subarea network, type 1, type 2.0, and type 2.1 nodes are peripheral nodes, while type 4 and type 5 nodes are subarea nodes.

nonescaping key. A key that allows a character to be typed without the imprint position being changed.

NRZI. (1) Non-return-to-zero inverted transmission. (2) Non-return-to-reference transmission in which the zeros are represented by a bit cell boundary transition in the information signal, and ones are represented by the absence of a bit cell boundary transition.

nonswitched line. (1) A connection between systems or devices that does not have to be made by dialing. Contrast with *switched line*. (2) A telecommunication line on which connections do not have to be established by dialing. Synonymous with *leased line*.

null modem. A device with two 25-pin D-shell connectors that attaches to the station end of a standard, straight-through, pin-for-pin EIA 232D cable. The null modem does the crossing-over of the appropriate EIA 232D leads required for the direct connection of a terminal or computer to an AEA port.

O

online test. A diagnostic test or data collection program that is run without interrupting the normal operation of the 3174 and its associated terminals.

open. (1) To make an adapter ready for use. (2) A break in an electrical circuit. (3) To make a file ready for use.

operator information area (OIA). The area below the line near the bottom of the display area where graphics and alphanumeric characters are displayed to define the status of the terminal or the system to the operator.

optical cable. A fiber, multiple fibers, or a fiber bundle in a structure built to meet optical, mechanical, and environmental specifications.

optical fiber. Any filament made of dielectric materials that guides light, regardless of its ability to send signals. See also *fiber optics*.

option. (1) A specification in a statement, a selection from a menu, or a setting of a switch, that may be used to influence the execution of a program. (2) A hardware or software function that may be selected or enabled as part of a configuration process. (3) A piece of hardware (such as a network adapter) that can be installed in a device to modify or enhance device function.

original equipment manufacturer (OEM). A manufacturer of equipment that may be marketed by another manufacturer.

P

pacing. (1) A technique by which a receiving station controls the rate of transmission of a sending station to prevent overrun. (2) In SNA, a technique by which a receiving component controls the rate of transmission of a sending component to prevent overrun or congestion.

packet. (1) In data communication, a sequence of binary digits, including data and control signals, that is transmitted and switched as a composite whole. (2) Synonymous with *data frame*. Contrast with *frame*.

parallel. (1) Pertaining to a process in which all events occur within the same interval of time, each handled by a separate but similar functional unit; for example, the parallel transmission of the bits of a computer word along the lines of an internal bus. (2) Pertaining to concurrent or simultaneous operation of two or more devices or to concurrent performance of two or more activities in a single device. (3) Pertaining to concurrent or simultaneous occurrence of two or more related activities in multiple devices or channels. (4) Pertaining to the simultaneity of two or more processes. (5) Pertaining to the simultaneous processing of the individual parts of a whole, such as the bits of a character and the characters of a word, using separate facilities for the various parts. (6) Contrast with *serial*.

parallel sessions. Two or more concurrently active sessions between the same two network accessible units using different pairs of network addresses or local-form session identifiers. Each session can have independent session parameters.

parameter. (1) A variable that is given a constant value for a specified application and that may denote the application. (2) An item in a menu for which the user specifies a value or for which the system provides a value when the menu is interpreted. (3) Data passed between programs or procedures.

parity. (1) A transmission error-checking scheme in which an extra bit is added to some unit of data, usually a byte, in order to make the total number of one bits even or odd. For the AEA feature, odd, even, mark, space, or no-parity coding is supported. No-parity means that no parity bit is sent or expected. Mark and space mean that the parity position is always set to one or zero, respectively, and that received parity is not checked. (2) The state of being either even-numbered or odd-numbered.

parity bit. (1) A binary digit appended to a group of binary digits to make the sum of all the digits, including the appended binary digit, either odd or even as pre-established. (2) A check bit appended to an array of binary digits to make the sum of all the binary digits, including the check bit, always odd or always even.

parity (even). A condition when the sum of all of the digits in an array of binary digits is even.

parity (odd). A condition when the sum of all of the digits in an array of binary digits is odd.

password. In computer security, a string of characters known to the computer system and a user, who must specify it to gain full or limited access to a system and to the data stored within it.

path. In a network, a route between any two nodes.

path information unit (PIU). A message unit consisting of a transmission header (TH) alone, or of a TH followed by a basic information unit (BIU) or a BIU segment. See also *transmission header.*

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 is a type 1, 2.0, or 2.1 node connected to a subarea node with boundary function within a subarea.

physical connection. (1) A connection that establishes an electrical circuit. (2) In ACF/VTAM, a point-to-point connection or multipoint connection.

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.

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. (2) Interrogation of devices for such purposes as to avoid contention, to determine operational status, or to determine readiness to send or receive data.

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.

Port Expansion Feature. In the 3174, an optional feature that allows up to 32 additional 3270 type terminals to be attached. This feature provides a new terminal adapter for specific large-cluster models of the 3174.

port pools. A port set that offers multiple access points to the same resource.

primary logical unit (PLU). In SNA, the logical unit (LU) that contains the primary half-session for a particular LU-LU session. Contrast with *secondary logical unit.*

printer authorization matrix (PAM). A matrix stored in the controller that establishes printer assignment and classification.

program access (PA) key. On a display device keyboard, a key that produces a call to a program that performs display operations. See also *program function (PF) key.*

program attention key. On a display device keyboard, a key that produces an interruption to solicit program action. See also *program access (PA) key* and *program function (PF) key.*

program function (PF) key. On a display device keyboard, a key that passes a signal to a program to call for a particular display operation. See also *program access (PA) key.*

programmable symbols (PS). Customer-defined symbols. There are a maximum of 190 symbols in a programmed symbol set.

programmed symbols (PS). In the 3270 Information Display System, an optional feature that stores up to six user-definable, program-loadable character sets of 190 characters each in terminal read/write storage for display or printing by the terminal.

protected field. (1) In word processing, preset data or an area that cannot be changed or overridden by an operator without altering the program. (2) On a display device, a display field in which a user cannot enter, modify, or erase data. Contrast with *unprotected field.*

protocol. (1) A set of semantic and syntactic rules that determines the behavior of functional units in achieving communication. (2) In SNA, the meanings of and the sequencing rules for requests and responses used for managing the network, transferring data, and synchronizing the states of network components. (3) A specification for the format and relative timing of information exchanged between communicating parties.

put. In 3174 central site customizing, to store data from the working copy into a library member.

R

register. A storage device having a specified storage capacity such as a bit, byte, or computer word, and usually intended for a special purpose.

remote. Pertaining to a system, program, or device that is accessed through a telecommunication line.

remove. (1) To take an attaching device off a network. (2) To stop an adapter from participating in passing data on a network.

request for price quotation (RPQ). An alteration or addition to the functional capabilities that the controller provides.

request header (RH). Control information preceding a request unit. See also *request/response header*.

request/response header (RH). Control information, preceding a request/response unit (RU), that specifies the type of RU (request unit or response unit) and contains control information associated with that RU.

request/response unit (RU). A generic term for a request unit or a response unit. See also *request unit* and *response unit*.

request unit (RU). A message unit that contains control information, end-user data, or both.

response field. On a display device, a specified area on the display space where the user can enter, modify, or erase response data.

response header (RH). A header, optionally followed by a response unit, that indicates whether the response is positive or negative and that may contain a pacing response.

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 a Bind), or if negative, contains sense data defining the exception condition.

Response Time Monitor (RTM). A network management tool that measures and records the transaction times of inbound host attention (AID) operations from display stations that communicate with the host.

ring in (RI). In the IBM Token-Ring Network, the receive or input receptacle on an access unit or repeater. Contrast with *ring out*.

ring network. A network configuration in which a series of attaching devices is connected by unidirectional transmission links to form a closed path. A ring of an IBM Token-Ring Network is referred to as a LAN segment or as a Token-Ring Network segment.

ring out (RO). In an IBM Token-Ring Network, the transmit or output receptacle on an access unit or repeater.

ring segment. A ring segment is any section of a ring that can be isolated (by unplugging connectors) from the rest of the ring. A segment can consist of a single lobe, the cable between access units, or a combination of cables, lobes, and/or access units.

route. 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.

Route Selection control vector (RSCV). A X'2B' control vector that describes a route in an APPN network. The RSCV consists of an ordered sequence of control vectors — either TG Descriptor (X'46') control vectors (when carried in the Bind RU) or Network-Qualified Name (X'0E') control vectors (when carried in the Locate search message) — that identify the TGs and nodes that make up the path from an origin node to a destination node.

route selection services (RSS). A type 2.1 facility that determines the preferred route between a specified pair of nodes for a given class of service.

router. 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*.

routing. (1) The assignment of the path by which a message will reach its destination. (2) 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.

S

scroll. To move all or part of the display image vertically or horizontally to display data that cannot be observed within a single display image.

secondary logical unit (SLU). In SNA, the logical unit (LU) that contains the secondary half-session for a particular LU-LU session. Contrast with *primary logical unit.*

segment. A section of cable between components or devices on the network. A segment may consist of a single patch cable, multiple patch cables connected, or a combination of building cable and patch cables connected.

serial. (1) Pertaining to a process in which all events occur one after the other; for example, serial transmission of the bits of a character according to V24 CCITT protocol. (2) Pertaining to the sequential or consecutive occurrence of two or more related activities in a single device or channel. (3) Pertaining to the sequential processing of the individual parts of a whole, such as the bits of a character or the characters of a word, using the same facilities for successive parts. (4) Contrast with *parallel.*

server. (1) A device, program, or code module on a network dedicated to providing a specific service to a network. (2) On a LAN, a data station that provides facilities to other data stations. Examples are a file server, print server, and mail server.

service access point (SAP). (1) A logical point made available by an adapter where information can be received and transmitted. A single SAP can have many links terminating in it. (2) In Open Systems Interconnection (OSI) architecture, the logical point at which an n + 1-layer entity acquires the services of the n-layer. For LANs, the n-layer is assumed to be data link control (DLC). A single SAP can have many links terminating in it. These link "end-points" are represented in DLC by link stations.

session. (1) In network architecture, an association of facilities necessary for establishing, maintaining, and releasing connections for communication between stations. (2) In MLT, synonymous with logical terminal (LT). (3) In SNA, a logical connection between two network addressable units that can be activated, tailored to provide various protocols, and deactivated as requested.

session limit. (1) In SNA, the maximum number of concurrently active LU-LU sessions that a particular logical unit (LU) can support. (2) For the 3174 AEA, the total number of logical terminals or defined AEA default destinations for an AEA port set.

session services. One of the types of network services in the control point (CP) and in the logical unit (LU). These services provide facilities for an LU or a network operator to request that a control point (an ENCP or NNCP) assist with initiating or terminating sessions between logical units.

shared access transport facility (SATF). A transmission facility, such as a multipoint link connection, a public switched network, or a token-ring, on which multiple pairs of nodes can form concurrently active links.

simulation. (1) The representation of selected characteristics of the behavior of one physical or abstract system by another system. In a digital computer system, simulation is done by software; for example, (a) the representation of physical phenomena by means of operations performed by a computer system, and (b) the representation of operations of a computer system by those of another computer system. (2) Contrast with *emulation.*

single link multi-host support. In the 3174, the ability of a terminal to access multiple hosts over a single physical link connected to the IBM Token-Ring Network, an X.25 Network, or an Enterprise Systems Connection Director.

single-route broadcast. The forwarding of specially designated broadcast frames only by bridges which have single-route broadcast enabled. If the network is configured correctly, a single-route broadcast frame will have exactly one copy delivered to every LAN segment in the network. Synonymous with *limited broadcast.*

small cluster. In 3174, the specific models of the controller that support attachment of up to 8 IBM 3270 Terminals.

SNA character string (SCS). A character string composed of EBCDIC controls, optionally intermixed with end-user data, that is carried within a request/response unit.

solid state component. A component whose operation depends on control of electric or magnetic phenomena in solids, for example, a transistor, crystal diode, or ferrite core.

sort. In 3174 central site customizing, to arrange a list of library members according to date, name, or microcode level.

station. (1) 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. (2) A location in a device at which an operation is

performed, for example, a read station. (3) In SNA, a link station.

stop bit. Synonym for *stop signal*.

stop signal. In start-stop transmission, a signal at the end of a character that prepares the receiving device for reception of a subsequent character. Synonymous with *stop bit*.

storage. A unit into which recorded text can be entered, in which it can be retained and processed, and from which it can be retrieved. See also *memory*.

structured field. A data stream format that permits variable-length data and controls to be parsed into its components without having to scan every byte.

subarea. A portion of the SNA network consisting of a subarea node, any attached peripheral nodes, and their associated resources. Within a subarea node, all network accessible units, 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.

subsystem. A secondary or subordinate system, or programming support, usually capable of operating independently of or asynchronously with a controlling system. The 3174 and its attached terminals are an example of a subsystem.

Suppress Index (SI) order. An order that generates the suppress index character, valid only for the 3288 Model 2 printer. This character inhibits a line index to allow overprinting.

switched line. A telecommunication line in which the connection is established by dialing. Contrast with *nonswitched* line.

synchronous. (1) Pertaining to two or more processes that depend on the occurrences of a specific event, such as common timing signal. (2) Occurring with a regular or predictable time relationship.

Synchronous Data Link Control (SDLC). A discipline conforming to subsets of the Advance 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. See also *binary synchronous communication (BSC)*.

synonym. A code point that is supported only by a device that contains an extended attribute buffer (EAB).

For devices without an EAB, synonyms are translated to hyphens.

system configuration. A process that specifies the devices and programs that form a particular data processing system.

system generation (SYSGEN). The process of selecting optional parts of an operating system and of creating a particular operation system tailored to the requirements of a data processing installation. System generation enables a host computer to identify and communicate with the I/O devices connected to it.

system services control point (SSCP). In SNA, the focal point within an SNA network for managing the configuration, coordinating network operator and problem determination requests, and providing directory support and other session services for end users of the network. Multiple SSCPs, cooperating as peers, can divide the network into domains of control, with each SSCP having a hierarchical control relationship to the physical units (PUs) and logical units (LUs) within its domain.

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.

T

telecommunication-attached. Pertaining to the attachment of devices by teleprocessing lines to a host processor. Synonym for *remote*. Contrast with *channel-attached*.

telecommunication control unit. See *communication controller*.

terminal. In data communication, a device, usually equipped with a keyboard and display device, capable of sending and receiving information.

terminal adapter (TA). In the 3174, an adapter that provides control for a maximum of 32 terminals per adapter. The maximum number of terminals that can be connected depends on the model of the 3174.

terminal component. A separately addressable part of a terminal that performs an input or output function, such as the display component of a keyboard-display device or a printer component of a keyboard-printer device.

terminal emulation. The capability of a microcomputer, personal computer, 3270 CUT mode display station, 3270 printer, ASCII display station, or ASCII printer to operate as if it were a particular type of terminal linked to a processing unit and to access data.

terminal multiplexer. A device, such as the 3299 Terminal Multiplexer, for interleaving the signals for many devices onto a single cable.

terminal multiplexer adapter (TMA). This adapter is connected to the terminal adapter in the 3174 and provides control for a maximum of eight terminals.

terminal node. (1) In a hierarchical data base, a node that has no subordinate records or segments. (2) In SNA products, a peripheral node that is not user-programmable and has less processing capability than a cluster controller node. Examples are nodes consisting of the IBM 3277 Data Station, 3767 Communication Terminal, 3614 Consumer Transaction Facility, and 3624 Consumer Transaction Facility.

terminal port. (1) In a network, the functional unit of a node through which data can enter or leave the network. (2) The part of a processor that is dedicated to a single data channel for the purpose of receiving data from or transferring data to one or more external or remote devices.

terminal type menu. A list of all the available names and terminal types for a given port.

threshold. (1) A level, point, or value above which something is true or will take place and below which it is not true or will not take place. (2) In IBM bridge programs, a value set for the maximum number of frames that are not forwarded across a bridge due to errors, before a "threshold exceeded" occurrence is counted and indicated to network management programs. (3) An initial value from which a counter is decremented to zero, or a value to which a counter is incremented or decremented from an initial value. When the counter reaches zero or the threshold value, a decision is made and/or an event occurs.

time-out. (1) An event that occurs at the end of a predetermined period of time that began at the occurrence of another specified event. (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. (3) A terminal feature that logs off a user if an entry is not made within a specified period of time.

to drive. The drive that receives the transferred data.

token. A sequence of bits passed from one device to another on the token-ring network that signifies permission to transmit over the network. It consists of a starting delimiter, an access control field, and an end delimiter. The access control field contains a bit that indicates to a receiving device that the token is ready to accept information. If a device has data to send along the network, it appends the data to the token. When data is appended, the token then becomes a frame. See *frame*.

token ring. A network with a ring topology that passes tokens from one attaching device (node) to another. A node that is ready to send can capture a token and insert data for transmission.

token-ring network. (1) A ring network that allows unidirectional data transmission between data stations by a token-passing procedure over one transmission medium so that the transmitted data returns to and is removed by the transmitting station. The IBM Token-Ring Network is a baseband LAN with a star-wired ring topology that passes tokens from network adapter to network adapter. (2) A network that uses a ring topology, in which tokens are passed in a sequence from node to node. A node that is ready to send can capture the token and insert data for transmission. (3) A group of interconnected token rings.

topology. The physical or logical arrangement of nodes in a computer network. Examples include ring topology and bus topology.

topology and routing services (TRS). An APPN control point component that manages the topology data base and computes routes.

trace. (1) A record of the execution of a computer program. It exhibits the sequences in which the instructions were executed. (2) A record of the frames and bytes transmitted on a network.

transaction. In an SNA network, an exchange between two programs that usually involves a specific set of initial input data that causes the execution of a specific task or job. Examples of transactions include the entry of a customer's deposit that results in the updating of the customer's balance, and the transfer of a message to one or more destination points.

translate table. A table that defines the translation of ASCII to EBCDIC and EBCDIC to ASCII and that allows the use of special characters and nonstandard codes.

transmission control unit (TCU). A communication control unit whose operations are controlled solely by programmed instructions from the computing system to which the unit is attached. No program is stored or executed in the unit, for example, the IBM 2702 and 2703 Transmission Controls. Contrast with *communication controller*. Synonymous with *telecommunication control unit*.

transmission group (TG). A group of links between adjacent subarea nodes appearing as a single logical link for routing of messages. A transmission group may consist of one or more SDLC links (parallel links) or of a single System/370 channel. In APPN, transmission group is synonymous with *link*.

Transmission group weight. A quantitative measure of how well the values of a transmission group's (TG's)

characteristics satisfy the criteria specified by the class-of-service definition, as computed during route selection for a session. If the TG does not satisfy the criteria specified by the class-of-service definition, it is assigned an infinite weight.

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.

transmitter. See *universal receiver-transmitter.*

transparency. See *transparent*

transparent. (1) Pertaining to operations or data that are of no significance to the user. (2) In data transmission, pertaining to information not recognized by the receiving program or device as transmission control characters.

type. In the 3174, the identifying number of a card. For example, 9150 is a type number of the terminal adapter in the 3174.

type 1 communication adapter. The 3174 adapter that supports communication between the 3174 (and its terminals) and a host over telecommunication links using any of these interfaces: (a) EIA 232D/V.24 and V.35 for SNA/SDLC, (b) BSC, and (c) X.25. The user selects the appropriate interface.

type 2 communication adapter. The 3174 adapter that supports communication between the 3174 (and its terminals) and a host over telecommunication links using either the X.21 interface for SNA/SDLC or the X.25 interface. The user selects the interface.

type 2.0 node. A node that attaches to a subarea network as a peripheral node and provides full end-user services but no intermediate routing services.

type 2.1 (T2.1) node. An SNA node that can be configured as an endpoint or intermediate routing node in a T2.1 network, or as a peripheral node attached to a subarea network.

U

unbind. In SNA, to deactivate a session between logical units.

unbind command. A command used to reset the protocols for a session. Contrast with *bind command.*

universal receiver-transmitter. A circuit used in asynchronous, synchronous, or synchronous/asynchronous data communication applications to provide all the necessary logic to recover data in a serial-in parallel-out fashion and to transmit data in a parallel-in serial-out fashion. It is usually duplex; that is, it can transmit and receive simultaneously with the option to handle various data word lengths.

universally administered address. The address permanently encoded in an adapter at the time of manufacture. All universally administered addresses are unique. Contrast with *locally administered address.*

unprotected field. A displayed field in which a user can enter, modify, or delete data. Contrast with *protected field.*

update. In 3174 central site customizing, to tailor a library member's customizing data, in working copy, and put it back to the library disk.

upgrade. In 3174 central site customizing, to select a library member and upgrade its data to the microcode level of the Central Site Customizing Utility disk.

upstream. (1) In the direction opposite to data flow or toward the source of transmission. (2) Toward the processor from an attached unit or end user. (3) Contrast with *downstream.*

Utility disk. A diskette or fixed disk that contains the microcode necessary to run various utilities, for example, to copy portions of a diskette for a backup diskette.

V

V.35 communication adapter. A communication adapter that can combine and send information on one line at speeds up to 64 kbps, and conforms to the CCITT V.35 standard.

variable. (1) In computer programming, a character or group of characters that refers to a value and, in the execution of a computer program, corresponds to an address. (2) A quantity that can assume any of a given set of values.

vector. One or more related fields of data, in a specified format. A quantity usually characterized by an ordered set of numbers.

version. A separate IBM-licensed program, based on an existing IBM-licensed program, that usually has significant new code or new function.

virtual circuit. Synonym for *virtual connection.*

X-28

virtual connection. (1) A connection between two nodes on the network that is established using the transport layer and that provides reliable data between nodes. (2) A logical connection established between two data terminal equipment (DTE) devices. Synonymous with *virtual circuit*.

virtual machine (VM). A functional simulation of a computer and its associated devices. Each virtual machine is controlled by a suitable operating system, for example, a conversational monitor system. VM controls concurrent execution of multiple virtual machines on one host computer.

virtual routing node. A representation of an end node's connectivity to a connection network defined on a shared-access transport facility, such as a token-ring.

virtual storage (VS). (1) The storage space that may be regarded as addressable main storage by the user of a computer system in which virtual addresses are mapped into real addresses. The size of virtual storage is limited by the addressing scheme of the computer system and by the amount of auxiliary storage available, not by the actual number of main storage locations. (2) Addressable space that is apparent to the user as the processor storage space, from which the instructions and the data are mapped into the processor storage locations.

W

workstation. (1) An I/O device that allows either transmission of data or the reception of data (or both) from a host system, as needed to perform a job: for example, a display station or printer. (2) A configuration of I/O equipment at which an operator works. (3) A terminal or microcomputer, usually one connected to a mainframe or network, at which a user can perform tasks.

wraparound. The continuation of an operation (for example, a read operation or a cursor movement operation) from the last character position in a buffer to the first character position in the buffer.

wrap test. A test that checks attachment or control unit circuitry without checking the mechanism itself by returning the output of the mechanism as input. For example, when unrecoverable communication adapter or machine errors occur, a wrap test can transmit a specific character pattern to or through the modem in a loop and then compare the character pattern received with the pattern transmitted.

write. To make a permanent or transient recording of data in a storage device or on a data medium.

write control character (WCC). A character used in conjunction with a Write command to specify that a particular operation, or combination of operations, is to be performed at a display station or printer.

Write Structured Field (WSF) command. A command used to transmit data in structured field format.

X

X.21. In data communication, a recommendation of the International Telegraph and Telephone Consultative Committee (CCITT) that defines the interface between data terminal equipment and public data networks for digital leases and circuit switched synchronous services.

X.21 communication adapter. A communication adapter that can combine and send information on one line at speeds up to 64 kbps, and that conforms to CCITT X.21 standards.

X.25. In data communication, a recommendation of the CCITT that defines the interface between data terminal equipment and packet switching networks.

3

3174 Peer Communication (3174-Peer). A network of personal computers, with adapter support and associated program interfaces, attached with 3270 wiring to a 3174 that has the associated microcode installed. The personal computers attached to the 3174 communicate as if they were Token-Ring LAN devices.

3270 data stream. (1) The commands, control codes, orders, attributes, and data or structured fields for 3270 devices, that are transmitted inbound to an application program or outbound to a terminal. (2) Data being transferred from or to an allocated primary or tertiary device, or to the host system, as a continuous stream of data and 3270 Information Display System control elements in character form.

3270 emulation. The use of a program that allows a device or system such as a personal computer or a System/38 to operate in conjunction with a host system as if it were a 3270-series display station or control unit.

3270 Port Expansion Feature. In the 3174, an optional terminal adapter and the required microcode that allows the 3174 to support an additional 32 terminals. This adapter is available only on large cluster models of the 3174.

Index

X-35

X-36

H

half-duplex SNBU operation   6-43
hardware setup, AEA   14-10
hardware, peer   13-6
hexadecimal polling address   6-9
high speed data transfer   6-39
HNAD (host network (DTE) address)   10-15
hop counts   13-5
host attachment
    ASCII   2-5
    Concurrent Communication Adapter   2-7
    ESCON Channel   2-8
    identifying to microcode   2-17
    multiple   2-6, 2-18
    remote link   2-5
    S/370 channel   2-4
    S/390 channel   2-4
    token-ring   2-4
    Token-Ring Single Link Multi-Host Support   2-8
    types of   2-4
    X.25 Single Link Multi-Host Support   2-9
Host Attachment worksheet   A-3
host attachment (101)   6-5
host configuration, CSCM   11-4
host connection menu option (725)   14-48
host connectivity   12-19
host considerations   12-15
host DTE address   10-13
host DTE address (423)   10-15
host filters, CECP   8-8
host mode, printer   15-8
host planning   4-1
    alerts   4-14
    bind extensions   4-17
    BSC protocol for IPDS printers   4-18
    channel protocol for IPDS printers   4-18
    coding macros   4-6
    CSCM   4-19
    CSCM microcode requirements   4-20
    CSCM system software requirements   4-20
    CSCM VTAM definitions   4-20
    downstream physical units   4-13
    error ID data   4-14
    gateway considerations   4-4
    IPDS printer support   4-18
    LU-1 pacing overruns   4-13
    machine type ID   4-14
    MVS/SP for gateway   4-5
    NCP for gateway   4-9
    NetView, RECFMS   4-15
    node ID block number, RECFMS   4-15
    overview of   4-3
    REQMS/RECFMS support   4-15
    RU sizes   4-16
    SDLC/X.25 attachment   4-17
    segmenting   4-5
    sense ID command, non-SNA   4-19

host planning (continued)
    SNA channel attachment   4-16
    SNA considerations   4-13
    SNA protocol for IPDS printers   4-18
    SNA SSCP/PU sessions   4-14
    SOEMI support   4-19
    system definitions, gateway   4-5
    unit control words for gateway   4-7
    VM/SP for gateway   4-6
    VSE for gateway   4-7
    VTAM for gateway   4-7
    VTAM hang-up   4-6
host printing operations   15-6
host system considerations   2-16, 4-3
hot key, personal computers (168)   6-31

I

I-frame size
    maximum inbound (370)   6-48
    transmit (382)   6-49
    transmit (941)   16-14
IBM ASCII host character set (776)   14-59
IBM COS defaults   12-36
IBM 3101 data stream, questions   14-58
    771 automatic line feed for cursor control   14-58
    772 carriage return/carriage return - line feed
        selection   14-58
    773 automatic new line for cursor control   14-59
    774 scrolling   14-59
    775 line turnaround character   14-59
Icelandic, language code   6-20
identification, physical unit (215)   6-36
identifier, connection   10-13, 10-14
identifier, logical channel (402)   10-10
identifier, machine (108)   6-14
IDs, keyboard   6-28
ID, network (501)   11-5
IMS/VS   6-34
inactivity timeout (742)   14-52
inbound sequence panels, UDT   14-74
inbound translation, UDX   14-82
incoming channel   10-9
    highest   10-9
    lowest   10-9
individual addresses, peer   13-5
individual port assignment (116)   6-18
information service, AEA   14-9
installation, device driver   13-7
intensity
    3290   6-33
intermediate route resources (IRR)   12-37
intermediate session routing   12-4, 12-9, 12-11
International, language code   6-20
introduction, APPN   2-11
IPDS printer support   4-18
    BSC and channel protocol   4-18
    SNA protocol   4-18

X-41

Special Characters

Readers' Comments

IBM 3174 Establishment Controller
Planning Guide
Configuration Support C Release 1

Publication No. GA27-3918-00

Use this form to tell us what you think about this manual. If you have found errors in it, or if you want to express your opinion about it (such as organization, subject matter, appearance) or make suggestions for improvement, this is the form to use.

To request additional publications, or to ask questions or make comments about the functions of IBM products or systems, you should talk to your IBM representative or to your IBM authorized remarketer. This form is provided for comments about the information in this manual and the way it is presented.

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

Be sure to print your name and address below if you would like a reply.

Name   Address

Company or Organization

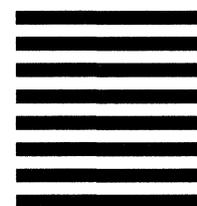Phone No.

IBM®

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

International Business Machines Corporation
Information Development
Department E02
P.O. Box 12195
Research Triangle Park, North Carolina 27709-9990

Fold and Tape   **Please do not staple**   Fold and Tape

GA27-3918-00

IBM